

# **An Investigation of Self-Care Practice and Social Support of Patients with Type 2 Diabetes in Saudi Arabia**

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# Table of Contents

<b>Dedication</b> .....	<b>i</b>
<b>Acknowledgements</b> .....	<b>ii</b>
<b>List of Figures</b> .....	<b>iii</b>
<b>List of Tables</b> .....	<b>iii</b>
<b>List of Appendices</b> .....	<b>iv</b>
<b>List of Abbreviations</b> .....	<b>vi</b>
<b>Abstract</b> .....	<b>vii</b>
<b>INTRODUCTION</b> .....	<b>1</b>
<b>CHAPTER 1: THE RESEARCH CONTEXT: SAUDI ARABIA AND T2DM TRENDS</b> .....	<b>12</b>
1.1. Introduction .....	12
1.2. Overview of Saudi Arabia .....	12
1.2.1. Saudi Arabia: Summary .....	12
1.2.2. The religious and cultural background of Saudi Arabia .....	13
1.2.3. Saudi Culture and Islam .....	14
1.2.4. Gender Roles in Saudi Arabia.....	16
1.2.5. Economic overview .....	18
1.2.6. Healthcare System in Saudi Arabia.....	18
1.2.7. Levels of Healthcare Services in the MOH.....	19
1.2.8. Diabetes Mellitus in Saudi Arabia .....	20
1.2.9. Healthcare Services for Diabetes Mellitus Patients in Saudi Arabia .....	21
1.3. The prevalence of T2DM and the pathophysiological processes seen in T2DM.....	23
1.3.1. The prevalence of T2DM .....	23

1.3.2. Pathophysiology of T2DM.....	23
1.3.3. Prevalence of type 2 diabetes mellitus in Saudi Arabia.....	25
1.3.4. Complications of type 2 diabetes in Saudi Arabia.....	26
1.3.5. Diagnosis of Diabetes Mellitus in Saudi Arabia.....	26
1.3.6. Risk factors for type 2 diabetes in Saudi Arabia.....	27
1.3.7. DM management in Saudi Arabia.....	31
1.4. Conclusion.....	35
<b>CHAPTER TWO: DIABETES SELF-CARE ACTIVITIES .....</b>	<b>36</b>
2.1. Introduction .....	36
2.2. Defining self-care .....	36
2.2.1. History of self-care.....	37
2.2.2. Empowerment: An overview .....	38
2.2.3. Diabetes self-care activities.....	39
2.2.4. Self-care Barriers.....	39
2.2.5. Overall Impact of Diabetes .....	47
2.3. Social Support .....	48
2.3.1. Social support definition .....	48
2.3.2. Sources of social support.....	50
2.4. Social Support Network.....	54
2.5. Adherence to T2DM self-care activities in Saudi Arabia.....	55
2.6. Conceptual Framework.....	56
2.6.1. Self-efficacy theory: An overview .....	56
2.6.2. Cohen’s social support theory .....	59
2.6.3. Self-care, self-efficacy theory, and social support theory .....	60
2.7. Conclusion.....	64
<b>CHAPTER THREE: LITERATURE REVIEW.....</b>	<b>65</b>
3.1. Introduction .....	65

3.2. Literature search strategies .....	65
3.3. Objectives of the comprehensive literature review .....	65
3.3.1. Research questions informed by the comprehensive literature review .....	66
3.3.2. A comprehensive literature review .....	66
3.3.3. Search strategy and process.....	66
3.4. Appraisal and quality review of the studies.....	71
3.5. Summary of analysis of themes and findings from the literature review .....	79
3.6. Conclusion .....	90
<b>CHAPTER FOUR: METHODOLOGY .....</b>	<b>92</b>
4.1. Introduction .....	92
4.2. Research philosophy.....	92
4.2.1. Ontology.....	93
4.2.2. Epistemology: pragmatism.....	94
4.3. Research approaches.....	96
4.3.1. Quantitative .....	96
4.3.2. Qualitative .....	96
4.3.3. Mixed Methods .....	96
4.4. Research design .....	98
4.5. Research Procedures.....	105
4.5.1. Ethical Considerations.....	105
4.5.2. Data Collection.....	107
4.6. Conclusion .....	124
<b>CHAPTER FIVE: FINDINGS .....</b>	<b>125</b>
5.1. Introduction .....	125
5.2. Profile of Participants .....	126
5.3. Findings .....	127
5.4. Similarities and differences in the results.....	181

5.5. Conclusion.....	183
<b>CHAPTER SIX: DISCUSSION .....</b>	<b>186</b>
6.1. Introduction .....	186
6.2. Patients with T2DM: adherence to self-care activities.....	187
6.3. The relationship between social support and adherence to self-care activities .....	192
6.4. Factors affecting self-care activities .....	196
6.5. Conclusion.....	208
<b>CHAPTER SEVEN: CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>212</b>
7.1. Introduction .....	212
7.2. Contribution to knowledge .....	212
7.3. Limitations.....	214
7.4. Recommendations for Policy .....	215
7.5. Recommendations for Practice.....	215
7.6. Dissemination Plan.....	216
7.7. Suggestions for future research .....	217
7.8. Reflexivity .....	218
7.9. Conclusion.....	222
<b>References.....</b>	<b>223</b>
<b>Appendices .....</b>	<b>265</b>

## **Dedication**

*By the grace and mercy of Allah.*

*This dissertation is dedicated to my loving family: to my mother for her kind words and wisdom, for always knowing the right thing to say and for guiding me through my life.*

*It is dedicated to the memory of the departed soul of my father “Ismile” who gave me his endless love, encouragement, and support every step of the way during my graduate education, and whose pride in my work has always inspired me to achieve.*

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## List of Figures

<b>Figure Number</b>	<b>Figure Name</b>	<b>Page Number</b>
<b>Figure 1</b>	Levels of Healthcare Services in the MOH in Saudi Arabia	20
<b>Figure 2</b>	Search results from included and excluded studies	70
<b>Figure 3</b>	The Research design map	102

## List of Tables

<b>Table Number</b>	<b>Table Name</b>	<b>Page Number</b>
<b>Table 1</b>	Inclusion and exclusion criteria	69
<b>Table 2</b>	Summary of literature findings	78
<b>Table 3</b>	Summary of themes from the literature review	80
<b>Table 4</b>	Characteristics of Expert Panel	114
<b>Table 5</b>	Example of Content Validity	114
<b>Table 6</b>	Thematic coding development process	122
<b>Table 7</b>	Profile of participants	126
<b>Table 8</b>	Themes and sub-themes	129
<b>Table 9</b>	Patients' diet in the last week	131
<b>Table 10</b>	Diabetes care team has discussed the need to reduce fat in diet	132
<b>Table 11</b>	Healthcare team recommendation to exercise	134
<b>Table 12</b>	Patients' exercise habits in the last week	135
<b>Table 13</b>	Medication to control diabetes	137
<b>Table 14</b>	Patients' medication and insulin consumption in the last week	138
<b>Table 15</b>	Medical teams' recommendations for testing blood sugar	140
<b>Table 16</b>	Frequency of testing blood sugar during the last week	141
<b>Table 17</b>	Patients' communication with chiropodist	143
<b>Table 18</b>	Patients' checking of their feet in the last week	144
<b>Table 19</b>	ANOVA table showing the significance of the differences between age groups across all self-care measures	145



<b>Table 20</b>	Independent samples t-test outcomes for gender effect on self-care measures	147
<b>Table 21</b>	ANOVA table showing the significance of the differences between marital status groups across all self-care measures	148
<b>Table 22</b>	ANOVA table showing the significance of the differences between education levels across all self-care measures	149
<b>Table 23</b>	ANOVA table showing differences across employment categories in self-care measures	150
<b>Table 24</b>	ANOVA showing differences between income categories in self-care measures	152
<b>Table 25</b>	Numbers of days in previous week: patients' self-care activity as recommended by the diabetes care teams as a percentage (%)	158
<b>Table 26</b>	Patients' diet in the last week	161
<b>Table 27</b>	Summary of quantitative and qualitative results	182

### List of Appendices

<b>Appendix Number</b>	<b>Appendix Name</b>	<b>Page Number</b>
<b>Appendix 1</b>	Search key terms	265
<b>Appendix 2</b>	Steps for the search strategy	266
<b>Appendix 3</b>	Summary of quantitative studies	267
<b>Appendix 4</b>	Summary of qualitative studies	276
<b>Appendix 5</b>	Summary of mixed method studies	283
<b>Appendix 6</b>	Study locations used for the literature review	286
<b>Appendix 7</b>	Ethical approval from Salford University	287
<b>Appendix 8</b>	Ethical approval from the MOH in Saudi Arabia	288
<b>Appendix 9</b>	Participant Study Information Sheet for people with T2DM and Arabic version	290
<b>Appendix 10</b>	Participant Study Information Sheet for Health Care Professional and Arabic version	295

<b>Appendix 11</b>	Questionnaire of diabetes self-care activities (SDSCA) and Arabic version	300
<b>Appendix 12</b>	Approval to use these SDSCA questionnaires was secured from the author	316
<b>Appendix 13</b>	Study Participant Consent Form and Arabic version	317
<b>Appendix 14</b>	Interview Guide, Interview questions for people with T2DM and Arabic version	319
<b>Appendix 15</b>	Interview Guide, Interview questions for healthcare professionals and Arabic version	329
<b>Appendix 16</b>	An example of the coding and data analysis process	332
<b>Appendix 17</b>	Example of transcript for one-to-one interview with HCPs	333
<b>Appendix 18</b>	Number of participants recruited for interviews	338
<b>Appendix 19</b>	Researcher Activity	340

## List of Abbreviations

<b>ADA</b>	<b>American Diabetes Association</b>
<b>CDCP</b>	Cardiovascular Disease Control Programme
<b>DESMOND</b>	Diabetes Education and Self-management for Ongoing and Newly Diagnosed
<b>DM</b>	Diabetes mellitus
<b>GCC</b>	Gulf Cooperation Council
<b>GDM</b>	Gestational Diabetes Mellitus
<b>GDNCD</b>	General Directorate of Non-Communicable Diseases
<b>HbA1c</b>	Glycated Haemoglobin
<b>HCPs</b>	Health Care Professionals
<b>IDF</b>	International Diabetes Federation
<b>MENA</b>	Middle-East and North Africa
<b>MOH</b>	Ministry of Health
<b>NCDs</b>	Non-communicable Diseases
<b>NDP</b>	National Diabetes Programme
<b>NICE</b>	National Institute for Health and Care Excellence
<b>OHA</b>	Oral hypoglycemic agent
<b>PHCC</b>	Primary Health Care Centre
<b>PPC</b>	Patient-Provider Communication
<b>QoL</b>	Quality of Life
<b>SDSCA</b>	Summary Diabetes Self-Care Activities
<b>SNP</b>	Saudi National Programme
<b>T1DM</b>	Type 1 Diabetes Mellitus
<b>T2DM</b>	Type 2 Diabetes Mellitus
<b>UAE</b>	United Arab Emirates
<b>UK</b>	United Kingdom
<b>USA</b>	United States of America
<b>USD</b>	United States Dollar
<b>WHO</b>	World Health Organization

## **Abstract**

**Background:** The prevalence of Type 2 Diabetes Mellitus (T2DM) is increasing globally, and the number of people with T2DM has increased particularly dramatically in Saudi Arabia in recent years. The International Diabetes Federation (IDF) has indicated that Saudi Arabia has a higher prevalence of diabetes than most other countries, with a prevalence rate of type 2 diabetes of 20.5% of the population in 2014. Adherence to self-care activities is the cornerstone of T2DM management, along with adopting a healthy lifestyle. This study thus aims to investigate the extent to which healthcare professionals and social support act as determinants of self-care among adults diagnosed with T2DM in Riyadh, Saudi Arabia.

**Methods:** This study uses a concurrent triangulation design that combines quantitative and qualitative methods in a convenience sample of adults (N=388) diagnosed with type 2 diabetes mellitus who were recruited from two separate hospitals. Each participant completed a set of questionnaires and a Summary of Diabetes Self-Care Activities (SDSCA). Semi-structured interviews were also conducted with 10 male and 10 female participants (n=20) and 12 healthcare professionals.

**Results:** Five themes emerged from the qualitative data analysis. The quantitative findings were then integrated to provide further explanations and context for these themes. The study indicated that poor adherence to diabetes self-care activities may lead to heightened incidence of uncontrolled T2DM among patients in Saudi Arabia. Culture and Religion, Gender, Stigma, Social Support, and Healthcare Environment all influenced adult diabetes adherence to self-care activities in Saudi Arabia.

**Conclusion:** The results of this study show that the successful management of T2DM is dependent on support from family, spouses, friends, and healthcare professionals. The findings of this study therefore have implications for the creation and implementation of healthcare policy and practice in Saudi Arabia. These findings contribute to expanding existing knowledge by enabling healthcare providers to tailor diabetes self-care management educational programmes to best fit the psycho-social and cultural needs of adults in Saudi Arabia. It is particularly necessary for healthcare professionals in Saudi Arabia to recognise the roles played by gender, culture, religion and stigma, and to integrate these into any educational programmes.

## **INTRODUCTION**

The prevalence of T2DM is currently increasing globally, particularly in Gulf Cooperation Council (GCC) countries. Among the ten countries worldwide with the highest prevalences of T2DM, six Arabic-speaking countries are included: Kuwait, Lebanon, Qatar, Saudi Arabia, Bahrain, and the United Arab Emirates (UAE) (Badran & Laher, 2012; IDF, 2011 and 2013); with the exception of Lebanon, these are all in the Gulf Region. This thesis contributes to the field of T2DM studies by focusing on investigating the extent to which healthcare professionals and social support act as determinants of self-care among adults diagnosed with T2DM in Riyadh, Saudi Arabia. The research examines the impact of several demographic factors, the role of social support, and the role of healthcare professionals in terms of improving adherence to self-care activities among Saudi patients with T2DM.

My road to undertaking this study has been long and involved, being based on more than twenty-five years' experience in a variety of nursing roles, including clinical and administrative positions within the Ministry of Health (MOH) in Saudi Arabia. My interest in nursing when I was 14 when I decided to follow my sister's career pathway. Her attitude towards nursing and caring for ill people inspired me to start my own nurse training in 1983 at King Saud Nursing College in Riyadh. I successfully completed this in 1989 and attained a Diploma in General Nursing. Thereafter, I was appointed as a general staff nurse, and undertook many roles in disciplines including gynaecology, antenatal care, and medical care. This experience provided me with a wide and varied set of nursing skills, enabling me to care for people diagnosed with a range of chronic conditions, including diabetes mellitus. I then took on the post of Head Nurse in antenatal care.

After three years, I was sponsored to undertake a Bachelor's degree in Nursing, which I successfully completed in 1998. Soon after that, I was promoted to Nursing Director at Al-Yamamah Hospital, Riyadh, Saudi Arabia. Between 2005 and 2007, I did my Master's Degree in Nursing Administration at King Saud University, Riyadh, and this qualification gave me the necessary knowledge to become a more able individual in terms of nursing leadership as well as nursing management. Having advanced knowledge through studying at a higher academic level further enhanced my passion for nursing practice based on evidence-based knowledge.

## **Involvement in diabetes mellitus**

My interest in diabetes has lasted throughout my nursing career, developed as I encountered and cared for many people diagnosed with diabetes mellitus. The incidence of this lifelong chronic metabolic disorder is rising at an alarmingly rapid pace in my country, and as a Hospital Nursing Director for the last 10 years, my work has been concerned with coordinating, planning, and directing the overall clinical nursing practices in the hospital, which includes managing such conditions. Administrative control and direction are maintained by fiscal and human resource management with the help of strategic plans for high quality care, yet one of the major issues with diabetes management is the lack of cooperation between the medical staff and the families of the people diagnosed with diabetes. Healthcare professionals believe that they are the experts, who know what is good for the patients' welfare, and they do not consult or collaborate with the recipient of such care or their family. Consequently, a one-sided prescriptive approach to care that reflects the medical model occurs, where direct advice is given and specific medications prescribed without the involvement of the person (Meetoo & Gopaul, 2005; Goff, Mazor, Meterko, Dodd & Sabin, 2008; Oshima Lee & Emanuel, 2013). Within the last 10 years, it has become evident that this approach does not promote adherence to diabetes self-care management, and the consequences of non-adherence include complications such as renal failure, which is also increasing in incidence. This in turn increases hospital admissions and bed occupancy in the haemodialysis unit.

Many questions have been raised with regard to this increase in incidence by many of the medical care teams, nutritionists, social workers, nurses and physicians involved in providing care to people with diabetes, and a number of steps have already been taken to remedy this situation. Nurses have been given training in diabetes care, yet this is not always the case for other healthcare providers (Holmes & Dyer, 2013), and the standard of care has thus not improved to the desired level. On a personal level, I made a conscious decision to bring about changes in how people with diabetes are managed by nurses, and after reading various works of literature in this field, I became aware that effective management of diabetes requires a multi-disciplinary approach. I also realised that healthcare professionals are only responsible for a small percentage of diabetes care; 95% of such care is managed by the person with diabetes. Furthermore, diabetes care does not take place in isolation. For self-care to be consistent and successful, the person with diabetes requires support not just

from the healthcare professionals but also from their family and social networks (Dean, 1989; Kadirvelu, Sadasivan & Ng, 2012).

To this end, I made a conscious decision to encourage changes, particularly as the prevalence of diabetes is rapidly increasing in Saudi Arabia, and undertaking a PhD to contribute to the evidence base represents the most effective course of action for a single individual.

## **An Investigation of Self-Care Practice and Social Support of Patients with Type 2 Diabetes in Saudi Arabia**

### **Significance**

In 2015, Saudi Arabia had 3.4 million diabetes diagnoses, making country's incidence of diabetes one of the highest in the world (Alanazi et al., 2017). More than 85% of diabetes cases internationally are type-2 cases, with a 5% incidence rate applying for all types of diabetes across the world. The possible advantages of diabetes self-management are clear, presenting greater proof for control of type-2 diabetes (Simon et al., 2008), as well as the encouragement of diabetes care self-management capabilities (Abu Sabbah & Al-Shehri, 2014). In particular, personal regulation of blood glucose could have a part to play in the positive self-regulation of diabetes as part of self-management (Sarkar et al., 2008; Majra & Acharya, 2009).

This study examines the impact of healthcare professionals and social support on the practise of diabetes self-care activities among Saudi patients seeking optimal management of their disease. The study findings may thus contribute to capacity building for individuals with T2DM and their healthcare professionals, and thereby improve patient outcomes.

### **Statement of the problem**

Diabetes mellitus (DM) is characterised by hyperglycaemia (high blood glucose levels), and may result from defects in insulin production, insulin action, or both (Kumar, Cotran, & Robbins, 2003). This chronic condition is one of the biggest health issues of the 21st century, as based on the available evidence from the American Diabetes Association [ADA] (2009a) and International Diabetes Federation [IDF] (2015), the number of people being diagnosed with this lifelong metabolic disorder is increasing yearly. Less than 10 percent of the diabetes population are known to have type 1 diabetes mellitus (T1DM), leaving 90 to 95%

affected with type 2 diabetes mellitus (T2DM) (ADA, 2009a; IDF, 2015). Current evidence suggests that this condition is the most prevalent form of diabetes and that this has increased alongside the introduction of cultural and societal changes (Goodwin, Curry, Naylor, Ross & Duldig, 2010; IDF, 2015). In high-income countries, up to 91% of adults with the disease have type 2 diabetes (IDF, 2015). In addition to the 415 million adults who are estimated as being currently diagnosed with diabetes, however, there are approximately 318 million individuals, about 1 in 15 adults, who have impaired glucose tolerance (IGT). This places these individuals at high risk of developing the disease in the future. Even more alarmingly, there are an estimated 193 million people whose existent diabetes has yet to be diagnosed (IDF, 2015). There was no significant gender difference in the global proportions of people with diabetes for 2015 or the projected numbers for 2040 (IDF, 2015), though overall, there are about 15.7 million more men than women with diabetes (215.2 million men vs 199.5 million women). This difference is expected to decrease to about 15.1 million more men than women (328.4 million men vs 313.3 million women) by 2040 (IDF, 2015).

The incidence of DM is reaching epidemic proportions in the Middle East and North Africa. In 2015, approximately 35.4 (24.3 to 47.4) million people, or 9.1% (6.3 to 12.2%) of adults aged 20 to 79, were living with diabetes in these areas (Sherif & Sumpio, 2015; IDF, 2015). Of these, two of every five adults with diabetes, around 14.4 million individuals, have undiagnosed T2DM (IDF, 2015), and while 54.9% of all adults in the region live in urban areas, 67.0% of people with diabetes live in these urban environments (IDF, 2015).

Arabic-speaking countries are not immune to chronic metabolic disorders, and there has been a rise in the prevalence of DM, and in particular T2DM, due to the rapid industrialisation that has taken place in these countries (Badran & Laher, 2012). This increase in Arab Gulf countries comes as a result of higher incomes in these countries since the discovery of oil. In Arab State countries, the prevalence rates vary between 4% and 21%, of which Somalia is the lowest and Kuwait the highest (Badran & Laher, 2012). As these economies have developed more quickly, people moving to urban areas have adopted lifestyles that include consuming food with high calories as well as engaging in more sedentary habits (Badran & Laher, 2012).

In addition, according to an IDF report from 2010, six Arabic-speaking countries were among the top ten countries worldwide in terms of prevalence of T2DM (Badran & Laher, 2012; IDF, 2011; IDF, 2013). In Kuwait, between 2000 and 2013, the prevalence of the



disease increased from 7% to 17.8%, while the rate of diabetes in 2014 was as high as 23.9% in Saudi Arabia, 23.1% in Kuwait, and 21.9% in Bahrain. In Qatar in that year, it was 19.8%, in the UAE it was 19%, and in Oman, the prevalence was 14.5% (The Economist Intelligence Unit Limited, 2015). In contrast, according to the IDF (2013), around 9.2% (34.6 million) of adults in the Middle East and North African regions (MENA) were estimated to have diabetes. The overall number was expected to reach 67.9 million by 2035, which would almost double the prevalence (IDF, 2013). Comparing the prevalence of diabetes in individual MENA countries, while the average is 11.3%, some countries have much lower prevalences, such as Algeria at 7.3% and Pakistan at 7.9%, while in Iran the prevalence is around 10%. In Arab Gulf countries, therefore, the prevalence of diabetes is much higher than the MENA average (The Economist Intelligence Unit Limited, 2015).

Global health expenditure for the treatment of diabetes and prevention of complications was estimated to range from US\$ 673 billion (R=2) to US\$ 1,197 billion (R=3) in 2015 (Alhowaish, 2013; IDF, 2015). By 2040, this figure is projected to rise from an average of US\$ 802 billion to the equivalent of US\$ 1,452 billion (IDF, 2015). Expressed in International Dollars (ID), which are used to correct for differences in purchasing power, global health spending on diabetes was estimated to be between ID 795 billion and ID 1,404 billion in 2015, and it is projected to be between ID 997 billion and ID 1,788 billion in 2040 (IDF, 2015).

DM places a heavy financial burden on individuals and their families due to the cost of insulin and other essential medications, yet diabetes also has a substantial economic impact on whole countries and their national healthcare systems (IDF, 2015; World Health Organization (WHO), 2016). This is due to increased use of health services, loss of productivity, and the need for long-term support to overcome complications associated with DM such as cardiac problems, kidney failure, and blindness. Most countries thus spend between 5 and 20% of their total health expenditure on DM management. Coming at such a high cost, the illness presents a notable challenge for any healthcare system and is an obstacle to sustainable economic development (IDF, 2015).

## **Overcoming the problem**

Based on these facts, it would seem logical that taking control of diabetes through self-care is important to prevent or minimise otherwise costly and often irreversible diabetes-related complications as well as to improve quality of life. However, self-care cannot take place in isolation. This places a spotlight on the need for ongoing structured education and additional support and motivation through social support for the many people with T2DM. Although new therapeutic interventions and technology have helped facilitate control of this condition in many individuals, the challenges of diabetes self-management remain overwhelming for many. Diabetes is a chronic disease in which proper glucose control demands several regular self-management behaviours such as monitoring blood glucose levels, taking medication, maintaining a healthy diet, participating in regular physical activity, and carrying out daily foot inspections (MacPherson, 2004; Heisler, 2007). However, a study carried out in Ghana found that only 8.6% of people reported adhering to a diet plan, while only 0.5% reported adherence to monitoring blood glucose levels (Mogre, Abanga, Tzelepis, Johnson & Paul, 2017). Thus, relatively high levels of non-adherence are seen in all areas of self-management behaviours. This may be because self-management behaviours usually require changes in a patient's daily life, so that in order to successfully make these changes, people with T2DM must opt or be encouraged by others to set goals to make the incremental changes necessary to create the lifelong habits that allow them to manage their diabetes (Glasgow, Toobert, Hampson & Strycker, 2002; Langford, Sawyer, Gioimo, Brownson, & O' Toole, 2007).

Effective goal setting along with support and feedback from a support group can significantly improve the chances of achieving self-management goals in persons with T2DM. Diabetes peer support groups are both a valuable source of diabetes information and provide links for patients to provide each other with mutual support (Estabrooks et al., 2005; Heisler, 2007). Such groups can be an integral factor in improving the gap between identifying with diabetes and setting diabetes-specific self-care goals (Estabrooks et al., 2005; Heisler, 2007). In addition, affiliation with diabetes clinics allows patients to receive structured education from Diabetes Educators, which is also conducive to improving self-care management (Eysenbach, 2005; Daley & Wallymahmed, 2014; NICE, 2015). Online groups similarly allow patients with T2DM to engage and exchange information, education, and advice with each other and clinicians and researchers in real time (Mazzi & Kidd, 2002; Barrera et al., 2002; Eysenbach, Powell, Englesakis, Rizo & Stern, 2004). Being a part of a

group also makes patients more accountable and motivated to achieve personal goals to improve the status of the group. While such collaborative goal setting is invaluable in terms of improving self-management skills (Langford et al., 2007), it can nevertheless prove difficult in many cultural settings, such as Saudi Arabia, where a diagnosis of diabetes is often kept hidden from other people for fear of stigma and social isolation.

Self-management of diabetes requires time and the performance of activities that can attract the attention of others. However, when the patient effectively manages their condition, outwardly they might appear healthy. Daily decision making in diabetes has direct implications for health, and many daily self-care activities are aimed at achieving and maintaining an acceptable living standard necessary to prevent long-term complications. Diabetes can influence everyday social interactions in many ways; the patient must restrict the types and amounts of food they ingest, they might have to monitor their blood glucose levels at specific times during the day, and medication might be necessary at times when the individual would otherwise be engaged in social activities (Thorne, Paterson, & Russell, 2003). It is also important to note that a diminished sense of self or loss of self can result from the reduction in social support possible due to the pervasive nature of diabetes (Tilden, Charman, Sharples, & Fosbury, 2005).

Any chronic illness and the management of its symptoms can affect social relationships, and thus can impact social and cultural relations (Charmaz, 1995; Tilden et al., 2005). As such, many patients with diabetes seek support from fellow diabetes patients to ease the strain of the social impacts of this illness. Participating in a diabetes support group is one way that patients can increase the odds of implementing self-management behaviours, and individuals with T2DM that participate in social support groups as well as cooperating with healthcare professionals in Saudi Arabia will thus be examined in this study. The mechanisms of support and the identification with illness within the setting, as well as the achievement of self-management behaviours are the primary factors that will therefore be explored.

### **Social Support in Saudi Arabia**

When comparing Western and Eastern societies, the literature identifies pressures from similar economic and social forces, but the influence of these on family life heavily reflects differences in social context and cultural history (Tsuya & Bumpass, 2004). It is important

to note that social support naturally varies according to national context, and that while some broad similarities with Western social support literature apply, Muslim and Arabic cultures encourage and value providing help to individuals in need. In Saudi Arabia, sick individuals within a family circle receive support from their relatives with regard to ensuring they stick to their medical regimes and take their medication correctly (Al Hamid, Ghaleb, Aljadhey, & Aslanpour, 2017). While in Western culture, the nuclear family is more common, consisting of just two parents and their children (Cole, 2007), in Saudi Arabia, the extended family predominates, which includes parents, their children, grandparents and potentially aunts and uncles and their offspring living together (Rose, 2013).

In the West, when a significant decision must be made that relates to healthcare, it is the parents who decide until children are deemed able to decide for themselves (Carteret, 2010). Parental permission is no longer an issue when individuals reach adulthood, as they can choose to exercise their right to confidentiality in health matters (Carteret, 2010). In Saudi culture, however, the views of many family members can change decisions made by the patients (Al-Shahri, 2002); Saudi patients' autonomy is frequently overruled by family authority (Al-Shahri, 2002). The custom in Saudi culture is for the family to be told first about any bad news, after which they will decide how to tell the patient (Al-Shahri, 2002). In Arabic culture, family members are thus frequently involved in important decisions concerning the individual, and in particular, many studies show that Arabic women are more likely than their male counterparts to seek family members' advice when making healthcare choices (Heath, 1999; Al-Lamki, 2000; Al-Krenawi et al., 2004).

There are other differences between Arabic and Western cultures; for example, Arabic families tend to be patriarchal, with the father as the head of the family (El-Islam, 1983). Thus, the father commands respect and maintains authority over all family matters (El-Islam, 1983). This contrasts with the West, where families are more individually based, and the relationship between a father and his children is more equal and friend-like (Lizhi, 2015). With regard to marriage, Saudi families arrange marriages within the tribe or with the family's benefit in mind, rather than copying modern Western ideas of self-identity and romantic love (el-Hazmi et al., 1995; Pande, 2014). In addition, in Arabic culture, daughters and sons are encouraged to marry their cousins in order to strengthen the extended family (Sadeghi, 2013). Within the family in Saudi Arabia, as in other Islamic countries, the man officially takes care of his family, and is the leader, spokesperson, breadwinner, and

protector (Luna, 1989 cited in Al Mutair et al., 2014), while women are officially only homemakers and must raise the children (Luna, 1989 cited in Al Mutair et. al., 2014). Men and women are seen as complementary to each other, and it is believed that Islam has ordered and organised the roles of men and women within the family (Luna, 1989 cited in Al Mutair et. al., 2014).

Saudi families with robust support networks can therefore provide positive models of parental behaviour (Walston et al., 2008). Additionally, such families generally have access to large communities of friends, neighbours, and relatives who can step in as caregivers or offer support and encouragement to both parents and children. Social support may consist of help with decision-making or problem-solving and emotional as well as practical measures, which can bolster self-confidence (Muhlbauer, 2002). This type of support may come from relatives, friends, neighbours, school, colleges, healthcare workers, religious organisations, or any a number of community institutions (Katooa, 2014).

Arab societies are also different from those in the West in terms of patterns of family structures, spontaneity, primary group relations, and expressiveness (Al-Krenawi & Graham, 1997a, 1997b; Barakat, 1993). While such support does exist in the West, its reach and expression is different due to differences in family and social support culture.

A Saudi study found that a weak social support system is a barrier to embracing a healthy lifestyle for people with T2DM in Saudi Arabia (Al-Khudairy et al., 2014). In particular, the frequency of extended family gatherings and social celebrations can make it difficult for patients with diabetes to follow a healthy diet (AlQuaiz & Tayel, 2009). Saudis encourage their guests to eat large amounts of food at social events, and this could tempt Saudis with T2DM to ignore dietary restrictions and overeat (Al-Khudairy et al., 2014). Furthermore, a general lack of social support for physical activity exists in Saudi Arabia, with 77% of respondents in a study conducted by AlQuaiz and Tayel (2009) stating that this discouraged them from partaking in physical activity. Finally, as noted by Alneami and Coleman (2016), the absence of an overall healthy environment is yet another obstacle to managing T2DM in Saudi Arabia.

## **Nature of the thesis**

This thesis employs a concurrent triangulation design that is centred on a self-administered questionnaire completed by patients, supported by additional semi-structured interviews, which seeks to explore the role of healthcare professionals and social support systems as determinants of self-care among adults diagnosed with T2DM in Riyadh, Saudi Arabia. The exploration of the relationships between support and self-care behaviours is guided by both self-efficacy theory and Cohen's social support theory.

## **Aim of the study**

The aim of this study is to investigate the extent to which healthcare professionals and social support act as determinants of self-care among adults diagnosed with T2DM in Riyadh, Saudi Arabia.

## **Objectives**

- To explore whether age, gender, education, marital status, employment, and income have any significant impact on diabetes self-care management.
- To examine the effects of family and social support on self-care management among Saudi people diagnosed with T2DM.
- To determine the role of healthcare professionals in terms of promoting diabetes self-care-management.

## **Research questions**

In order to address the stated aims and objectives, the following research questions will be investigated:

- How do demographic factors impact self-care management for people with T2DM?
- To what extent does support from healthcare professionals improve diabetes self-care management in people with T2DM?
- To what extent do family support and participation in social groups improve the efficacy of diabetes self-care management among people with T2DM?

## **Structure of the Thesis**

This thesis is divided into seven chapters:

**Chapter 1:** This chapter is divided into two sections. Section one discusses the setting of the study and offers an overview of Saudi Arabia and its healthcare system. This is followed by a description of diabetes mellitus occurrence in Saudi Arabia. Section two discusses the prevalence of T2DM and the pathophysiological processes seen in T2DM.

**Chapter 2:** This chapter discusses self-care, patient empowerment, and barriers to self-care activities. This chapter also discusses social support and its effect on adherence to T2DM self-care activities in Saudi Arabia, as well as the proposed conceptual framework.

**Chapter 3:** This chapter presents a review of the literature, setting out an overview of current evidence on this topic. A systematic search strategy is employed, and a critical appraisal of the literature retrieved offered.

**Chapter 4:** This chapter lays out the epistemological assumptions and methodological strategies adopted in this thesis, and outlines the research design. The chapter also contains detailed information about data collection and ethical considerations, as well as offering more detail about the questionnaire and semi-structured interview schedule used.

**Chapter 5:** This chapter seeks the findings are presented as an integration of the quantitative and qualitative data.

**Chapter 6:** This chapter draws together the findings from the preceding chapter, relating them to the wider literature.

**Chapter 7:** This concluding chapter presents a summary of the key findings of the thesis, as well as offering some recommendations to inform future interventions and research in this area.

# **CHAPTER 1: THE RESEARCH CONTEXT: SAUDI ARABIA AND T2DM TRENDS**

## **1.1. Introduction**

This chapter is divided into two sections. Section one discusses the setting of the study, offering an overview of Saudi Arabia and its sociogeographic situation, including its population, the religious and cultural background in Saudi Arabia, gender roles in the region, and the economy. This is followed by a description of its healthcare system. Section two discusses the prevalence of T2DM, along with its pathophysiology and management.

## **1.2. Overview of Saudi Arabia**

This section aims to provide an overview of Saudi Arabia, in particular depicting the economic growth of this country, the complex nature of the population and its related religious and cultural backgrounds, as well as the gender differences and the development of healthcare system; this is followed by an overview of diabetes mellitus in Saudi Arabia and healthcare services for DM patients in Saudi Arabia.

### **1.2.1. Saudi Arabia: Summary**

Saudi Arabia, as the birthplace of Islam and the place where the Holy Qur'an was revealed, is home to Islam's two holiest mosques, in Mecca and Medina. The country was unified by King Abdul-Aziz in 1932, and it is currently the largest country on the Arabian Peninsula, with a population of 31.2 million, of whom 9 million are immigrants (World Population Review, 2016). According to the Central Department of Statistics (2008), only 2.8% of the population is aged over 65 years old; the majority of the population is relatively young. Overall, 45.7% are female, and 30% of the population is aged less than 15 years (Central Department of Statistics, 2008; WHO, 2013). Though life expectancy (74.4 years in 2012) is similar to that of other developed manufacturing countries, Saudi Arabia was placed 56th out of 187 countries in the 2011 Human Development Index and as such is categorised as a "high human development" country (Malik, 2013). In 2014, 7.0 % of the total governmental budget was spent on health (MOH, 2014). This can be compared favourably with Oman, where 5% of the governmental budget was spent on health in 2017 (KPMG, 2017). The MOH has played a major role in enhancing the healthcare system in the country, which



provides free healthcare facilities to every Saudi resident and to those non-Saudis working in the government sector (Aldossary, While, & Barriball, 2008).

### **1.2.2. The religious and cultural background of Saudi Arabia**

In order to understand attitudes towards health and long-term illness in Saudi Arabia, it is important to examine the religious and cultural background of the country. Islam is a religion that is widespread across the globe, and in Saudi Arabia, Islam has been generally responsible for driving cultural and social advancements. The country additionally claims responsibility not only for the creation of Islam but also for its ongoing development.

Saudi Arabia is thus mainly populated by Muslims (Littlewood & Yousaf, 2000), although migrants account for the small percentage of other religious groups. Over the past 40 years, a noteworthy change to the composition of the Islamic community has been spotted, derived from economic expansion. In terms of movement from country to city living, an increase of almost 60% was seen (49% to 78% in total) during the period 1970 to 1991. Additionally, it has become evident that the way of life in Saudi Arabia is determined and shaped by religious views and faith, as well as the country's social and economic attributes, even though a variety of other elements such as education, health, and culture, also contribute to individuality of the country (Al-Shahri, 2002). Sharia law, the judicial system in Saudi Arabia, is in particular built upon principles from the Qur'an and prophecies originating from the Prophet Muhammad (Peace Be Upon Him).

A key Islamic principle taught throughout Saudi Arabia, which forms a large part of the country's cultural and social foundations, is the understanding that illness is the result of wrongdoing; the religion deems it to be divine retribution as well as a means of repenting for misconduct (Al-Shahri, 2002); thus, within many Muslim groups, sickness is viewed as something that is deserved. As a result of this teaching, it is quite common for people to refuse necessary medicinal treatment on the grounds that this would oppose the wishes of Allah. However, the Islamic faith does urge individuals to take care of themselves by taking regular exercise, eating healthily, refraining from drinking and smoking, looking after their personal health, and breastfeeding babies (Rassool, 2000). Nevertheless, in certain provincial parts of Saudi Arabia, it is not uncommon for older types of medicine to be used, including practices of dubious efficacy such as cauterisation, homeopathy, and cupping (Al-

Shahri, 2002). Overall, Islamic principles must be used as a base and backdrop for all teaching in this region.

Whilst Islam seeks to encourage Muslims to maintain their health and wellbeing (Al-Shahri, 2002) through the methods described above, this conflicts with the general way of life and customs of the people living in Saudi Arabia. One example is the regular consumption of Kabsa, a meal consisting of rice with meat (sheep or camel) that is eaten twice a day (lunch and dinner). This dish contains large quantities of carbohydrates and fat, increasing the prevalence of widespread chronic nutritional disease in the country. With a strikingly high number of Saudis reported as having minimal physical exercise (Mahmoud & Faramawi, 2015), such chronic diseases now contribute to approximately 70% of all deaths in Saudi Arabia, with the younger generation becoming overwhelmed by obesity in epidemic proportions.

### **1.2.3. Saudi Culture and Islam**

The Holy Qur'an offers three approaches to health: legal, directive and direct healing (El-Kadi, 1993). The legal approach uses legislation to forbid behaviours and habits that are damaging to health and to demand behaviours that uphold health. Examples of legislation that support health include eating in moderation; avoiding alcohol, tobacco, and all psychoactive substances; frequent exercise; regular prayer; and fasting. The guiding approach further sets out general rules and regulations that the individual can apply to daily life to support wellbeing, while the direct healing approach encompasses the Holy Qur'an and its supposed power to influence the systems of the human body (El-Kadi, 1993).

Islam demands that individuals take a holistic approach to life, including working, praying, spending time with the family, eating moderately, exercising, staying clean and limiting sexual relations to legal partners (husband or wife) (Ahmed, 1999). Cleanliness is viewed as "half the faith" according to a hadith of the Prophet Muhammad (Peace Be Upon Him), and similar attention to personal hygiene is also exhorted in the Holy Qur'an and in the examples set by the Prophet Muhammad (Peace Be Upon Him) (Athar, 1998). Tahara, or ritual ablution, has a spiritual as well as a purely physical significance, and must be performed before any positive act or behaviour.

Eating healthy food and leading a wholesome life are also viewed as religious obligations; the Holy Qur'an lays out dietary laws and specifies that certain foods are forbidden,

particularly pork or pork products, meat from animals not slaughtered using the Islamic ritual method (halal), any type of blood, and alcoholic drinks (Rassool, 2000; Chand, 1994). In addition, the Prophet stated, "your body has rights over you" and said "Ask Allah for forgiveness and well-being". The major problem is thus the role of culture rather than religion in the Middle East, which means that exercise for women is not commonly accepted because there of the preference in Arabic society for women to be heavy-set as a sign of beauty and high social standing (Musaiger, Shahbeek, & Al-Mannal, 2004). Saudi food also contains high levels of oil, butter, and carbohydrates, all of which contribute to obesity (Musaiger et al., 2004).

Hospitality and generosity are highly valued in Arabic culture, and Arabic people commonly invite each other into their homes to communicate, celebrate and share ideas, and during these sessions, many kinds of food and drink are served (Crumrine, 2000; Azban, 2012; Sobh, Wilson, & Belk, 2013; Harn, 2017). On these occasions, the guest is expected to eat and drink all served items, because refusal to accept food and drinks may upset the hosts (Crumrine, 2000; Azban, 2012; Sobh et al., 2013; Harn, 2017). This is in contrast to Islam, which instructs people to not eat too much, in order to maintain health. As the holy prophet Muhammad said, "a few mouthfuls that would suffice to keep his back upright are enough for a man, but if he must eat more, then he should fill one third (of his stomach) with food, one third with drink and leave one third for easy breathing" (Tahir-ul-Qadri, 2005, p. 13). Therefore, it is the culture rather than religion that must be deemed to cause problems in relation to T2DM in this area. Diabetics follow the diets shaped by their culture, and unfortunately Saudi Arabia is also currently in the grip of a rise in the popularity of junk food. When added to the existing lifestyle of minimal exercise, obesity, diabetes mellitus, hypertension, and coronary heart disease, the health risks are likely to increase and lifestyle diseases will become more common (Naeem, 2012).

In Saudi Arabia, food intake and lifestyles are radically changing. Both children and adults have embraced western fast foods that involve increasingly large amounts of sugar and high fat products (Musaiger, 2011). As a result, both diabetes and obesity have further risen in prevalence, with recent studies (Shara, 2010) showing that Saudi per capita daily fat consumption has reached 143.3% per person, including large amounts of red meat, carbohydrates, and sugar are now part of the Saudi diet. This is in spite of Islam encouraging Muslims to look after their health in every aspect of the daily life, including language,

behaviour, healthcare, diet, and economic and social development (El-Gilany & Al Wehady, 2008). The dietary laws noted above are intended to prevent Muslims from damaging their health; yet not every Muslim respects Islamic guidelines consistently.

The last thirty years have transformed Saudi Arabia, but, in general, the population's health has been a casualty of this change. The lifestyle transformation has resulted in increased spread of non-communicable diseases in the country (Al-Hazzaa, 2002; Al-Nohza et al., 2004), and while it is impossible to determine precisely who exercises to what extent and when, it is clear that Saudi citizens are becoming more sedentary over time (Al-Hazzaa, 2002; Al-Nohza et al., 2004). A number of studies have confirmed this trend (Al-Hazzaa, 2000; Al-Refae & Al-Hazzaa 2001; Al-Hazzaa, 2002), and Al Hazzaa has estimated that between 43 per cent and 99 per cent of the population, depending on age, gender, location and target population, do not partake in any sustained form of physical activity. This author suggests that the rate of inactivity in Saudi Arabia is among the highest in the world, and that it is particularly high among women.

Local data shows that the Saudi population as a whole is at high risk of CHD, and type 2 diabetes mellitus is also on the rise in the country (Al-Nohza et al., 2004); obesity, particularly among Saudi women, has spiralled out of control (Al-Nuaim et al, 1997; Al-Nohza et al., 2004). Studies show that the Middle Eastern tradition of eating dates with coffee is harmful in terms of weight control, in spite of the popular belief that dates are highly nutritious and valuable (Abdulahadi et al., 2007; Al-Shookri et al., 2011; Alhyas, Nielsen & Majeed, 2013). In particular, research shows that a large intake of dates can have a negative impact on glycaemic control in patients with diabetes mellitus, as dates have a very high sugar content.

#### **1.2.4. Gender Roles in Saudi Arabia**

Gender roles in Saudi Arabia are generally determined according to Islamic principles. It is the job of women to act as carers and housewives (Rassool, 2000; AlShahri, 2002), while men are charged with protecting and supporting their wives and other members of the family (Rassool, 2000). The control that men have over women and the regard in which older people are held is further preserved by the Saudi social system (Gazzaz, 2009). The ethics and morals taught by Islam are also expected to guide the ways in which family members

treat each other, including being honest and loyal, respecting each other, and being sympathetic (Aldossary et al., 2008).

The way of life in Saudi Arabia is such that male and female roles of caring within the family are defined by particular understandings of Islamic law; these roles are thus legally enforceable. As a result, women may have limited access to health services due to the Saudi way of life. Other restrictions are also imposed on them, such as limited freedom via the guardianship system (Aldosari, 2017); in particular, Saudi women cannot travel without a male guardian's permission (Zuhure, 2011). It has been reported that ill health in women in this area is thus initiated through two routes; the roles women must carry out and marital struggles (Alyaemni, Theobald, Faragher, Jehan, & Tolhurst, 2013).

According to Islamic texts, men and women are spiritual equals (Sonneveld, 2017). However, this conceptual equality is not reflected in many of the actual laws in Islamic countries (Safra, 2014). In part, this is due to Islamic hermeneutics' domination by male scholars, who impose their own political and cultural contexts on their interpretations of the Qur'an and the hadith narratives to support their own worldviews (Sonneveld, 2017). This means that gender roles are ingrained in law. According to Saudi Arabia's personal status law, an unmarried woman is her father's ward; when she is married, she becomes her husband's ward. Widowhood means that the woman becomes the ward of her sons. Hessini (2007) has also pointed out that over half of marriages in Saudi Arabia are between blood relatives, reflecting the structure of the Saudi male-dominated tribal society, where women are not equal to men.

This law impacts women's healthcare in several ways. The MOH law prevents women from being admitted to a government hospital unless they are accompanied by a male guardian when they present themselves (Al-Hajjaj, 1996). Rural areas report that male relatives frequently refuse to allow women to be treated by male obstetricians or gynaecologists, even if it is a matter of life and death. In all circumstances, including medical emergencies, adult women do not have the right to sign a consent form for any type of invasive medical procedure; this has to be done by a male guardian (Abu Aisha, 1985). This has severe implications for women who must self-manage an illness such as diabetes, because they must constantly seek guidance and permission from a male to access the correct resources. In addition to this, the culture in Saudi Arabian communities is a combination of Islamic religious beliefs and Saudi societal customs, which impact on the behaviours of the people.

Several customs such as gender segregation in places of work or societal settings, as well as in education, are strictly followed in Saudi Arabia. Furthermore, women in Saudi Arabia are required to wear the hijab to cover the head or even the niqab to cover their face at all times in public. They are also required to cover their bodies with confining abayas in front of any non-related men (Ezzi et al., 2014).

### **1.2.5. Economic overview**

Saudi Arabia is the world's biggest extractor and transporter of oil (Almalki, Fitzgerald, & Clark, 2011), making it one of the most rapidly developing and wealthiest countries in the Middle East. Oil was first detected in Saudi Arabia in 1936, with production for monetary purposes commencing during the Second World War. In recent years, the financial prosperity resulting from this has led to accelerated socio-economic change, which has greatly affected Saudis' physical well-being and styles of living (Aldossary et al., 2008); it is, however, predicted to have a beneficial impact on healthcare provision (Almalki et al., 2011). The financial gains from oil have also enabled the country to lay down solid economic foundations and to develop expansion projects, so the Saudi population has experienced rising wages due to a robust economy and the consolidation of its manufacturing foundation.

### **1.2.6. Healthcare System in Saudi Arabia**

The MOH is the main provider of healthcare services in Saudi Arabia, delivering around 60% of services, which are free of charge (Albejaidi, 2010). Other government agencies, provide around 20% of the free services available, and the non-government sector (private sector) also contributes to the healthcare services in the country (Albejaidi, 2010). All government health services are free of charge for Saudi citizens and foreign citizens working in the government sector.

The discovery of oil in Saudi Arabia, and Saudi Arabia's resulting improved financial situation, meant that the Saudi Ministry of Health has been able to invest extensively in its public healthcare infrastructure (Almalki et al., 2011). As a result, dramatic enhancements have been undertaken in recent years. At present, the MOH is the predominant government healthcare provider, accounting for 60.2% of health services in the country, with 268 hospitals providing 38,970 beds. The private sector accounts for 22.1% of the country's health services, with 136 hospitals offering 14,310 beds, though these are primarily based in urban areas. Thirty-nine hospitals (11,497 beds; 17.7% of the country's health services) are

operated by various other government departments, their purpose being to accommodate public sector employees and their relatives. These hospitals are wide-ranging in scope, including referral hospitals (King Faisal Specialist Hospital and Research Centre), ARAMCO Hospitals, and Ministry of Education hospitals (MOH, 2014).

The Saudi Arabian national healthcare infrastructure is organised in such a way as to ensure that all citizens receive free-of-charge services (via public hospitals and primary healthcare centres (PHCCs), and including other government health sectors (the MOH, the Military Health Services, and University Health Institutions). However, private sector healthcare is not free of charge.

### **1.2.7. Levels of Healthcare Services in the MOH**

MOH healthcare services are disseminated via three pathways: primary, secondary, and tertiary (Almalki et al., 2011). The primary care centres provide services for preventative and curative cases. This is also the first level of interaction that individuals, families, and communities generally have with the healthcare system in Saudi Arabia (Mufti, 2000). The secondary care centres (public hospitals) receive cases in need of a greater degree of care; individuals are referred to public hospitals from primary healthcare centres where they require more care (Boslaugh, 2013). The tertiary care centres (specialised hospitals) serve the more complicated cases, such as individuals suffering from an advanced illnesses (Jabbour and Yamout, 2012) (see Figure 1).

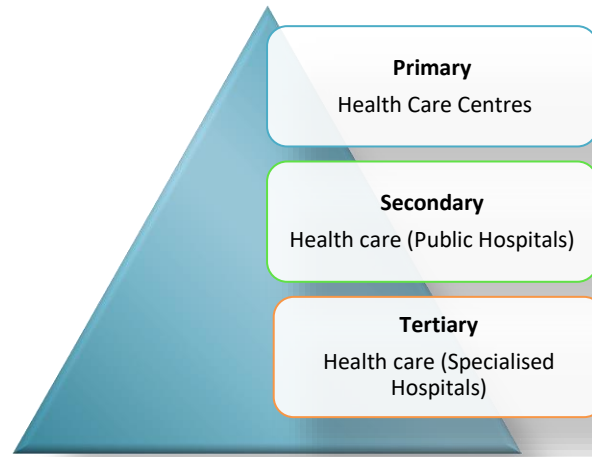


Figure 1: Levels of Healthcare Services in the MoH in Saudi Arabia (Annual Statistics Book, 2014)

### 1.2.8. Diabetes Mellitus in Saudi Arabia

According to the WHO, DM prevalence in Saudi Arabia is the seventh highest globally and the second highest in the Middle East (Robert et al., 2017). Although the present level of DM in the Saudi population (approximately 7 million DM and 3 million pre-DM diagnoses) is already concerning, the rising prevalence (approximately 10 times initial measured levels) represents an even greater concern. One of the main reasons DM represents a public health crisis is because of the complications it produces and the subsequent expenditure required to treat these complications, which include cardiovascular diseases, blindness, and general disabilities resulting from amputation, all of which greatly reduce quality of life (QoL) (Al Dawish et al., 2016; Robert et al., 2017).

Nevertheless, despite the highly significant impact that DM currently has on Saudi Arabia and its population, the literature pertaining to its incidence and prevalence, and the impact of sociodemographic characteristics in the Saudi context is lacking, especially when comparatively examined against research undertaken in developed countries (Al Dawish et al., 2016; Robert et al., 2017). In the event that adequate measures are not taken to control and prevent DM in Saudi Arabia, it is expected that the public health crisis will continue to place pressure on the State's healthcare infrastructure; concerted efforts must therefore be directed towards encouraging lifestyle interventions as part of a multidisciplinary treatment strategy in the area (Al Dawish et al., 2016; Robert et al., 2017).



### **1.2.9. Healthcare Services for Diabetes Mellitus Patients in Saudi Arabia**

With estimates of DM prevalence in Saudi Arabia reaching 20% of the population, and approximately 23% of the national healthcare expenditure allocated to DM prevention and management, DM represents a modern public health crisis in Saudi Arabia (Robbins, 2004). In conjunction with this, according to Jabbour and Yamout (2012) and Al-Rubeaan et al. (2015), the Saudi healthcare system is expanding at an annual rate of 2% for two fundamental reasons: the first is to fulfil the increasing need for healthcare services demanded by population growth; and the second is to prevent and manage the country's rapid increase in the prevalence of chronic conditions in recent years.

In view of this predicament regarding public health in Saudi Arabia, the Saudi Ministry of Health (MOH, 2013a) has released a mission statement to establish an interconnected system of integrated facilities for the comprehensive prevention, treatment, and rehabilitation of chronic conditions. Ultimately, this must also feed into the MOH's larger aim of facilitating equal access to healthcare services for all Saudi citizens. Given the worrying rise in DM prevalence in Saudi Arabia, one of the major steps forward in achieving this goal has been to open 20 dedicated care centres for DM treatment, with a further eight now in the planning phase, covering several Saudi regions and governorates. Concomitantly, the MOH (represented by the Diabetes Centres and Units Department of the Hospitals' general departments) is eager to promote evidence-based practice for the treatment of DM patients, and it has taken measures to engage with several at-risk demographics in order to raise awareness and to promote educational initiatives (MOH, 2013a).

The Saudi healthcare system provides DM patients with the care they require at primary, secondary, and tertiary levels by drawing on the services of General Practitioners (GPs), internists, and endocrinologists. The programmes bring together nephrologists, cardiologists, and ophthalmologists, along with other relevant medical practitioners, in dedicated diabetes centres and clinics (Jabbour & Yamout, 2012). It is noteworthy that the international standard at present emphasises DM treatment at the primary level, rather than the secondary and tertiary levels; Saudi Arabia's overall strategy is thus distinct in this respect (Jabbour & Yamout, 2012).

An overwhelming proportion of healthcare for DM patients in Saudi Arabia is facilitated via Primary Health Care Centres (PHCCs). Once a DM diagnosis is confirmed, patients must

schedule routine follow-ups with their PHCC, paired with GP intervention and health education, usually administered by nursing practitioners. PHCCs contain DM records (typically updated on a monthly basis) pertaining to each patient with a diagnosis; these include key data relating to vital signs, urine and blood test results, and educational material received. In terms of the pharmaceuticals prescribed and administered within PHCCs, these include insulin and various types of oral hypoglycaemic medication. The entire process of patient treatment, management, and education remains within the PHCC unless secondary or tertiary levels of care are required for further assessment or more specialised patient management. According to the Saudi MOH (2015), 545,982 such referrals to higher levels of care were registered in 2015.

To combat the rising trend of non-communicable diseases (NCDs) in Saudi Arabia, as well as managing their unfavourable secondary effects, the Saudi MOH founded the General Directorate of Non-Communicable Diseases (GDNCD) in 2003. Fundamental to the GDNCD's strategy are an increase in public awareness regarding NCDs, education regarding NCD complications and risk factors, population screening to underpin timely diagnoses, and national-level control and prevention campaigns (Al Quwaidhi, 2013). A range of units and programmes have emerged from the GDNCD, including the National Diabetes Programme (NDP), the Diet and Physical Activity Programme (DPAP), the Cardiovascular Disease Control Programme (CDCP), and the Cancer Control Programme (CCP) (Al Quwaidhi, 2013).

The NDP is tasked with obtaining the following outcomes: to maintain an up-to-date statistical database pertaining to Saudi morbidity and mortality rates from DM (type I, type II, and gestational); to design and implement state-level plans for disease control and prevention; to promote national health; to conduct population screening; and finally, to monitor the quality of DM healthcare services at the primary, secondary, and tertiary levels (Al Quwaidhi, 2013).

In 2010, the Saudi MOH passed a ten-year National Executive Plan (NEP) for DM control and prevention. The NEP relies on the cooperation of the government and all privatised healthcare facilities in Saudi Arabia; its fundamental tenets are as follows: to educate the Saudi population about the risks of DM and its complications; to enhance the currently underperforming DM detection programme; and finally, to reduce DM prevalence, mortality, and morbidity in Saudi Arabia (MOH, 2013a).

The next section will discuss this prevalence of T2DM, as well as the pathophysiology and management of the disease.

### **1.3. The prevalence of T2DM and the pathophysiological processes seen in T2DM**

This section will discuss the prevalence of T2DM, and the pathophysiological processes seen in T2DM. This is important in order to better understand the management of this disease, which can then be subsequently considered from both pharmacological and non-pharmacological perspectives in order to help prevent hyperglycaemia.

#### **1.3.1. The prevalence of T2DM**

The prevalence of T2DM is rising worldwide (IDF, 2013), and people of all countries suffer from diabetes mellitus (DM). Without efficient prevention and effective management programmes, the burden of DM will thus continue to rise. Globally, in 2013, DM resulted in more than US\$ 548 billion in health spending, and the total proportion of health expenditure on adults was 11% (IDF, 2013). T2DM is a particularly serious health problem globally and a common condition in all countries (IDF, 2013). Incidence of the condition is rising in most countries as a result of rapid cultural and social changes and increases in unhealthy lifestyles, such as a lack of physical activity, eating unhealthy food, and unhealthy behaviours arising from rising urbanisation and ageing populations (IDF, 2013). T1DM incidence is also rising each year in both high-income and low-income countries, but this is less common than T2DM (IDF, 2013). Most commonly, T1DM occurs in children and adolescents in high-income countries (IDF, 2013). Gestational diabetes mellitus (GDM) is also rising in prevalence worldwide, matching T2DM and obesity (Kirkman et al., 2012). Women who have had GDM also have a higher risk of developing T2DM (IDF, 2013), and one in seven births is influenced by GDM (IDF, 2015).

#### **1.3.2. Pathophysiology of T2DM**

The worldwide explosion of obesity has resulted in increased prevalence of T2DM, a non-communicable disease affecting more than 370 million people. Without concerted efforts to address the pathogenesis and treatment of the syndrome, the harmful macrovascular and microvascular outcomes of T2DM are likely to be a major burden for decades to come (Kahn, Cooper, & Del Prato, 2014). The aim of this section is thus to explore the progress and pathogenesis of T2DM (Kahn et al., 2014). This is of particular importance, as only a

sound grasp of the defects that underpin T2DM can allow Health Care Professionals (HCPs) to understand the impact of therapeutic interventions in order to make a positive contribution to educating people with T2DM to better manage their diabetes (Kahn et al., 2014). It is envisaged that a more knowledgeable approach to diabetes care can help reverse the tide of obesity and prevent or delay the development of diabetes-related complications, which, as well as being costly to treat, also have negative impacts on quality of life. A discussion regarding the mechanisms involved in the development of diabetes-related vascular complications is thus also included (Kahn et al., 2014).

Diabetes is defined as a lifelong metabolic disorder characterised by chronically elevated glucose levels resulting from either an absolute or relative lack of insulin (Kumar et al., 2003). There are four types of DM: T1DM, T2DM, and Gestational diabetes mellitus (GDM) are the most common, although there is another type of diabetes caused by specific diseases, infections and other illnesses (WHO, 2006; Baynest, 2015). T2DM, as described by the WHO, is a chronic illness in which the body fails to produce or use insulin effectively (WHO, 2011). Insulin is a hormone produced by the pancreas, an organ found in the upper left region of the abdomen that contains both endocrine and exocrine cells. The endocrine cells are divided into alpha and beta cells, which are also known as the Islets of Langerhans. It is the role of the alpha cells to produce glucagon, whereas the beta cells produce insulin (Scanlon & Sanders, 2003). Raised levels of blood sugar (hyperglycaemia) trigger the release of insulin, and low levels of blood sugar (hypoglycaemia) trigger the release of glucagon.

Hyperglycaemia typically occurs after the consumption of carbohydrate-rich food (Scanlon & Sanders, 2003). The process is initiated when raised blood glucose levels are detected by system-wide glucokinase (an enzyme), which then transmits messages to the pancreas to release insulin (Shier, Butler, & Lewis, 2010). Similarly, following the consumption of protein-rich foods, insulin is released by amino acids. Many additional hormones are released during digestion that are also linked to the release of insulin, such as glucose-dependent insulinotropic peptides (Sherwood, 2004).

The body uses glucose as an energy source, and in order to aid the swift passage of glucose into cells, membrane receptors and insulin join together to raise the cell membrane's permeability. There are two ways in which insulin can lower the levels of glucose in the blood: using a greater quantity of glucose to produce energy or storing a greater amount of

glucose in places such as the skeletal muscles or liver. Insulin also uses glucose to aid the production of amino acids, which are key in producing the proteins and fatty acids used further down the line in fat tissue to produce triglycerides (Sherwood, 2004). Insulin also prevents premature breakdown of these proteins and triglycerides.

Sufferers of T2DM are unable to use insulin effectively, either due to a lack of insulin receptors on the cell membranes, or due to the outer tissues of the body not responding to existing insulin (Buse, Polonsky, & Burant, 2003). As the body becomes more resistant to insulin, and blood sugar levels continue to rise, the pancreas strives to balance out this deficiency by creating a greater quantity of insulin. This can lead to excessive volumes of insulin in the blood (hyperinsulinemia) (Warram, Martin, Krolewski, Soeldner, & Kahn, 1990) which may be worsened if the liver becomes unable to absorb and break down the excess (Buse et al., 2003). People with T2DM may also have reduced levels of glucokinase (Shier et al., 2010), resulting in poor reactions to blood sugar and a greater chance of hepatic gluconeogenesis, leading to hyperglycaemia (Buse et al., 2003).

There are many repercussions to the irregular regulation and release of insulin, including circulating blood glucose not being used by the cells; greater breakdown of triglycerides, leading to higher levels of fatty acids in the blood; and proteins being broken down at a greater rate, causing muscle wastage (Sherwood, 2004).

### **1.3.3. Prevalence of type 2 diabetes mellitus in Saudi Arabia**

Of the 18 million Saudi citizens aged between 20 and 79 years of age (approximately 70% of whom are Saudi nationals), roughly 3.6 million have diabetes, and of these, 90% have T2DM. This widespread occurrence thus affects between 23.1% and 25.4% of the Saudi population (Al-Nozha et al., 2004; Al-Daghri et al., 2011; Alqurashi, Aljabri, & Bokhari, 2011). The number of people diagnosed with T2DM in Saudi Arabia is also predicted to increase sharply; of the predicted T2DM sufferers over the age of 30, roughly 40.3% do not yet know they have the disease (Al-Rubeaan et al., 2015). A further 25.5% of people over 30 years of age are also now showing symptoms of pre-diabetes, and 28.7% of people are now diagnosed as obese and are therefore in danger of developing T2DM; these factors combined make the risk abundantly clear (Mugharbel & Al-Mansouri, 2003; Al Quwaidhi., 2013; Al-Rubeaan et al., 2015). Furthermore, it is calculated that the number of people with diabetes who between 20 and 79 years old will hit 7.5 million by 2035 (Guariguata et al.,

2014). This profound rise in the number of individuals with T2DM among Saudi nationals can be linked to a number of factors, such as genetic predisposition, obesity and overweight (Elhadd, Al-Amoudi, & Alzahrani, 2007).

#### **1.3.4. Complications of type 2 diabetes in Saudi Arabia**

As the prevalence of DM continues to rise, so does the occurrence of associated problems, such as diabetic retinopathy, one of the most frequently seen problems associated with the illness. Diabetic retinopathy is diagnosed in 36.4% of all T2DM sufferers (Ahmed, Khalil & Al-Qahtani, 2016), and is an increased danger for those who have had T2DM for a long period of time, or those who poorly manage the condition. A greater number of retinopathy cases are also discovered in sufferers in cities rather than rural regions. (Khan, Wiseberg, Lateef, & Khan, 2010).

According to Alsenany and Al Saif (2015), many Saudis are also suffering from other associated problems, such as cardiovascular disease. No data, or limited data, is available on the incidence of diabetic nephropathy in Saudi Arabia, but T2DM is one of the most prevalent causes of this type of incident (Al-Khader, 2001; Al-Rubeaan et al., 2014).

#### **1.3.5. Diagnosis of Diabetes Mellitus in Saudi Arabia**

In Saudi Arabia, the ADA's *Standards of Medical Care in Diabetes* were adopted, and thus diabetes is detected by measuring the amount of plasma glucose in the blood using either a fasting plasma glucose (FPG) test, or the 2-hour plasma glucose (2-h PG) level after a 75-g oral glucose tolerance test (OGTT) (ADA, 2014). However, the ADA has since recommended an alternative practice for diagnosis, which includes the use of glycated haemoglobin (HbA1c) with the criterion for diagnosis of  $HbA1c \geq 6.5\%$  (ADA, 2014; ADA, 2017).

An early risk factor for developing T2DM is glucose intolerance or impaired glucose regulation (IGR). This is typically termed pre-diabetes, as it cannot be characterised as full diabetes as the glucose levels are not sufficiently elevated to meet the diagnosis threshold, despite being too high to be deemed normal. This is therefore classed as an in-between stage of the disease, with several levels then set in place by the ADA to detect persons who may be at an increased risk of going on to develop the disease fully: FPG levels between 100 mg/dl (5.6 mmol/l) and 125 mg/dl (6.9 mmol/l), and 2-h OGTT values between 140 mg/dl

(7.8 mmol/l) and 199 mg/dl (11.0 mmol/l), respectively (ADA, 2009a; ADA, 2014; ADA, 2017).

The indicator used to determine the severity of the disease, and therefore identify the type of diabetes, is HbA1c. This is a blood sugar evaluation measured over a three-month period, and the following values highlight the thresholds with which each type of disease is established: less than 5.7% (normal); 5.7% to 6.4% (pre-diabetes); 6.5% or higher (diabetes) (ADA, 2014; ADA, 2017).

### **1.3.6. Risk factors for type 2 diabetes in Saudi Arabia**

T2DM is a disease with a multifactorial aetiology, and the likelihood of developing the disease is increased or decreased by certain elements. It is possible to alter the prevalence of the disease in high-risk individuals by changing several types of behaviour, such as losing weight if obese, increasing the amount of exercise, quitting smoking, and ensuring a healthy diet (Rewers & Hamman, 1995; Alsenany & Al Saif, 2015). Additionally, other issues appear to affect the management of the disease, such as poor knowledge provision, community support, and healthy environments (Alneami & Coleman, 2016). As will be discussed below, the dangers of T2DM can thus be categorised into modifiable and non-modifiable risk factors.

#### **1.3.6.1. Modifiable risk factors**

##### **A. Obesity**

As discussed previously, there is a clear link between T2DM with obesity, and increased body mass index (BMI) is a key danger (Bei-Fan, 2002); several researchers have shown a correlation between raised BMI and a greater risk of T2DM. Obesity occurs when a disproportionate amount of adipose tissue, or fat, builds up in the body (Memish et al., 2014), and this is one of the most prevalent modifiable risks of T2DM (Murad, Abdulmageed, Iftikhar, & Sagga, 2014), with between 80% and 90% of obese people developing T2DM (Aljohani, 2014; Sidawi, Alhariri, & Albaker, 2014). Obesity is also a key element behind insulin resistance (Murad et al., 2014).

Sadly, Saudi Arabia suffers from high levels of obesity. A study was conducted to review previously analysed data in the hope of predicting future patterns and forecasts to help to

determine the rate of adult obesity between 1992 and 2022 (Al-Quwaidhi, Pearce, Critchley, Sobngwi, & O'Flaherty, 2014). Upon completion, the results highlighted a rise in adult obesity from 22% in 1993 to 36% in 2005, and it is expected that this will increase further, to 41% in men and 78% in women by 2022. A further study, conducted by Murad et al. (2014) showed the direct link between T2DM and obesity within the Saudi population, heavily affected by the lack of physical exercise in the country.

## **B. Physical inactivity**

Earlier studies have highlighted the benefits of exercise in terms of lowering the chances of T2DM diagnosis (Gill & Cooper, 2008). A lack of physical exercise is also a risk factor for other chronic diseases, such as coronary heart disease (CHD), high blood pressure, and osteoporosis (Admiraal et al., 2011; Khlid, Abbas, & Nisha, 2017). A nationwide study was conducted to gather information on physical activity carried out by Saudi men and women aged 30 to 70 years old (Al-Nozha et al., 2007). A significant result showed low levels of activity across both men and women. This finding can be explained by several environmental factors that may make it difficult for Saudis to exercise, including overcrowding, heavy traffic, low air quality, severe weather, and limited sports provision and space (Al-Refae & Al-Hazzaa, 2001). In Saudi Arabia, lack of physical activity is thus one of the major high risk factors contributing to T2DM (Khlid et al., 2017).

## **C. Unhealthy Diet**

Much other research has also shown that the way people eat is also linked to the onset of T2DM (Alqurashi, Aljabri & Bokhari, 2011). The uptake of a westernised diet has been a crucial part in this, as this leads to consumption of an increased quantity of sugar and fat, which play significant roles in the advancement of T2DM (Al-Khudairy, Stranges, Kumar, Al-Daghri, & Rees, 2013). These findings were corroborated by Midhet, Al-mohaimed, and Sharaf (2010), who carried out group research in the United States that found that people who followed standard western diets had a greater chance of developing T2DM than those eating diets containing a greater percentage of healthier produce such as fresh fruit, vegetables, and whole grains.

Adding to the unhealthy nature of the diet in Saudi Arabia is the inclusion of particular traditional produce, such as dates and desserts, as well as the general preference for meat dishes, all of which have a large amount of fat and carbohydrates (Midhet, Al-mohaimed



& Sharaf, 2010; Al-Khudairy, Stranges, Kumar, Al-Daghri, & Rees, 2013). Finally, 25% of Saudis do not eat sufficient quantities of fruit and vegetables, and a further quarter admit to eating a poor diet consisting mainly of unhealthy products such as fried food and fizzy drinks (Sidawi et al., 2014).

#### **D. Other factors, including severe and prolonged stress**

When an individual becomes extremely stressed for an extended period of time, certain hormones are activated, in particular glucocorticoids, which cause glucose intolerance. Several findings suggest that the chance of developing T2DM is greater when stress is a factor (Huang, Cabanela, & Howell, 1997). The prevalence of T2DM has thus increased in Saudi Arabia due to a combination of risk factors such as unhealthy dietary patterns, sedentary lifestyles, and oxidative stress (Fareed, Salam, Khoja, Mahmoud, & Ahamed, 2017).

#### **1.3.6.2. Non-modifiable risk factors**

##### **A. Age**

T2DM is thought to be associated with age; people of older generations have increased chances of becoming sufferers. Nowadays, 45% of T2DM cases are adolescents (Pinhas-Hamiel, & Zeitler, 2007). In recent years, however, the disease has steadily become more prevalent in children (Buse, Polonsky, & Burant, 2003). In Saudi Arabia, 7.8% of people affected by this condition are between the age of 25 and 34 years, while 50.4% of cases are over the age of 65 (MOH, 2013a).

##### **B. Gender**

One study has shown that females are less likely to acquire this disease than males, even though T2DM is found in comparable numbers in both genders (Gale, 2001). However associated problems arising from T2DM occur at similar rates in both genders, with the exception of cataracts. One study has shown that the rate of cataract diagnosis is greater in women (odds ratio (OR) and 95% confidence intervals (CI) of 1.47 (1.04, 2.08) (Summerson, Spangler, Bell, Shelton, & Konen, 1999). In Saudi Arabia, the occurrence of diabetes was 34.1% among males and 27.6% among females (Alqurashi et al., 2011).

### **C. Genetic factors**

Even though a significant amount of research has been carried out to investigate genetic factors, the specifics relating to T2DM inheritance remain unclear (Das & Elbein, 2006). However, the general link between T2DM and genetic causes has been well chronicled, with the resulting data affirming familial aggregation of T2DM (Das & Elbein, 2006; Zarkoob, Lewinsky, Almgren, Melander, & Fakhrai-Rad, 2017).

When considering the onset of T2DM via genetic routes, other external causes may greatly contribute to triggering this (Poulsen et al., 1999). The tendency of the disease to be passed on through genetics may thus be increased or reduced by outside elements. This can be seen in the modern world where the Western way of life, coupled with little or no exercise, significantly contributes to the onset of T2DM (Struber, 2004; Lyssenko, Groop, & Prasad, 2015). As people are becoming more obese, they are putting themselves at greater danger of contracting the disease, whatever their underlying genetic tendency.

Elhadd, Al-Amoudi, and Alzahrani (2007) stated that, over a particular period of time, the incidence of T2DM rose due three factors: the lifestyle transformation in Saudi Arabia; a genetic predisposition to diabetes among Saudi people; and the high rate of consanguineous marriages. Anokute (1992) conducted a study of Saudi Arabian married couples and found a positive connection between T2DM and consanguinity; 80% of couples related by blood had a family history of T2DM, yet this figure dropped to 20% in non-consanguineous marriages.

### **D. History of GDM**

For women who have previously suffered from gestational diabetes mellitus (GDM), the chance of contracting T2DM within a 10-year period following their pregnancy is 10 times greater than for those women who did not have GDM (Herath, Herath & Wickremasinghe, 2017). The rate at which women with GDM go on to develop T2DM differs significantly, however, although some figures suggest it could be as high as 60% (Noctor and Dunne, 2015). Any pregnancy where either type of diabetes is present (GDM or T2DM) is also considered to be high-risk.

### **1.3.7. DM management in Saudi Arabia**

Management of DM in Saudi Arabia is classified into two categories: a) Non-Pharmacological, and b) Pharmacological.

#### **A. Non-Pharmacological**

##### **Lifestyle Modifications and Education Programmes**

The management of T2DM progresses in phases, with the ultimate goal being to lower blood glucose concentrations to levels that approximate those in the normal range to minimise the risk of developing, or reducing the progression of, the many complications consequent to T2DM (Holman, Paul, Bethel, Matthews, & Neil, 2008). This thus includes the prevention of CVD and microvascular diseases, and the detection and management of early macrovascular complications (Marshall & Flyvbjerg, 2006). It is therefore important to establish treatment goals early, to recognise the effectiveness of therapy, and to modify treatment appropriately.

The diagnosis of diabetes often occurs when people are already experiencing stress and other complications in their lives (Diabetes UK, 2009). It is therefore not unusual for people to display an array of negative psychological responses such as shock, anger, and denial, when they are informed of their diagnosis. The role of the clinical psychologist as a member of the multidisciplinary diabetes care team therefore should not be underestimated, and their function includes promoting healthy behaviours, managing psychological problems, and incorporating psychological principles into patient care to enhance clinical outcomes (Garay-Sevilla, Malacara, Gutiérrez-Roa, & González, 1999; Williams, 2005).

Once a person has accepted their diagnosis, the initial phase of care incorporates several lifestyle changes such as increased levels of exercise and better nutrition (Hussain, Claussen, Ramachandran & Williams, 2007), and a structured education programme, such as Diabetes Education and Self-Management for Ongoing and Newly Diagnosed (DESMOND). Effective education must further meet the cultural, linguistic, and literacy needs of the patient and their family members or carers at the time of diagnosis; this will assist people to manage their own long-term conditions through the control of blood pressure, dietary intake, lipid control, smoking cessation, and attention to other cardiovascular risk factors (Daley & Wallymahmed, 2014; National Institute for Health and Care Excellence (NICE), 2015).

Referral to a dietician for dietary counselling, and a focus on appropriate carbohydrate intake and calorific reduction is likely to be critical. Progress in such matters is often evaluated after four weeks, and at this point, a decision can be made regarding the subsequent course of therapy.

Exercise provides several synergistic metabolic benefits, including improvements in insulin sensitivity with consequent improvement of glycaemic control, maintenance of weight loss, reduction of CV risk, and an increase in psychological wellbeing (Hamdy, Goodyear, & Horton, 2001). As T2DM is closely associated with obesity, even modest weight loss can significantly improve insulin resistance and  $\beta$ -cell function (Klein, 2001). Furthermore, the onset of T2DM can be delayed by medical nutrition therapy and exercise (Knowler et al., 2002).

Although the management of T2DM without medication is often the first-line of treatment for people diagnosed with the condition, there are few individuals who are able to successfully control their diabetes using lifestyle measures alone (Nathan et al., 2006; ADA, 2009b). There has thus been a paucity of research on people who manage their conditions without medication in the longer term. The only major UK-based study to date to focus on this sub-population (Hippisley-Cox & Pringle, 2004) found that approximately one-third of people managed their condition without medication, but that these individuals generally received a lower quality of care than their pharmacologically-treated peers.

Given that lifestyle modifications, which are ultimately required for the successful treatment and management of DM (especially T2DM), can only come about when patients are motivated to implement them, it is imperative that the educational practitioners who instruct DM patients understand how to ensure patient compliance. According to Elbur (2014), it is necessary for DM patients to conform closely to certain lifestyle templates and to simultaneously self-administer pharmaceuticals that regulate blood glucose. The motivation of DM patients in Saudi Arabia must thus centre on patient preferences, noting that some individuals will be more or less likely to comply with an intervention depending on who promotes it, whether this is a friend, a relative, or a healthcare professional (Asiri, 2015). If a healthcare professional notes that their DM patient is especially responsive to advice received from a family member, that stakeholder should be brought into the overall course of treatment (Asiri, 2015). In addition, DM patients must be exposed to adequate information about the requirements for lifestyle adjustments relating to exercise, self-management of

blood glucose, and the administration of insulin where necessary (Bartol, 2011). Where interventions are effective, patients can expect higher QoL, fewer or at least postponed complications, and enhanced metabolic control (Mohamed, Al-Lenjawi, Amunad, & Zotor, 2013).

The majority of the Saudi population eats little in the way of fruit and vegetables, preferring a diet based on meat and heavy carbohydrates, particularly dates, which although technically a fruit have a high sugar content that contributes to weight gain. Sherif and Sumpio (2015) add that westernisation has aggravated this lack of dietary balance by popularising fizzy drinks and processed foodstuffs. The last forty years have seen Saudi Arabia expand its economy, raise the standard of living, and embrace a westernised lifestyle. As Midhet, Al Mohaimeed, and Sharaf (2010) point out, poor diet and lack of physical activity as found in western industrialised countries have thus impacted negatively on the Saudi population, raising the incidence of T2DM over this period. Midhet et al. (2010) argue that these lifestyle changes have also contributed to a rise in the incidence of T2DM and added to the problems caused by the Saudi genetic predisposition to diabetes and the preponderance of consanguineous marriages.

### **Anti-Diabetes Education National Programme**

Educational campaigns related to DM are coordinated by the Saudi MOH's Saudi National Programme (SNP). One of the key benefits of the SNP is the way it draws on all relevant stakeholders, including healthcare officials, healthcare practitioners, DM patients, and the general public. The vision of the SNP is to ensure that healthcare officials enforce the programme effectively, providing DM patients with the education and tools they require for self-management such as self-care education programmes, online training schemes, and blood glucose monitoring initiatives, and to capitalise on positive community interactions to raise awareness of DM's risk factors and complications (MOH, 2013b). With this in mind, the SNP stipulates that every DM patient must be afforded a uniform general education on the disease either in an individual or group format, and ideally using MOH-sanctioned teaching materials, with particular emphasis placed on the critical nature of lifestyle modifications (MOH, 2013c).

In Saudi Arabia, diabetes self-management education (DSME) must thus be afforded to all DM patients immediately upon diagnosis and continued based on the progress of the disease

(MOH, 2013c). Importantly, all DSME must conform to government regulations, and the key outcomes that must be logged and supervised are efficacious self-management and QoL (MOH, 2013c). In conjunction with its focus on the physiological aspects of DM and the mechanics of DM self-management, DSME must therefore involve consideration of psychosocial issues, as emotional well-being is positively correlated with favourable patient outcomes. It is also notable that DSME as a cost-effective and results-oriented practice ought to be suitably remunerated by third-party payors (MOH, 2013c).

## **B. Pharmacological**

The complex pathogenetic mechanisms of T2DM mean that lifestyle modifications alone often fail to induce or maintain adequate glycaemic control, thereby necessitating the introduction of pharmacological intervention (Meetoo, Wong, & Alsomali, 2016). Glycaemic management in T2DM has become increasingly complex and, to some extent, controversial, with a wide range of pharmacological options now available (Nyenwe, Jerkins, Umpierrez, & Kitabchi, 2011), which has generated mounting concerns about their potential adverse effects and new uncertainties regarding the benefits of intensive glycaemic control on macrovascular complications (Matthews & Tsapas, 2008; Yudkin, Richter, & Gale, 2011). Uncertainty regarding the most appropriate means of treating diabetes has also raised questions as to whether pharmacological options should be used alone or in combination with other options (Nathan et al., 2006). HCPs should therefore be fully conversant with the actions of these medications and their compatibility with individuals' other needs in order to make effective decisions (Meetoo et al., 2016). To this end, NICE (2009) recommends a number of oral hypoglycaemic agents (OHAs) for the management of T2DM, which include sulphonylureas, biguanides (metformin), thiazolidinediones (glitazones), incretin mimetics, and alpha-glucosidase inhibitors of insulin. It is thus proposed that a working knowledge of each of the medications that act as oral hypoglycaemic agents (OHA) be emplaced. Insulin replacement treatment will ultimately be started in the majority of individuals with T2DM, however, and a major aim of this treatment is to recreate the normal patterns of insulin discharge, with a foundation level of insulin supplemented by greater release of insulin to coordinate with the load of glucose released following a meal (Packer & Crasto, 2015). Pharmacotherapy for T2DM is a major developmental field in Saudi Arabia and other countries seeking to reduce the level of T2DM complications (Sorli & Heile, 2014).

#### **1.4. Conclusion**

This chapter offered an overview of Saudi Arabia's location, population, and healthcare system. In addition, it discussed the continuing development and improvement of the healthcare system in Saudi Arabia. The prevalence of non-communicable diseases, including DM, has increased in the Saudi population (Alshaikh, Filippidis, Baldove, Majeed, & Rawaf, 2016), yet DM is a global health problem, and its prevalence is increasing in all countries, causing death and economic burdens throughout the world (Javanbakht, Mashayekhi, Baradaran, Haghdoost & Afshin, 2015). Saudi Arabia's rise in DM prevalence, in particular that of T2DM, gained attention several years after the rapid industrialisation of the country (Alzaid, 1997) as the significant socio-economic growth and urbanisation in Saudi Arabia together with improved medical care resulted in increased longevity and the adoption of more westernised lifestyles, incorporating aspects such as smoking and physical inactivity, resulting in increased obesity and DM across all age spectrums (Alhowaish, 2013).

The following key themes were also highlighted:

- The rapid increase in the Saudi population and the country's economic development have led to improvement and development of the healthcare system in Saudi Arabia
- DM is the most widely known non-communicable disease linked to economic growth in GCC countries
- Lifestyle modification and diabetes health education are essential for managing T2DM
- Risk factors such as obesity, physical inactivity, and unhealthy diets are increasing the prevalence of T2DM in Saudi Arabia

The next chapter will discuss diabetes self-care in the context of social support and the chosen conceptual framework.

## **CHAPTER TWO: DIABETES SELF-CARE ACTIVITIES**

### **2.1. Introduction**

Irrespective of the style of intervention, whether lifestyle modification, OHAs, or both, the daily management of diabetes is the primary responsibility of the person with the condition. Contemporary diabetes management is thus underpinned by the notion of self-care in terms of diet, exercise, medication, testing blood sugar levels, and foot care, which, if implemented effectively, may assist in constraining the ever-escalating costs of DM treatment and care as well as offering more autonomy and choice to patients. This chapter discusses the definition of self-care and its history, as well as considering patient empowerment. Barriers to diabetes self-care for patients with T2DM are also investigated in the context of social support and adherence to T2DM self-care activities in Saudi Arabia. Finally, the chapter presents the conceptual framework and draws a conclusion.

### **2.2. Defining self-care**

The concept of self-care has many definitions, a number of which must therefore be presented. Paterson and Throne (2000) and Cooper, Booth, and Gill (2003) defined this concept as an evolutionary process of knowledge development or awareness as patients learn to survive with the complex nature of diabetes in a social setting. Diabetes self-care activities are also expressed as being any behaviour adopted by an individual with diabetes for the purpose of managing their disease successfully (American Association of Diabetes Educators (AADE), 2008). Other sources, such as the WHO (2009, p. 17), view self-care from a generic perspective and suggest that it is "the ability of individuals, families and communities to promote health, prevent disease, and maintain health and to cope with illness and disability with or without the support of a health-care provider". Orem (1995), on the other hand, sees self-care as an individual's actions that support taking more care of themselves and maintaining a healthier lifestyle, thus preventing illness, sickness, and allied complications. With regard to the diagnosis of long-term diseases such as diabetes, the purpose of self-care is for the patient to understand the illness, cope with it, and know how to take medication and otherwise stay healthy (Hall, 2015). The common denominator among all these definitions was succinctly identified by the Department of Health in the



United Kingdom (UK) (2006), when it suggested that self-care is owned and managed by the individual in such a way that, other than dealing with the effects of long-term illness on their lives, the individual should also be able to cope with the emotional changes, adherence to treatment regimes, and maintaining those things that are essential to them, such as work, family, and socialising. In the context of diabetes, this concept of care places a heavy emphasis on the individual's responsibility to undertake a range of daily activities to maintain blood glucose parameters within an agreed normal range (Meetoo, 2004). How the individual deals with their condition is critical, as ineffective self-care management can potentially lead to life-threatening micro- and macro-vascular complications and related disabilities that impact both the individual and society (Rosland et al., 2008; Cade, 2008; ADA, 2013; Shrivastava, Shrivastava, & Ramasamy, 2013).

### **2.2.1. History of self-care**

Throughout history, individuals have taken care of their own health during episodes of illness (World Self-Medication Industry (WSMI), 2010). Self-care is often associated with traditional methods and locally-created therapies that seek to ensure the wellbeing of individuals and their families. The effectiveness and the preparatory process involved in these traditional medicines are often unclear, however (WSMI, 2010). The trend of ill people treating themselves at home continued for a considerable period of time when sound medical advice was unavailable (Elliot-Binns, 1973; Hannay, 1979). However, at the beginning of the 19th century and throughout the 20th century, the healthcare system underwent a dramatic transformation, powered by scientific and medical findings as well as technical advances in disease diagnostics. This era brought about developments in healthcare provisions that delivered the appropriate evidence-based care to alleviate suffering caused by diseases as well as promoting physician-led self-care (Lorig & Holman, 2003; Wilkinson & Whitehead, 2009; WSMI, 2010). The concept of modern self-care was thus originally evident in high-income countries, and this later cascaded to low-income countries (WHO, 2009; WSMI, 2010), where it became known by many different names such as self-treatment, self-medication, and self-management.

### **2.2.2. Empowerment: An overview**

Self-care can be achieved through empowerment in terms of understanding the causes of an illness, its symptoms, and remedies.

In the context of diabetes, the term *empowerment* includes incorporating key elements of knowledge, skills, attitudes, and self-awareness with regard to diabetes rather than simply following the conventional methods provided by doctors (Funnell & Anderson, 2004). These key elements help individuals to understand the importance of empowerment in terms of improving their behaviour and the quality of their lives (Funnell & Anderson, 2004). The concept of self-care and empowerment is based on three fundamental aspects in chronic illness: choice, control, and consequences (Funnell et al., 1991). This three-step model of implementing empowerment changes the role of diabetes healthcare providers (HCPs) from the provision of fixed information to the facilitation of self-care (Funnell et al., 1991). Collaborative care is thus to be preferred over individual care and problem-based interventions, as it offers partnership in the treatment of diseases (Funnell et al., 1991).

The implementation of the empowerment approach to achieving self-care management goals has provided positive outcomes essential for achieving the goals of self-care management (Meeto & Gopaul, 2005; Dunstan et al., 2002). This empowerment regarding diabetes is successfully shown in collaborations between individuals suffering from diabetes and their healthcare providers (Hernandez-Tejada, Campbell, & Walker, 2012; Shrivastava et al., 2013; Jackson et al., 2014). It can be assumed that the key principle of empowerment is to enable people to understand the importance of self-care in managing various diseases and enabling people to manage their lifestyles according to their own choices. However, some critics suggest that the idea of implementing empowerment is not useful for families who depend on doctors' prescriptions rather than educational approaches to curing diabetes (Knight, Dornan & Bundy, 2006). The empowerment concept overall, however, suggests that patients and healthcare providers prefer to communicate effectively without hesitations and misunderstandings, which is important for managing diseases by means of educational and instructional methods. It is evident from the self-care concept that patients desire active participation in their analysis of diabetes with the help of the empowerment method, and that healthcare providers are also ready to replace many conventional methods with educational and instructional methods. These practices are considered appropriate in all

medical cases to improve the conditions of patients by applying cost effective services (Asimakopoulou, 2007; Newton & Asimakopoulou, 2008).

### **2.2.3. Diabetes self-care activities**

Several studies have found a relationship between factors such as hypertension, lipids, lack of physical exercise, body mass index, and smoking, and the risk of type-2 diabetes (Gadsby, 2002; Meisinger, 2002; Chan et al., 2009). T2DM can thus be inhibited by adopting a healthy lifestyle for those at high risk (Tuomiletho et al., 2001). These healthy lifestyle aspects include regular physical exercise and eating healthy food, including loss of weight for obese persons, and regular follow-ups with healthcare professionals (Tuomiletho et al., 2001). For people with T2DM, the main source for information is healthcare professionals, who also impart health education, which is very important for enhancing knowledge regarding self-care management of diabetes (Tham, Ony, Tan, & How, 2004).

For effective diabetes management, a multi-disciplinary team is therefore required, which generally includes a diabetic educator, a physician, a dietician, a psychologist, a social worker, and the individual with DM. The most important player in this team is the person with DM, as more than 95% of the care is carried out by the person suffering from diabetes (Funnell & Anderson, 2004; Funnell, 2010). Diabetes Self-Management Education (DSME) does, however, play an essential role in providing necessary knowledge and skills for individuals with T2DM to assist them in adopting recommended behaviours such as physical exercise, healthy diets, self-monitoring of blood glucose, foot self-care, and the administration of medication (Clark, 2008; Funnell et al., 2007).

### **2.2.4. Self-care Barriers**

There are several barriers to diabetes self-care for individuals diagnosed with DM; the challenge is thus how to cope with and manage the many aspects of their lives that may have such an impact (Stiffler, Cullen & Luna, 2014).

#### **Patient**

The term *self-care* was a broader concept in much of the previous literature, and individuals with diseases were seen to have varying readiness for self-care depending on the way self-care was defined (Ellins & Coulter, 2005). When asked whether they performed specific

activities, the majority of the public reported high levels of commitment to self-care (Ellins & Coulter, 2005). According to a survey by the UK's Department of Health (2005a), the most predominant self-care barriers were deficiencies of money and time and lack of information. A further study undertaken by the UK's Department of Health (2005b) showed that motivation is required to encourage patients to change their behaviours. It is also important that the Department of Health believes that self-care does not consume money and time in excess of results. The report also mentioned that more than half of the participants stated that they had very seldom had the implementation of self-care recommended (Department of Health, 2005b).

According to Sharp and Hamilton (2001) and Williamson, Ellis, Wilson, McQueenie, and McConnachie (2017), another important factor negatively influencing the level of patient care is the failure of patients to attend scheduled clinical appointments. A number of excuses are presented by absentee patients, including logistical problems with respect to travel and related expenses. However, much time and other resources are lost to outpatient clinics as a result of missed appointments. According to Hashim, Franks, and Fiscella (2001), numerous schemes such as telephone and postal reminders are recommended to enhance the level of attended appointments. In addition, in Saudi Arabia, there is no public transportation, and patients must use a car or taxi to attend the diabetic clinic. A study in the region thus found that the demographic factors related to missed appointments among Saudi patients included long distance travel and the unavailability of transportation (Al-Hamad, 2013).

Patients' denial of their diabetes also affects management of T2DM. Denial of the condition is a psychological homeostatic response to the problem of the perception of despair related to a chronic illness (Péres, Franco, & dos Santos, 2008). Freud first established the idea of denial as a comatose process for mental defence, which is the ego's defence between instinctual initiatives and outside reality (Freud, 1958). The majority of people who deny their diabetic condition diagnosis initially minimise the gravity of the condition or relate symptoms to another condition (Spiess, Sachs, & Frischenschlager, 1994; Diabetes UK, 2018). Denial is used to avoid facing pressure and negative feelings (Spiess et al., 1994). However, denial of the diabetic condition may weaken social support and reduce care of people with diabetes (Spiess et al., 1994). Partial denial, when the patient denies just one aspect of the condition or treatment, may also occur (Péres et al., 2008). Patients thus deceive themselves by hiding a part of their condition in terms of causes, pain, and distress.

Condition denial is a flawed defence of the personal self-esteem endangered by the increasing severity of a disease (Péres et al., 2008).

### **Healthcare Professionals**

Health care professionals' opinions about individuals with diseases who practise self-care are often unclear (Silva, 2011). According to the Expert Patients Programme, HCPs and GPs have been slow to express positive engagement in their appraisals (Kennedy et al., 2004). Primary care trust leaders also observed that encouraging engagement was seen as time consuming and difficult (Kennedy et al., 2004), and HCPs were non-receptive towards the idea of user-led enterprises or first steps (Kennedy et al., 2004). Specialists doubt that people with diseases have the ability to make decisions for themselves and thus apply *blocking tactics* (Thorne, Nyhlin, & Paterson, 2000; Shaw & Baker, 2004). Those specialists who do recognise patients as *partners* have a habit of overlooking people's opinions where these may contradict the set active arrangements for treatment rules; this is known as the *paradox of self-reliance and compliance* (Thorne et al., 2000; Paterson, 2001). In contrast, people with diseases who practice self-care are recognised as being in control of their own illness and are more likely to comply with the guidance of HCPs (Wilson, 2001).

Morrison (2007) highlights a number of significant features that govern team competence, such as autonomy, equality of resources, and clear communication, alongside each individual member's perception of making a valuable contribution to the team. Significantly, Zwarenstein, Reeves, and Perrier (2005) argued that inadequate interprofessional collaboration can negatively affect the level of patient care. Conversely, Bridges, Davidson, Odegard, Maki, and Tomkowiak (2011) maintain that education and the development of interprofessional team-working skills are of central importance to the creation of high-quality professional healthcare. According to Mickan and Rodger (2005), a successful healthcare team is based upon clearly stated common goals and objectives along with efficient and effective communication. It is headed by an operative leader, is strongly bonded, and constructed from mutually respectful team members. A literature survey by Manser (2009) further highlighted the central aspects of successful doctor-nurse collaboration: quality, coordination, common perceptions, communication, and leadership.

Campbell, Ramsay, and Green (2001) identified a number of factors leading to poor performance in such teams, including high workload and short consultations, as well as

inadequate teamwork and disparagement of the capabilities of practising nurses, dieticians, and healthcare teachers. However, the definition of an ideal clinic size is complicated by the wide range of opinions held by doctors, patients, and managers (Campbell et al., 2001). For example, some doctors blamed poor teamwork specifically upon scepticism surrounding the capabilities of dieticians, healthcare teachers, and available nursing staff (Donnelly & Anderson, 1990). Donnelly and Anderson (1990) also asserted that the complex nature of diabetes management necessitates the distribution of answerability from physicians to nurses, dieticians, and patients, who should ideally function as a team. Moreover, according to the WHO (2008), outcomes in countries such as Sweden, the United Kingdom, and the Netherlands, where primary care is mainly handled by multi-professional teams, provide significant evidence to suggest that the participation of nursing staff with specialised knowledge of diabetes management leads to improved results in comparison with established physician-centred care.

According to Powers et al. (2015), the stated position of the ADA is that diabetic patients should be provided with self-management education and support; support is defined as actions that provide the patient with behavioural, clinical, educational, or psychosocial assistance in enacting and maintaining the practices necessary for the continual management of their illness. The same authors noted that, although a large number of education and support schemes for the self-management of diabetes are based in the clinic or community, the availability of eHealth technologies has increased to the point where they can reinforce or even substitute for interview- or amenity-based schemes. These eHealth approaches are generally defined as schemes that supply healthcare information or services via the internet or associated technologies such as telecommunications, telehealth, texting, and web-based or virtual techniques. According to Boogerd, Arts, Engelen, and Belt (2015) and Vorderstrasse, Lewinski, Melkus, and Johnson (2016), the use of these approaches has grown in the last 5 to 10 years to supply or improve education, support, and participant-provider communication relevant to diabetes outside of the clinical environment.

An investigation by Vorderstrasse et al. (2016) indicated that the providers of social support via eHealth schemes have both direct or indirect experience with T2DM. Direct experience was defined as when a medical practitioner or patient was fully informed about T2DM, while indirect experience was defined as when the support provider had no medical knowledge, professional, or personal experience relating to the condition. It was found that the majority

of information and assistance in eHealth schemes was provided by people with medical backgrounds, however (Vorderstrasse et al., 2016).

Although the importance of interdisciplinary involvement has been stressed in a number of studies, with nurses in particular expressing the belief that patient education is enhanced by the participation of other medical disciplines, authors such as Gregor (2001) have noted the presence of several barriers. Studies by Zakrisson and Hägglund (2010), Kääriäinen and Kyngäs (2010), Abazari et al., (2012), and Oyetunde and Akinmeye (2015) have also identified numerous factors that negatively affect the availability of patient education. These include cultural barriers, lack of continuous training programs for diabetes education providers, inadequate nursing experience, inadequate staffing, ineffective organisation to facilitate the completion of nursing duties to create time for training, excessive patient-to-nurse ratios limiting the time available for each patient, inadequate synchronisation of teaching, insufficient time, negative workplace environments and attitudes, and the absence of any forum for discussion or clinical direction of teaching schemes and activities, not to mention the complicated nature of the illness itself.

### **Healthcare system**

Morris and Dawson (2007) argued that the idea of an improved relationship between people with diseases and HCPs is embedded in the many concepts of self-care and the idea of fully-involved people with diseases. An individual with a disease will generally listen to the advice of HCPs where this supports their decision making (Morris & Dawson, 2007). Essentially, it is imperative for people with diseases for self-care to be appropriate in order to establish constraints to manage their time schedules and limited supplies (Anderson, 1996). This underlines the barriers to self-care connected with service facilities, such as waiting for blood results, waiting for a transfer, or physicians being rushed (Jerant, von Friederichs-Fitzwater, & Moore, 2005). Some researchers thus suggest that HCPs be allowed to make decisions for an individual with a disease where they are rushed. Another study noted that if doctors are rushed, they will fail to prescribe medication accurately (Paterson, 2001; Morris & Dawson, 2007). Likewise, self-care typically depends on persons gaining access to and using information from healthcare providers, as well as other sources, and these may prioritise some individuals with a disease over others (Mead, Varnam, Rogers, & Roland, 2003).

People with long-term conditions thus need support not only from HCPs, but also their families and social networks. Self-care with social support unquestionably has a positive impact on health, and several studies show that social support has a positive association with the performance of self-care. One study showed that social support was the reason for 34% of the change in the practice of protective health behaviours, while another found that receiving provider-patient communication, receiving social support, and receiving a high level of self-efficacy were related to improved positive diabetes self-care behaviours; these behaviours were also directly associated with the management of glycaemia (Gao et al., 2013).

### **Stigma as a barrier to ongoing support**

While the maintenance of support is regarded as essential for the long-term self-management of diabetes, the cultural stigma linked to the disease (or to any illness) has been recognised by providers as an obstacle to continuing support. According to Fritz et al. (2016), providers stated that the social stigma of the disease could cause patients to deny the presence of the disease and to refuse to participate in self-management activities. Hence, cultural stigma could have a major effect on patients' wellbeing by causing them to absent themselves from worthwhile social activities or by obstructing healthy decision making, such as pursuing mental health advice (Fritz et al., 2016). Furthermore, one provider noted that a socially ashamed patient cannot find many willing supporters (Fritz et al., 2016).

According to Mommersteeg, Herr, Pouwer, Holt, and Loerbroks (2013), T2DM patients confirm that social pressures and fear of disgrace impede the successful management of their illnesses and encourage them to be secretive about their health situations. These patients are vulnerable to a variety of mental problems, including stress and depression, which can adversely affect their glycaemic control and, hence, exacerbate the consequences of their condition. Conversely, Rosland et al. (2008) identified a positive effect upon the impressions and beliefs of patients and their family members when they are provided with knowledge and understanding of the disease process and with practical and emotional support for disease management.

According to Wazqar and Evans (2012), diabetes is considered by patients to be a condition that should be concealed; they claim there is something shameful and dishonourable about being diabetic. As a result, the study participants revealed that they felt socially excluded



because of their secret condition, particularly in pregnancy, which is assumed to be disease-free. In these circumstances, participants preferred not to tell anyone about their diagnoses, as they feared social disgrace (Wazqar & Evans, 2012).

Stigma is a negative social judgement based on a feature of a condition that leads to exclusion, perceived blame, and rejection (Link & Phelan, 2001; Weiss, Ramakrishna, & Somms, 2006). This is a destructive social phenomenon that has been observed and studied widely in situations such as obesity, mental illness, and AIDS/HIV (Couture & Penn, 2003; Corrigan, 2004; Mahajan et al., 2008; Puhl & Heuer, 2010). People with diabetes similarly face discrimination and stigmatisation as a result of their illness (Browne, 2014). The IDF (2013-2015) identified diabetes-related stigma as a serious problem requiring urgent attention, and one of the organisation's key goals is thus to champion a world free from stigma for people with diabetes. The study found that patients with T2DM felt stigmatised as a result of having type 2 diabetes, and that they were blamed by others for their diabetes (Browne et al., 2013). The study further indicated that one in five people with diabetes reported having experienced discrimination, offering examples of how stigmatisation can manifest (Nicolucci et al., 2013; Browne et al., 2014).

### **Social environment**

According to Booth et al. (2013), patients and HCPs described numerous obstacles relating to the social settings in which individuals pursue their daily lives. For example, problems arose from the social groups among which people lived and worked where family, friends, and colleagues did not always take into consideration or sympathise with the requirements of the diabetic person. Female patients experienced additional problems relating to their roles shopping for and preparing food for others, which frequently resulted in their own needs being subordinated to the desires of other family members (Booth et al., 2013). Having to buy food according to the preferences of family members unavoidably led to increased difficulty in making the best choices for themselves from the food available in the home. Difficulties were also experienced during social gatherings because of the tempting range of inappropriate foods available along with an insufficiency of healthy options (Booth et al., 2013).

A number of researchers such as Pasala, Rao and Sridhar (2010) and Salois (2012), have agreed that people have difficulty controlling their T2DM where their environment does not

provide them with appropriate facilities. An absence of public swimming pools, leisure centres, gyms, cycling routes, parks, and pavements all give people fewer opportunities to exercise. Allannah, Ashley, and Farley (2010) also note the importance of creating an environment that promotes physical activities. A good diet is also crucial to health, and neighbourhoods often differ in the food outlets they contain, ranging from restaurants to food stands, corner shops, and supermarkets, which affects health outcomes. In 2009, Larson, Story, and Nelson determined that US residents who shopped in grocery stores rather than fast food outlets had better diets and lower rates of obesity, and were at lower risk of developing T2DM.

A number of studies have also looked at the physical environment and its impact on discouraging physical activities, as lack of exercise contributes directly to insulin resistance. Auchincloss, Diez Roux, Brown, Erdmann, and Bertoni (2008) found that insulin resistance paralleled the growth of neighbourhood activity resources, a conclusion that takes into account adjustments for age, gender, ethnicity, education, income, and family history of diabetes. In 2012, Sidawi and Al-Hariri emphasised the importance of providing healthy environments for Saudis with T2DM to help them manage their diseases, asserting that Saudi Arabia lacks neighbourhood parks, recreation, and sports centres. In 2014, Sidawi et al. surveyed 76 Saudi patients with T2DM and noted a discrepancy between people who had diabetes early on in their lives, and those who developed it later, with a majority of the former complaining that they had no access to nearby fitness centres, unlike the latter. In addition, the authors stated that public gardens and sports centres were poorly planned, so Saudis with T2DM found themselves drained of energy as a result of using these facilities, particularly during the six hottest months of the year.

### **Obstacles to Changing Behaviour**

Pun, Coates, and Benzie (2009) cited several research papers to provide fundamental insights into the circumstances influencing the behavioural adaptation of more than 2,400 diabetic patients in the United States of America (USA). The surveyed patients indicated that they performed most poorly in meeting the dietary and physical exercise requirements of their diabetes management programmes (Pun et al., 2009). Similarly, when Ary, Toobert, Wilson, and Glasgow (1986) enlisted a group of 208 diabetes patients in the USA to answer a set of structured and open-ended questions, the participants confirmed that they complied least successfully with their dietary and exercise recommendations. The most frequent

causes of dietary non-compliance were revealed by open-ended questioning to be circumstances such as dining at restaurants or being offered unhealthy food, while non-compliance with exercise was primarily attributed to counteractive physical reactions. More recent investigations have supported the conclusions of this 1986 survey.

In order to elucidate the obstacles to compliance with medication, Hill-Briggs et al. (2005) enlisted 181 African-American type 2 diabetes patients to answer a set of structured questions. While 74% of the participants complied with the requirements of their medication, obstacles such as running out of, or forgetting to take, medication were highlighted. Thus, Pun et al. (2009) argued that the almost universal requirement for diabetic patients to diverge from established behaviour patterns and preferences in favour of new dietary choices and physical exercise regimes is a crucial aspect of self-care management.

#### **2.2.5. Overall Impact of Diabetes**

According to WHO (2006), diabetes is linked to diminished life expectancy and high morbidity arising not only from poor quality of life, but also from specific microvascular complications such as retinopathy, nephropathy, and neuropathy, and a heightened risk of macrovascular conditions such as ischaemic heart disease, strokes, and peripheral vascular disease. Studies by Khowaja and Khowaja (2010) and Hansen, Jensen, and Carstensen (2012) also revealed increased mortality among individuals with diabetes, with variations in the rate according to age and sex as well as the time and cause of death.

Samuel-Hodge et al. (2000) indicated that the overall impact of diabetes involved both physical and psychological elements, with a large number of patients reporting physical fatigue and occasional nausea. Notably, such feelings of nausea have frequently been linked with other chronic illnesses including arthritis, heart disease, and hypertension. The authors noted that the psychological effects of diabetes were more pronounced than the physical, and these were expressed as feelings of deprivation relating to diet along with feelings of nervousness, mental weariness, and worry relating to the complications of the condition (Samuel-Hodge et al., 2000).

During the investigation by Samuel-Hodge et al. (2000), women reported a significant amount of stress in their daily lives, much of which was not directly linked to their diabetes. The authors highlighted three classes of stress: time of life, multiple care-giving responsibilities, and general health (Samuel-Hodge et al., 2000). Various degrees and causes

of stress were noted for women at different times of life, such as child-bearing age groups or those in retirement, for example. Women who were retired or living alone claimed to experience little or no stress, while women who worked or had caring responsibilities for relatives described numerous stressful experiences (Samuel-Hodge et al., 2000). Stress at work was linked to work environment, shifts, and multiple jobs. However, the multiple caregiver role was identified by a number of individuals as potentially the most significant cause of stress, exacerbated by a perceived lack of compassion from family members. The demands of family members with respect to physical labour linked to the caregiving role were not lessened in response to a diagnosis of diabetes, nor did such family members offer increased emotional support (Samuel-Hodge et al., 2000).

### **2.3. Social Support**

Social support is considered to be an important factor in terms of its influence on self-efficacy and disease self-management (Sarkar, Fisher, & Schillinger, 2006; Funnell, 2010; Dale, Williams, & Bowyer, 2012). Additionally, when people with chronic diseases have positive social support in their life, it improves their quality of life, as well as their health (Gonzales, Haan, & Hinton, 2001). In a similar manner, individuals with diabetes see improved health when they have social support or assistance from others (Morrow et al., 2008). Social support is a dynamic process that relates people to their social networks to work together to achieve their needs and become responsible for available resources, as well as providing the support to cope with new conditions (Boas, Foss, de Freitas, & Pace, 2012).

#### **2.3.1. Social support definition**

The definition of social support is interaction and help given by one person to another; this can also extend to a group of people (Shumaker & Brownell, 1984). Taking the example of a person suffering from diabetes, family, social networks, friends, and cultural beliefs can all count as affecting factors, impacting on a person's skills at coping with the sickness (Janice et al., 2010; Schiøtz et al., 2012; Shayeghiana et al., 2015). Diabetic patients suffer a great deal when this medical condition leaves them exasperated, and their eating choices must be changed, which has a direct effect on their lifestyles. Thus, emotional support can play a vital role in maintaining patient composure and mental wellbeing (Kleinman, 1980).

Social support is defined as “the degree to which a person's basic social needs (affection, esteem or approval, belonging, identity, and security) are gratified through interaction with

others” (Thoits, 1982, p. 147). In addition, such needs “may be met by the provision of socio-emotional (affection, sympathy and understanding, acceptance and esteem from a significant other), or by the provision of instrumental aid (advice, information, help with family or work responsibilities, financial aid)” (Hannigan and Coffey, 2003, p. 67). Social support has a positive effect on chronic diseases and is also connected with improved ability of self-care (Evangelista & Shinnick, 2008). Studies have also suggested that positive social support for people with chronic illness enhances their quality of life as well as their practical health status (Goodall & Halford, 1991; Morrow et al., 2008). Cohen, Gottlieb, and Underwood (2000) defined social support as “Social resources that persons perceive to be available or that are actually provided to them by non-professionals in the context of both formal support groups and informal helping relationships” (Cohen et al., 2000, p. 4).

Cohen et al.’s (2000) definition is particularly applicable to the objectives of this study, and is adapted here to refer to social resources that a person perceives as coming from family members, friends, healthcare professionals, and spouses.

### **Types of social support**

Types of social support are often characterised and referenced in the psychological literature as informational support, tangible or instrumental support, and emotional support. Emotional support is support that is concerned with an individual’s feelings related to their existence, and being loved and cared about. Thus, it is comprised of attractive feelings of self-esteem (Agarwal, Hamilton, Crandell & Moore, 2010). Informational support deals with feedback and support for problem resolution with the help of written or verbal information, while tangible or instrumental support refers to direct assistance provided to an individual (van Dam et al., 2005). This study adapted all three types of support, from various sources, in order to improve health outcomes and to answer the research questions in order to explore the effect of different sources of social support such as family, friends, spousal and emotional support, information, and instruments such as formal support groups and informal helping relationships.

### **2.3.2. Sources of social support**

#### **Healthcare Professional support**

Diabetes is a lifelong disease that requires regular consultation with healthcare professionals. Thus, the support of these professionals is essential for effective diabetes management (Stewart, 2000). Support offered by HCPs can include emotional support, giving information regarding the latest self-care trends, and providing affirmations (Gleeson-Kreig, 2008; Tang, Brown, Funnell & Anderson, 2008). It has been established through many studies that learning to self-manage diabetes is strongly dependent on the help and support received from HCPs. According to one survey, more than 40% of people taking that survey agreed that they received the greatest social support from their physician in terms of managing their diabetes (Stewart, 2000; Tang et al., 2008). The main intention behind social support is to empower the people living with chronic diseases and their families to help them gain control of their lives. For a person living with diabetes, this can improve quality of life significantly (Miller & DiMatteo, 2013).

By carrying out patient-centred activities, healthcare practitioners can also promote self-management in diabetic patients (Heisler, Bouknight, Hayward, Smith, & Kerr, 2002; Ahmad, Ellins, Krelle, & Lawrie, 2014). Effective patient-physician communication may be particularly important for patients who rely primarily on their physician for support (Rosenfield, 1992; Heisler et al., 2002). Evidence also suggests that when the providers display superior communication skills, patients practise better self-management. HCPs must thus pay attention to various aspects such as verifying patient understanding, managing the style and content of verbal interactions, determining perceptions of key messages, and other strategies that foster behavioural change (Kadirvelu, Sadasivan, & Ng, 2012). There should be a negotiation of goals to help healthcare providers and patients achieve a balance between accepting medical care and the patient's desire to live a normal life; the importance of self-management and engagement in the procedure must be emphasised (Gensichen et al., 2009; Oftedal, Karlsen, & Bru, 2010).

Each patient should have their strategy individually designed, as each person has their own limitations and a distinctive set of needs and risks. This type of personalised strategy is based on the principle that similar treatments given to different patients suffering from chronic disease may have different responses (Oftedal et al., 2010). If every patient were considered

using the same broad-brush approach, this would result in indifference towards an individual's characteristics and their social culture. This has significant possibilities for adding value to the management of patients suffering from chronic disease by improving quality of life, providing the required treatments, and being more cost effective (Gensichen et al., 2009; Oftedal et al., 2010). The practical support provided by healthcare practitioners is essential to meet the expectations of patients in terms of them being able to perform diabetes control actions. Once healthcare professionals build up trust and empathy with the patient, they can help them by providing practical and ongoing support on an individual basis (Gensichen et al., 2009; Oftedal et al., 2010).

Regardless of the fact that this has seldom been addressed in T2DM research, the significance of building up self-management has been highlighted in some studies. It has been reported in the current study that the diabetic patients have received inadequate results related to gathering practical information from doctors. It has been shown that healthcare practitioners consider it to be not just the healthcare system's basic concern, but rather a matter for the individual's family (Gensichen et al., 2009; Oftedal et al., 2010).

Continuous support is needed from healthcare providers for diabetics, particularly with reference to self-management, as managing the prescribed lifestyle behaviours poses a major challenge for patients (Gensichen et al., 2009). Patients' results with respect to the control of diabetes have been very poor despite modern technology-based approaches and drug-delivery systems (Weatherall et al., 2006). This suggests the need to go down the route of increased doctor-patient communication, placing more emphasis on personal rapport and contact. This seems to be especially important for patients suffering from chronic diseases (Gensichen et al., 2009).

### **Support from Family and Friends**

As well the support by HCPs, it is very important for the patient that family and friends give support to help tackle social obstacles and implement personally managed behaviour (Kadirvelu et al., 2012). Personally managed behaviour specifically includes diabetes-related tasks such as testing glucose levels, injecting insulin into the body, diet planning for diabetes control, checking the feet, and increasing physical exercise to remain fit. These tasks take place within a specific social configuration and can affect daily social and family timetables (Kadirvelu et al., 2012). Furthermore, it is only the patients who must undertake

these behavioural changes (Martire, 2005; Chlebowy, Hood, & LaJoie, 2010). If the patient obtains practical and emotional support from family members and friends, however, this can have a positive effect on increasing diabetes self-management behaviours. This effect has been found in studies among White, African-American, and Latino adult diabetes patients, supporting the idea that there is a positive relationship between the assistance of friends and family members and the food patients consume, the physical exercise they take, and their adherence to foot care, sugar testing, and taking medication as per instructions at the correct times (Chlebowy et al., 2010). According to studies featuring both research and experiments, the involvement of the patient's family in psychosocial interventions can improve the results for long-term diseases such as diabetes (Martire, 2005; Chlebowy et al., 2010). However, with type 2 diabetes, the role of family and friends is often neglected, according to specific adult diabetes-intervention studies (Martire, 2005; Chlebowy et al., 2010).

Though the assistance provided by society can be a positive resource, clinicians must be aware that there can also be negative impacts that can obstruct self-care behaviours alongside reducing self-management objectives (Carter-Edwards, Skelly, Cagle, & Appel, 2004; Gallant, 2007). In many cases, assistance from the family and friends is given without any restrictions and boundaries, but there should be provision for this to be provided only while respecting certain principles (Carter-Edwards, 2004; Gallant, 2007). Normally, family assistance should be provided when the disease is first diagnosed and in its initial stages, particularly when the person is not so ill, and there is a low level of diabetes complications. However, family and friend assistance should be minimised over a period of time as the disease is brought under management (Carter-Edwards, 2004; Gallant, 2007). This is necessary, as qualitative studies suggest that patients may face criticism or harbour guilt if they consistently receive help and assistance from family members and friends, and this can ultimately lead to a worsening of the patient's condition (Carter-Edwards, 2004; Gallant, 2007). Younger patients and those who are functioning well but have parents, children and spouses who are active in various activities are affected more by these family barriers to self-care. Other restrictions may include patients who have bad relationships with their families and are not very social; these factors can reduce the efficacy of diabetes management (Carter-Edwards, 2004; Gallant, 2007).

It is thus very important for medical personnel and clinicians to be aware of the positive impact the assistance of family and friends can produce, but to take into consideration



possible family barriers to self-care, even where there are good relationships within the family and patients are functioning well. This should be applied particularly to younger and female patients (Samuel-Hodge et al., 2002; Beanlands et al., 2005; Franks et al., 2006).

Fritz et al. (2016) reported that, while patients and providers agreed that family is central to Arab culture, they expressed different views regarding the effect of family upon long-term self-care management of diabetes. While providers frequently cited the family as a valuable source of support and argued that patients were unlikely to perform self-care management effectively without the support of their families, the patients themselves did not regard their families as actively assisting in self-care management endeavours. Furthermore, the patients tended to blame their families for day-to-day stress and further blamed their difficulties in long-term self-management on this stress (Fritz et al., 2016).

According to Engström, Leksell, Johansson, and Gudbjörnsdottir (2016), the levels of support received from family, friends, colleagues, managers, acquaintances, other diabetic patients, and so on, tended to vary according to circumstances and over the course of time. The nature of necessary support might be linked to maintaining a healthy lifestyle, understanding and adapting to the requirements of management, or developing a better understanding of the dangers of hyperglycaemia (Engström et al., 2016). When the support offered by others was appropriate to the needs and desires of the individual, it generated a perception of solidarity and assistance that acted to limit the perception of illness as an obstacle. The absence of support, in contrast, engendered a sense of isolation and disillusionment that exacerbated the strain of dealing with diabetes (Engström et al., 2016). Nevertheless, the presence of support from others might be seen as intolerable if the individual is held under constant supervision or criticism, with constant remarks about the individual's dietary needs leading to feelings of shame or of being public property (Engström et al., 2016). The individual may also resent the feelings of dependency or of being a nuisance engendered where such feelings are associated with the need for support. This is unfortunate, as the presence of friends and family may demonstrate their appreciation of the importance of the patient's struggle; Jones et al. (2008) argued that, in cases where friends and family make the management process more difficult, it is because they do not appreciate the extent of the challenges involved in diabetes care. In general, friends and family who make themselves available seemed eager to improve their understanding of management of the disease in order to offer enhanced support.

One of the main obstacles for Saudis trying to adhere to a healthy diets is the expected socialising between extended families. Guests are expected to eat large amounts, and this can make it difficult for people with T2DM to stick to healthy diets (AlQuaiz & Tayel, 2009). The community therefore plays a major part in undermining individuals' efforts, and in addition, 77% of respondents stated that they received no support in undertaking additional physical activity (AlQuaiz & Tayel, 2009). The situation is exacerbated by a lack of healthy environments, and these factors make it more difficult to manage T2DM.

### **Spousal support for people with T2DM**

The spousal relationship has received attention from social support researchers and its relationship with self-care behaviours in people with diabetes has been extensively studied. It is suggested that higher marital intimacy and better marital quality is associated with better self-care behaviours as well as reduced diabetes-related stress and better diabetes adaptation (Kadirvelu et al., 2012). Marital quality has been described as a diffuse and vague construct, however. More specific patient-spouse interactions surrounding self-care behaviour thus need to be defined to obtain an in-depth understanding of the effect of marital quality on self-care (Trief, Ploutz-Snyder, Britton, & Weinstock, 2004).

Investigations have revealed that male and female patients experience different domestic support. According to Liburd, Namageyo-Funa, and Jack (2007), male patients perceive their wives as their major social support providers and reported that their families gave moral support by making comparable lifestyle adjustments, including diet, as well as actively assisting their self-management of the condition in other respects. In contrast, Antonucci and Akiyama (1987) found that women reported less support from their husbands, although this was offset by support from broader networks, including siblings and children. Mathew, Gucciardi, De Melo, and Barata (2012) also argued that men may perceive their condition as being detrimental to their sense of masculinity, thus limiting their search for support to their wives and closest family in order to limit the number of people who know about their illness to avoid any change in the wider public's perception of them.

### **2.4. Social Support Network**

For a person living with diabetes, it is often necessary to make changes in lifestyle as suggested by the treatment guidelines, which makes the social world an important factor in helping with the process (Brunton, 2008). Sometimes, the connections in a social circle may

have a negative effect on a patient's ability to provide self-care. Observation of the social support system is thus necessary to better understand the impact of social networks on health-related outcomes (Sjolander & Ahlstrom, 2012; Laranjo et al., 2015). Among men, morbidity and mortality risks are higher where there is a lack of social relationships. However, the presence of positive social support can increase the quality of diabetes self-management by assisting with adherence to medication, dietary restrictions, and exercise schedules; reducing depression; and encouraging avoidance of smoking, which ultimately results in improved clinical outcomes and quality of life (Ciechanowski et al., 2010; Ahmad et al., 2015). Many supporting studies have found a positive relationship between social support and self-care improvements, making it an important factor in diabetes care (Ahmad et al., 2015; Lee, Bowen, Mosley, & Turner, 2017).

Among diabetes patients, support from society and their peers plays a vital role in diabetes management. Most of the time, social support has a positive effect on self-care, though in some cases, it may have a negative effect (Song et al., 2012; Yin et al., 2015). Interactions that suggest criticism or that offer the potential to develop dependent tendencies can hamper attempts made towards self-care (Song et al., 2012; Yin et al., 2015).

## **2.5. Adherence to T2DM self-care activities in Saudi Arabia**

According to Abu Sabbah and Al-Shehri (2014), good self-care helps support good glycaemic control. This means that patients must adhere to the various self-care activities recommended to them by their healthcare professionals. This includes observing various expected behaviours, in particular living a healthy lifestyle that includes physical exercise, healthy eating, reduction in tobacco consumption, and weight management. Another important finding is that participants generally had poor glycaemic control despite most reporting taking their medication as prescribed (Al Johani, Kendall, & Snider, 2015). These study participants demonstrated low levels of compliance with most other self-management practices, which indicates that they did not understand the importance of these practices in terms of moderating their blood glucose levels and minimising the possibility of developing undesirable complications of the disease (Al Johani et al., 2015). Furthermore, the finding that only 15% of participants had good glycaemic control is strong evidence that medication alone is not the answer to the effective management of type 2 diabetes mellitus. These findings reflect serious limitations in the way type 2 diabetes mellitus self-management is promoted in many locations (Al Johani et al., 2015). According to Kassahun, Gesesew,

Mwanri and Eshetie (2016), patients with low levels of education have lower adherence to self-care activities than those with higher levels of education, as less educated patients may find it more difficult to understand treatment recommendations from healthcare professionals (Kassahun et al., 2016; Ishak, Yusoff, Rahman, & Kadir, 2017).

Al-Aboudi, Hassali, Shafie, and Saleem (2016) argued that families provide motivation, which plays a therapeutic role and ensures that an increase in adherence to self-care activities. Accordingly, there are higher adherence levels among patients who have good family support as compared to patients who have less family support. Family and friends support patients to ensure they are motivated to make the right decisions, follow various recommendations made by healthcare professionals, and undertake the various lifestyle changes that are expected.

## **2.6. Conceptual Framework**

There are two conceptual bases for this study. The first is the theoretical framework of Bandura's theory of self-efficacy, which explains the perceptive competencies people have that assist them in evaluating incidents and situations in order to take decisions to change their behaviours (Bandura, 1977, 1986, 1995, 1997). The second is the theoretical framework of Cohen (1988), a social psychologist who has researched the relationships between social support and health.

### **2.6.1. Self-efficacy theory: An overview**

Self-efficacy theory, as conceived by Bandura, is the guiding structure for this study (1977). This theory was postulated based on Social Cognitive Theory (Bandura, 1986), and refers to the exercise of human agency through people's beliefs in their capabilities to produce desired effects by their action (Bandura, 1997). Thus, self-efficacy theory identifies the way specific actions are demonstrated by people in order to cause particular outcomes (Bandura, 1986, 1997). Self-efficacy beliefs identify how individuals think, feel, behave, and encourage themselves (Bandura, 1994), and in many ways, a strong feeling of efficacy improves human achievement and individual wellbeing (Bandura, 1994). Individuals with high levels of confidence in their abilities approach difficult assignments as challenges to develop their expertise rather than as obstacles to be avoided; they give themselves challenges and take strong responsibility for their actions (Bandura, 1994). Moreover, they

intensify and sustain exertion in the face of failure; as a result, they generally rapidly recover their feelings of efficacy following any failures (Bandura, 1994).

Self-efficacy consists of two main notions, efficacy expectancy and outcome expectancy. Efficacy expectancy is the estimation of ability to achieve a certain level of performance, symbolised by capability, while outcome expectancy is the probable consequences the behaviour will create, which signifies conviction about results (Bandura, 1986). For example, people who have become adapted to diabetes self-care may perform self-care effectively, but they may not believe in their ability to carry out the necessary behaviours successfully (Girdwood, 2004).

According to Bandura's (1986) social cognitive theory, self-efficacy refers to a person's belief or sureness that they can accomplish starting and carrying out a behaviour or activity. As a mechanism of change behaviour, it is thus essential that self-efficacy is well-established (Bandura, 1997). In addition, social cognitive theory offers *a human agency perspective*, in that the person chooses to perform in a confident way and can thus regulate or manage their activities based on individual, community and environmental feedback (Bandura, 1986). This feedback also affects the main beliefs or insights around a person's abilities, rather than their actual competencies, and in thus encourages actions (Bandura, 1997). Bandura (1997) argues that self-efficacy is task-focused, and represents an obligation that must be constructed over time, which may well be subject to modification during its duration. The principles of self-efficacy are controlled by four main sources: expert experience or life capabilities and achievement; vicarious experience or seeing comparable persons being successful in a similar task, including societal modelling; community encouragement or oral persuasion from others; and affecting state, or emotional state as it affects the self-evaluation of individual strengths and weaknesses, both physiological and emotional (Bandura, 1997).

Several studies have shown that self-efficacy is an important factor for self-management of illness (Glasgow et al., 2001; Krichbaum, Aarestad & Buethe, 2003). According to Bandura (1997), as self-efficacy assists in forecasting individual-level behaviours, enhanced self-efficacy can be predicted to develop the self-management of illness; thus, if self-efficacy can be built up at an earlier age, this increased self-efficacy may support avoidance of, or delay the onset of, illnesses. High self-efficacy increases levels of self-management of illness, while lower self-efficacy reduces levels of self-management of illness. What is more,

self-efficacy impacts the relationship between self-management and social support (Bandura, 1997).

The concept of self-efficacy is based on social cognitive theory, which describes the interactions between behavioural, personal, and environmental factors in both health and chronic disease conditions. The theory of self-efficacy proposes that patients' confidence in their ability to perform health behaviours influences which behaviours they engage in (Bandura, 1997; Lorig & Holman, 2003). As diabetes self-management incorporates behavioural, personal, and environmental factors in the daily performance of recommended activities, the concept of self-efficacy is highly relevant. Evidence suggests that the implementation of self-efficacy is successful for the appropriate self-management of many chronic health conditions (Bernal et al., 2000; Aljaseem, Peyrot, Wissow, & Rubin, 2001), although in the specific context of diabetes, the research findings have demonstrated mixed results for interventions attempting to improve self-management behaviours through improved self-efficacy (Glasgow et al., 2001; Krichbaum et al., 2003; Maddigan, 2004).

Although a few recent studies have addressed particular racial/ethnic minority populations (Skelly, Marshall, Haughey, Davis, & Dunford, 1995; Lorig, Ritter, & Jacquez, 2005), little is known about the applicability of self-efficacy research to ethnically diverse low-income patients with diabetes. In these populations, access barriers (Karter, Ferrara, Darbinian, Ackerson, & Selby, 2000) including the cost of treatment (Piette, Wagner, Potter, & Schillinger, 2004) and cultural beliefs (Schorling & Saunders, 2000) may be key determinants of self-management behaviours. To the extent that these factors contribute to high rates of failed attempts or lack of modelling of successful behaviours, they may also contribute to lower self-efficacy.

Within this patient population, individuals with limited health literacy may be especially vulnerable. A growing body of research demonstrates that limited health literacy, a prevalent problem in vulnerable populations, is independently associated with poor self-rated health (Weiss et al., 1992; Berkman et al., 2005), higher utilisation of services (Howard, Gazmararian, & Parker, 2005), less access to preventive services (Scott et al., 2002), and worse glycaemic control and hence more diabetes complications (Schillinger, 2002). Therefore, self-efficacy may be a relevant determinant of self-management behaviours among populations with limited health literacy (Fisher et al., 2004; Kim et al., 2004).

### **2.6.2. Cohen's social support theory**

Given the complex nature of this lifelong condition, the consistent application of care cannot be sustained entirely by the individual. Several complex factors, referred to as the social determinants of health, are thus viewed as primary influencers and are considered to be the best predictors of health outcomes, both at individual and population level in the physical and social environments that affect health (Mikkonen & Raphael, 2010). One such determinant is social support (Cohen, 1988), which reflects the second theoretical framework of this study. Cohen's (1988) basic theory is built on the concept that social support, along with additional factors, such as socioeconomic status, stress, mental health, and character, has a remarkable influence on health (Cohen & Wills, 1985; Cohen et al., 2000).

As a multifaceted experience, the concept of social support involves voluntary associations and formal and informal relationships with others (Bardach et al., 2011). It is a perception that one is accepted, cared for, and given assistance from certain individuals or a specific group or the realisation of actual support received from another (Bardach et al., 2011). Social support can be positive or negative and can arise from many sources, including family members, friends, and spouses (informal support) and healthcare professionals and organisations (formal support) (Ford, Tilley, & McDonald, 1998; van Dam et al., 2005). It may also be perceived differently based on the recipient's gender, racial or ethnic background, or cultural practices. It is a construct thought to mediate improved self-management practices and healthcare outcomes. In contrast, social networks are considered to be webs of social relationships and social linkages, distinguished from social support (van Dam et al., 2005). Social networks are best gauged by size and should include all individuals in a person's environment who provide support (Ford et al., 1998; Bardach et al., 2011).

The application of Cohen's (1988) social support theory suggests that higher levels of social support are a positive factor for improved healthcare decision making and motivation to undertake self-care, leading to improved clinical outcomes. Furthermore, it will inevitably encourage behavioural changes with regard to other self-care activities relating to medication adherence and the adoption of nutritional and active lifestyles.

Cohen (1988) focused on developing the concepts associated with social support, stress, and health. His understanding of social support is as a wide-ranging term incorporating diverse

aspects of a person's network of social facility (Cohen, 1988). The basic theory is built on the concept that social support, along with additional factors such as socioeconomic status, stress, mental health, and character, have a distinct influence on health (Cohen et al., 2000).

The term social support can be problematic, however, and in-depth investigations of it were conducted by researchers in the mid-1970s and early 1980s (House, 1987; Hupcey, 1998). There is still little agreement in relation to the operational definition of social support (Hupcey, 1998). Nevertheless, there are some agreements with regard to the characteristics of social support, which are threaded through the multiple definitions of social support. All social support definitions suggest the idea of positive support or interactive behaviours provided to an individual who is in need of support (Hupcey, 1998).

### **2.6.3. Self-care, self-efficacy theory, and social support theory**

In a general sense, self-care refers to the aptitudes that people must possess in order to deal with their medical conditions (Goodhall & Halford, 1991). This study draws on self-care due to the fact that type 2 diabetes generates several potential complications that patients can prevent by the effective practice of five self-care behaviours: regular exercise, foot care, healthy diet, close monitoring of blood sugar, and taking medication (Montague et al., 2005).

Richard and Shea (2011) define self-care as the capability of a person, their family, society, and health professionals to manage medical conditions in ways such as implementing adjustments to routines and coping with the effects of a condition with regard to cultural, psychosocial, and spiritual aspects. This definition is used in this study due to its suitability for the Saudi Arabia context, where self-care takes the form of individuals maintaining or adopting healthy lifestyles in order to improve their health and wellbeing.

Individuals with long-term conditions such as diabetes are more likely to participate in, and benefit from, self-care that allows them to have more control over their care and adapt it to suit their needs. Each person has a unique set of needs, so a generic care plan will not suit all patients (Puziah et al., 2016). For diabetics, social cognitive theory also supports the idea that self-efficacy can help improve self-care. The definition of self-efficacy, as per Sarkar, Fisher and Schillinger (2006), is the belief a person has in themselves and their surroundings that they can carry out tasks with a specific aim; thus, it is the confidence an individual has in themselves to effectively change a given situation. Self-efficacy is a component of a *self-*



*system* that establishes connections between information and action, and action and results. Bandura (1986, 1994) thus observed that a person's thoughts can influence their behaviour.

Most diabetics in Saudi Arabia do not exercise very high levels of self-care or self-efficacy and have bad control over their blood sugar (Al-Aboudi, Hassali, Shafie, & Saleem, 2016). Those who do practice good self-care were also found to have higher levels of self-efficacy, confirming the positive correlation between the two elements (Al-Aboudi et al., 2016). When designing educational material and other resources for diabetic management, it is therefore important to include the theory of self-efficacy. More specifically, healthcare professionals should take account of the following self-efficacy elements: regular physical activity, healthy diet, and blood sugar monitoring, with the aim to maximise self-care and promote optimum blood glucose control (Al-Aboudi et al., 2016).

A particular kind of self-efficacy that is relevant to diabetes self-management (DSM) concerns individuals' beliefs in their own capabilities to carry out various DSM behaviours. The improvement of DSM is a continuing challenge for healthcare professionals worldwide, including in Saudi Arabia (Saad et al., 2018). Therefore, in the process of trying to achieve improved management of diabetes, it is helpful to establish DSM behaviours and self-efficacy in diabetes control and to analyse their impact on blood sugar management, as well as establishing areas in which patients require extra assistance (Al-Khawaldeh, Al-Hassan & Froelicher, 2012).

A study of Saudi Arabian diabetes patients found a strong correlation between self-efficacy and self-care behaviours. The findings showed that self-care was related to self-efficacy, as those patients with greater belief in their ability to perform the five self-care behaviours displayed better self-care (Saad et al., 2018). The same study discovered that the necessary behaviours had an effect on the level of self-belief felt by patients. For instance, some patients had a high level of confidence in themselves to stick to a healthy diet, but were less sure of their commitment to regular exercise (Al-Khawaldeh et al., 2012). These observations support the theory that people are more likely to seek out tasks and situations where they believe they will achieve success, avoiding those they feel are beyond their abilities (Bandura, 1977). The group of patients in this study that exhibited higher levels of self-efficacy also had high levels of self-management in terms of the aforementioned five self-care behaviours (Al-Khawaldeh et al., 2012).

Social support is also related to self-care; several studies have shown that those patients receiving support from their family, friends, spouses, and healthcare professionals were better able to manage their diabetes and perform self-care behaviours (Gleeson-Kreig, 2008; Chlebowy et al., 2010; Kadirvelu et al., 2012). In a general sense, *social support* can be seen as a sharing of resources between two or more people with the purpose of creating improvement in the recipient's well-being (Shumaker & Brownell, 1984). Therefore, when a diabetic negotiates with friends, family, healthcare professionals, and their community for resources that are helpful for their self-care, social support is in action (Pouladi, 2018). There are other aspects to social support, such as education, love, encouragement, and care (Sausa, 2003), but the definition used in this study is that of Lin (1986, p. 18), which states that social support is "the perception of actual instrumental and expressive care provided by family, friends, other people in the community, and social workers". This definition is suited to the Saudi Arabia context, where social support can be understood in terms of the help and support that individuals with T2DM receive to manage and improve their medical conditions from their family, friends, neighbouring society, and health professionals.

The social support theory also takes into account that some social interactions may inadvertently have a detrimental effect on a patient's self-management (Wortman & Conway, 1985; Krause, 1990). This may be due to misunderstandings about diabetes or the requirements for care on the part of family and friends. While their actions may be well-intentioned, they may offer advice that contradicts that given by health professionals and can encourage unhealthy behaviours such as cooking unhealthy meals or smoking (Wortman & Conway, 1985; Krause, 1990).

It is possible that different illnesses require differing methods of social support delivery and different self-care behaviours may invite varying results in terms of social support. Patients with complex needs benefit more from a lot of support, while complicated routines tend to cause stress to the patient and create lower levels of self-efficacy. Those behaviours that have a social element to them, such as eating healthy food, are more susceptible to outside influence than, for example, taking medication (Gallant, 2003).

Cohen and Wills (1985) stated that social support can help improve a person's self-efficacy by arming them with the knowledge required to carry out certain tasks, making those tasks feel less daunting. It is thus important that a person dealing with a stressful medical condition is surrounded by the people and resources that enable them to cope (Helgeson, 2003).

Self-efficacy theory refers to a patient's ability to effectively follow a personal care plan in order to control blood sugar and manage their condition. Effective self-management of T2DM is related to the ability of the individual to carry out self-care practices that minimise the symptoms and prevent the negative side-effects of the disease (Al-Khawaldeh et al., 2012). McDowell, Courtney, Edwards, and Shortage-Baggett (2005) support the idea that intense consideration must be given to the management of T2DM in order to avoid complications; they also note that management should include a healthy diet, regular exercise, taking prescription medication, monitoring blood sugar, and foot care. These findings will be considered alongside the theories by Bandura (1986) and Cohen (1988).

In the present study, self-efficacy theory and social support theory are applied due to their suitability in exploring of the complexity of Saudi Arabian T2DM patients' self-care activities and management in relation to personal, cultural, religious, stigma, and social support factors, defined as environmental variables. Self-efficacy is a significant predictor of the level of self-care practice among Saudi patients (Saad, 2018). Self-efficacy theory thus provides a scientific rationale for the present study, highlighting that lower self-confidence in self-care proficiency can undermine T2DM management. Social support theory confirms the results, showing how respondents' perceptions of social support received affects their practice of self-care activities. Nevertheless, support from family, spouses, and HCPs offers a crucial resource for strengthening implementation of diabetes self-care activities among Saudi T2DM patients.

Ultimately, these theories help develop a broad perspective on the means through which Saudi T2DM sufferers practise self-management activities, as well as the effects of social support on their self-care activities. These theories underpin the results of the present study, as self-efficacy and confidence were found to enhance patients' optimism and self-belief in their abilities to successfully manage T2DM and secure more favourable outcomes. Social support theory confirms that patients benefit from adequate self-care when receiving support from family, spouse, friends and HCPs.

Self-efficacy theory and social support theory are seen to apply strongly to Saudi Arabia, where peoples' decisions and actions are considered to be seriously affected by their family and community. However, little research exists concerning the relevance of self-efficacy theory and social support theory in Saudi Arabia, although literature reviews focusing on East Asia and the Middle East more broadly may be applicable, given the similarities of

culture. Ultimately, these theories facilitate diabetic healthcare teams' sound comprehension of self-care and social support, enabling greater empathy with patients and improving planning for patient care.

## **2.7. Conclusion**

This chapter discussed the definition of self-care, patient empowerment for the practice of self-care activities, and barriers to self-care activities; this was followed by a discussion of social support and the conceptual framework. The following are the key findings:

- Diabetes self-care activities are the cornerstone of managing T2DM, and patients with T2DM must take responsibility for self-managing the condition constantly on a day-to-day basis
- The empowerment of patients is essential to achieve successful diabetes self-care
- A multidisciplinary team is required for effective diabetes management
- Stigma and culture are significant challenges facing patients coping with and managing diabetes
- A lack of social environments, such as absence of public places for exercise, affects adherence to physical exercise regimes
- HCPs should maintain effective communication with patients to improve diabetes self-care
- Individuals with T2DM need support from the people around them, HCPs, and their communities in order to facilitate self-care behaviours
- Conceptual Framework: Individuals with T2DM, a chronic condition, must perform diabetes self-care activities in their daily lives, which is a complex task. Self-efficacy theory explains individual beliefs about the capabilities to practise these self-care activities to manage such conditions, while social support theory explains that individuals with T2DM need support from HCPs and social bodies to perform diabetes self-care activities

The next chapter presents a systematic global literature review to explore the impact of healthcare professional and social support on diabetes self-care activities among people with T2DM.

## **CHAPTER THREE: LITERATURE REVIEW**

### **3.1. Introduction**

This chapter introduces and reviews relevant literature in this area of research. A literature review can generally be defined as a “comprehensive study and interpretation of literature that addresses a specific topic” (Aveyard, 2010, p.5). This review focused specifically on the role of healthcare professionals (HCPs) and those providing social support (family/spouse/friends) in initiating and maintaining self-care activities for patients with T2DM. Significantly, it has identified the need for further studies to be undertaken in relation to HCPs, family and friends supporting the self-care activities of Saudi Arabian-based patients with T2DM.

### **3.2. Literature search strategies**

A comprehensive literature review was conducted to inform and direct the emerging study goals, recognise and clarify concepts and provide an overview of the available evidence to demonstrate the need for further research. According to Boote and Beile (2005), the primary purpose of a literature review is to highlight the gaps in previous research and to assist the researcher to re-focus. The current chapter comprises three sections. In Section One, a comprehensive literature review of relevant studies on this topic was undertaken, which sets out the search strategy and process; Section Two comprises an appraisal and quality review of these studies; and Section Three presents the key themes and findings from the review.

### **3.3. Objectives of the comprehensive literature review**

In terms of more specific objectives, this chapter aims to lay a solid foundation for subsequent empirical stages by identifying key trends in self-care activities for patients with T2DM, and the support role played by HCPs, family, spouse and friends. The following objectives were addressed based on identified themes and trends that emerged from the literature:

- To identify the level of diabetes self-care activities carried out by T2DM patients
- To identify the effectiveness of family, spouse and friends’ support in adherence to self-care activities by individuals with T2DM

- To identify the impact of HCP support for patients with T2DM in the management of their diabetes
- To identify the effect of the lack of support from HCPs, family, friends and spouse on participation in self-care activities by patients with T2DM
- To identify the barriers and challenges to activation of diabetes self-care activities by patients with T2DM

### **3.3.1. Research questions informed by the comprehensive literature review**

It is envisaged that the literature review will address the following research questions:

- What level of self-care activities are T2DM patients engaging in?
- What is the impact of social support on adherence to self-care activities by patients with T2DM?
- What is the effect of HCPs' support in motivating people with T2DM to commence diabetes self-care activities and manage their condition?
- What are the barriers and challenges that impede T2DM patients from putting self-care activities into practice?

### **3.3.2. A comprehensive literature review**

This chapter initially sets out the comprehensive search strategy that was employed in this research process, prior to the researcher critically appraising the retrieved studies. Relevant studies have clearly provided a solid foundation on which to conduct the current study, as well as to outline the requirements necessary to enhance the role of HCPs, family, spouse and friends in supporting patients to engage in self-care diabetes activities, on an ongoing basis. Significantly, to the best of my knowledge, no studies have been conducted to date that comprehensively examine the impact of the role HCPs and social support play in engagement in self-care activities among Saudi Arabian adults diagnosed with T2DM. This is particularly important, given that the incidence of T2DM continues to increase, with relatively few people with this condition able to manage the lifestyle modifications required.

### **3.3.3. Search strategy and process**

According to Greenhalgh (2014), a research strategy can be defined as a systematic review that acts as a summary of the main studies, and constitutes the objectives, tools and methods

used in the research. Furthermore, Brettle and Grant (2004) have viewed it as primarily building an evidence base, as is the case in this particular study, where the effect of the role of HCPs and social supporters is explored in the self-care of those with Type 2 diabetes. It comprises several steps, including: initially clearly defining the keywords encapsulating the study goals and objectives; identifying the inclusion and exclusion criteria; and finding related sources, having conducted a guided keyword search. In this study, the systematic search strategy developed by Brettle and Grant (2004) was used to guide the search process, combined with a critique conducted within a well-defined framework developed by the Health Care Practice Research and Development Unit (HCPRDU) (Long et al., 2002a, 2002b).

The systematic search strategy involved searching the main electronic databases, such as the Cumulative Index of Nursing and Allied Health Literature (CINAHL), which is the most comprehensive resource available, comprising four databases: the MEDLINE database, which contains numerous academic and medical scientific journals and provides authoritative medical information on medicine, nursing, healthcare systems and pre-medical science; the PubMed database, which is a free digital archive of biomedical and life sciences developed by the United States (US) National Institute of Health; the OVID database, which comprises many academic and medical scientific journals; and the British Nursing Index, a British database that seeks to redress certain issues arising as a result of bias found in larger US-based databases. The search was also extended to include Social Services Abstracts, Applied Social Sciences Index and Abstracts (ASSIA), PsycARTICLES Full Text, and finally, Google Scholar. Additionally, the University of Salford catalogue of materials (books, theses and publications only available in printed form) were also reviewed and obtained directly from the university library, where available.

### ***Search strategy***

The search strategy was carried out using a combination of keywords (free text searching) to identify sources of information on non-insulin dependent Type 2 diabetes, Type 2 diabetes in Saudi Arabia linked to self-care, self-management, self-care behaviour, adherence, diabetic educator, diabetic nurse, healthcare team, diabetic care team, physician, social support, family/friends' support and spouse support. Its aim was to source relevant articles on HCP support and social support (families/friends) that influence engagement in diabetes self-care practices by patients with T2DM. A Boolean search technique used a combination

of terms, such as ‘AND’ or ‘OR’, and avoided the use of ‘NOT’ to combine keywords (Coughlan, Cronin & Ryan, 2013) (see Appendices 1 and 2: Key Search Terms).

### ***Inclusion and exclusion criteria***

The inclusion criteria, summarised in Table 1 below, include research based on quantitative, qualitative and mixed methods, in order to capture a wider range of studies in diabetes self-care, healthcare team support and social support. The literature search was conducted within a near eight-year time frame, from January 2010 - November 2017, and influenced by the fact that the Saudi Arabian Government announced a ten-year National Executive Plan (2010–2020) to control diabetes, which includes the establishment of 22 specialised diabetes centres, one in each health directorate (Ministry of Health (MOH), 2014; MOH, 2015; Aitken et al., 2016). Furthermore, the MOH has established a referral process for people with DM, by integrating care pathways across the 2,281 primary healthcare centres (PHCs), 22 specialised diabetes centres and 270 diabetes centres and units in the departments of tertiary care in MOH hospitals (MoH, 2014; MoH, 2015; Aitken et al., 2016).

A further inclusion criterion was studies published in the English language. However, Saudi Arabian-based studies were not excluded as a result, as English is the language used in all formal academic studies published in the field of medicine in the country (Fatani, Mira & el-Zubier, 1987). Moreover, it was essential to focus on studies that examined the role of HCPs, family and friends, and diabetes self-care for people with T2DM, as these three components are considered an integral component in the management of T2DM, through engagement in self-care activities. The study sampling frames included HCPs and people with T2DM, who were the target group for this specific study. In addition, essays, review papers, clinical reports and assignment papers were excluded in order to focus on high-quality, methodologically rigorous studies, published in peer-reviewed journals. A further exclusion criterion was studies that solely described T1DM management, due to the variation between T2DM and T1DM management.



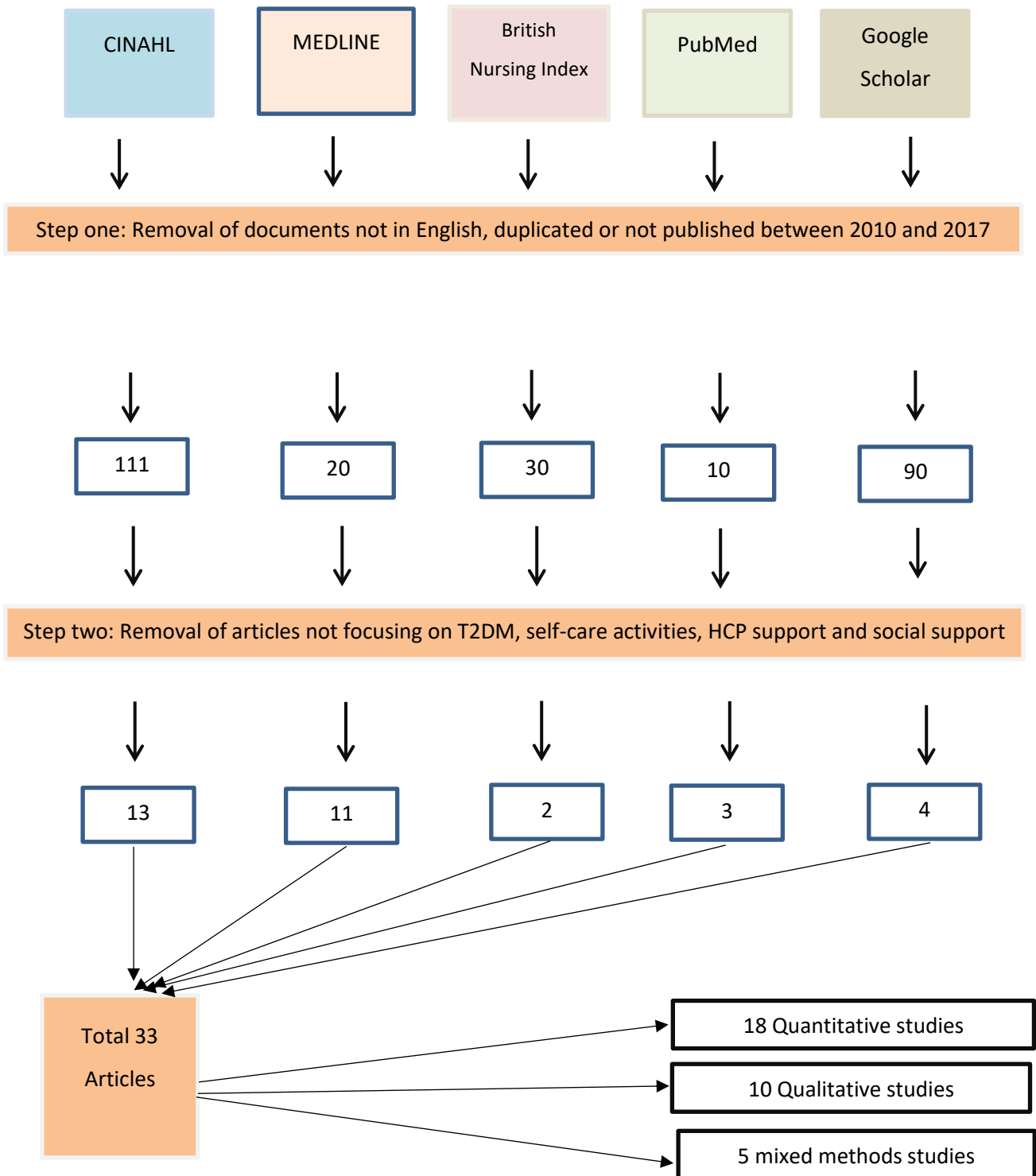
Table 1: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Published between the period 2010–2017.	All articles published before 2010.
English language.	All other languages.
Studies using qualitative, quantitative and mixed methods.	Reports, essays and review papers.
Studies that focused on controlling T2DM, diabetes self-care activities, self-management, social support, HCP support and factors influencing or barriers to diabetes self-care.	Studies that focused on T1DM, children with diabetes, T1DM and gestational diabetes.

***Search results from included and excluded studies***

The researcher used the aforementioned inclusion and exclusion criteria (see Table 1 above) to screen the articles, and by means of this process, only 33 relevant articles were identified (see Figure 2).

Figure 2: Search results from included and excluded studies



### ***Critical appraisal process***

The critical appraisal of these studies was guided by Brettle and Grant's (2004) study. A systematic approach was employed, adhering to the framework developed by the HCPRDU (Long et al., 2002a, 2002b). In total, 33 papers were reviewed (see Appendices 3, 4 and 5 for summaries of the quantitative, qualitative and mixed method studies).

### **3.4. Appraisal and quality review of the studies**

The 33 studies published between the period January 2010–November 2017 consisted of 18 quantitative, 10 qualitative and five mixed methods studies. These studies are analysed in relation to four key areas:

- Aims
- Sample
- Methodology
- Results

The majority of studies took place in the Americas (12 in the US, one in Canada and one in Brazil). The US-based studies, in particular, identified the need to boost support for diabetes self-care through HCPs, family and friends of people with T2DM. Five studies were conducted in East Asia (one in China, two in Malaysia, one in Japan and one in Taiwan), two in Oceania (Australia and New Zealand) and two studies in Africa (Nigeria and Uganda). In addition, six studies were conducted in Europe (Germany, the Netherlands, Denmark, Norway, Portugal and one pan-European). Four studies were conducted in the Middle East (Saudi Arabia, Kuwait, Turkey and the Lebanon). It is noteworthy that these articles focused specifically on the topics of T2DM, self-care activities, diabetes self-care, social support, family and friends' support and HCPs. In addition, these articles emphasised the important role played by HCPs and social supporters in promoting self-care among adults with T2DM.

### ***Aims of the studies***

The aims and scope of the studies selected in this review differed significantly. Twelve studies focused on the relationship between social support and diabetes self-care activities. Of these 12 studies, five assessed how social/family support for patients with T2DM affected

their self-care activities, such as diet, physical exercise, medication adherence and glycaemic control (Gomes-Villas Boas et al., 2012; Mayberry & Osborn, 2012; Sukkarieh-Haraty & Howard, 2014; Mayberry & Osborn, 2014; Harvey et al., 2017). One study undertaken by Huang et al. (2013) compared levels of self-care behaviour, social support and quality of life among patients with T2DM. Shayeghiana et al. (2015) also specifically explored the impact of coping styles on T2DM, along with social support, in the relationship between self-care activities and glycated haemoglobin among T2DM patients. A Turkish study carried out by Sürücü et al. (2017) investigated empowerment, social support related to self-care behaviours and glycaemic control in patients with T2DM. A further study conducted by Komar-Samardzija et al. (2012) examined the relationship between physical exercise and caloric expenditure among African-American women with T2DM and self-efficacy and family/friend social support. Watkins et al. (2013) investigated the correlation between spiritual and religious beliefs and practices, social support and diabetes self-care activities among African-American patients with T2DM. The direct and indirect effects of neighbourhood-related factors and self-care on glycaemic control in patients with T2DM were also examined by Smalls et al. (2015).

In addition, five studies investigated how facilitators, barriers, factors and challenges affect engagement in diabetes self-care activities among patients with T2DM (Chlebowy et al., 2010; Mathew et al., 2012; Jeragh-Alhaddad et al., 2015; Laranjo et al., 2015; Badedi et al., 2016). Only one Saudi Arabian-based study was identified (Badedi et al., 2016), and it assessed factors associated with glycaemic control among patients with T2DM. The study measured diabetes self-care behaviour performance, barriers, family support, the physician-patient relationship and haemoglobin A1c (HbA1c) test results (measure of average blood sugar levels). It also assessed factors such as knowledge of diabetes and attitude to self-care behaviour, physical health, depression, stressful life events and HbA1c.

The Kuwaiti-based study (Jeragh-Alhaddad et al., 2015) specifically explored barriers to medication adherence among patients with T2DM. The factors identified as contributing to such barriers include spirituality and God-centred locus of control, perceptions of social support, beliefs about medicines/diabetes, perceptions of HCPs' attitudes toward patients and social stigma. Three studies by Chlebowy et al. (2010), Mathew et al. (2012) and Laranjo et al. (2015) also focused on identifying barriers, facilitators and challenges in self-management among patients with T2DM. A further three studies assessed and investigated

social/network support and dietary adherence (Watanabe et al., 2010; Stephens et al., 2013; Knutsen et al., 2015), while a study carried out by Vissenberg et al. (2017) explored the effect of the social network-based intervention ‘Powerful Together with Diabetes’ on diabetes self-management among socioeconomically deprived patients with T2DM.

Five studies focused on the effect of HCPs and social support on diabetes self-care activities among patients with T2DM (Goetz et al., 2012; Gao et al., 2013; Venkatesh & Weatherspoon, 2013; Baumann et al., 2015; Crotty et al., 2015).

One intervention study was centred on the design and implementation elements required to deliver an integrated behavioural intervention that simultaneously targets T2DM and depression self-management (Kaltman et al., 2015). In addition, McEwen et al.’s (2010) study pilot tested the efficacy of culturally-tailored diabetes self-management through social support interventions to improve the behavioural and physiological outcomes for patients with T2DM. One Malaysian study conducted by Puziah et al. (2016) explored how patients with T2DM adapted and engaged in diabetes self-management behaviour, from a nursing perspective. Another study by Oftedal et al. (2010) explored the importance of social support for people with T2DM and, in particular, the role general practitioners and practice nurses perform in providing such support. A US study focused on differences in primary sources of social support (Song et al., 2012).

A study conducted by Schiøtz et al. (2012) examined the relationship between social networks and patient activation, psychosocial problems, self-management behaviours and HbA1c levels among people with T2DM. The study adopted a cross-sectional survey design, where an online questionnaire was used to collect data from 2,572 patients with T2DM (Schiøtz et al., 2012). A Nigerian study undertaken by Odume et al. (2015) assessed the relationship between family characteristics and glycaemic control among people with T2DM. Janice et al. (2010) focused on the day-to-day life experiences of people with T2DM, and, in particular, their historical capacity, as well as their current ability to self-manage this illness.

The brief outline of the aims of the aforementioned studies clearly highlights that no previous research to date has sought to examine the role of HCPs, coupled with discerning the impact of social support on diabetes self-care, using a mixed methods research design. Undoubtedly, further research is required in the area of diabetes self-care, as the incidence

of this disease is increasing and its effects are being felt in all countries throughout the globe. In particular, there is an absence of this type of work being undertaken in Gulf Cooperation Council (GCC) countries, which rank among the top ten countries in terms of the prevalence of DM (IDF, 2013). All 33 studies included either people with T2DM, HCPs or family members, and were therefore highly relevant for the present study, which used a mixed methods approach to investigate the views of both people with T2DM and HCPs.

### *Sample*

The study samples were drawn from people with T2DM (both male and female), HCPs, couples, families and friends. Two study samples comprised couples (Stephens et al., 2013; Baumann et al., 2015), while another sample was of HCPs and people with T2DM (Goetz et al., 2012). In the two studies that used quantitative methods, the sample was made up of females only (Komar-Samardzija et al., 2012; Harvey et al., 2017). In one qualitative methods study, the sample consisted of HCPs, patients with T2DM and their families (Kaltman et al., 2015). Twenty-seven of the studies recruited participants who were people with T2DM (see Appendices 3, 4 and 5).

The number of research participants in these studies ranged from 21–2,572. Large sample sizes predominated in the quantitative studies. On the other hand, the sample sizes were relatively small for the qualitative studies (10 in total), ranging from 9–125 participants. Nine participants took part in the New Zealand-based study (Janice et al., 2010), while there were 125 participants in the studies conducted over five European countries (Bulgaria, Greece, Norway, Spain and the United Kingdom) (Knutsen et al., 2015). Variations in sample size are to be expected as they reflect differences in the research methodologies adopted (Creswell, 2007).

All of the studies reviewed provide important information and input for this study. However, unfortunately, a lack was identified of Saudi Arabian-based studies that focus on support from HCPs/family/spouse/friends and diabetes self-care activities. This is significant, not only because the sociocultural context differs for Saudi Arabian patients as compared to other countries, but also because there are limits to the extent to which relevant policy and programme-related knowledge is transferable from one context to another, without having first undertaken an in-depth analysis of the original setting (Park et al., 2014, 2017).

## ***Methods***

Studies selected in the review comprised a variety of methodological designs and approaches. A quantitative approach was used in the majority of cases (18) (see Appendix 3). Ten of the studies used a qualitative approach (see Appendix 4), while five studies adopted a mixed methods design (see Appendix 5).

### *Quantitative methods*

While quantitative approaches were applied in 18 studies, they all used different instruments for data collection purposes. These instruments mainly focused on three key themes:

- Diabetes self-care activities among people with T2DM
- Associations between social support (HCPs/family/friends/spouse) and self-care activities in patients with T2DM
- Social support, self-care activities and glycaemic control in individuals with T2DM

Ten studies used the Summary of Diabetes Self-care Activities Scale (SDSCA) to measure diabetes self-care activity (McEwen et al., 2010; Schiøtz et al., 2012; Song et al., 2012; Watkins et al., 2013; Mayberry & Osborn, 2014; Sukkarieh-Haraty & Howard, 2014; Smalls et al., 2015; Shayeghiana et al., 2015; Harvey et al., 2017; Sürücü et al., 2017). All studies selected different instruments to measure social support, with the exception of two studies that used the Diabetes Care Profile (DCP) (Song et al., 2012; Harvey et al., 2017).

In general, a variety of different methods were adopted in these studies. Many administered a survey, as this approach is conducive to applying a variety of methods to recruit participants, collect data and utilise different instruments and measurement tools (Ponto, 2015). Surveys are often employed to describe and explore human behaviour, and hence, are frequently used in social and psychological research (Singleton & Straits, 2009). In addition, surveys are relatively economical and enable the recording of multiple variables, such as knowledge and attitudes, of several individuals in one single setting (Coughlan, Cronin & Ryan, 2013).

### *Qualitative methods*

Ten qualitative studies were retrieved, two of which used a single method, namely focus groups (Ofstedal et al., 2010; Laranjo et al., 2015). Puziah et al. (2016) used a combination of semi-structured interviews, focus groups, longitudinal observations and personal and reflective diaries in developing support system strategies to assist people with T2DM to self-manage the condition, with help from HCPs and family members. A study undertaken by Goetz et al. (2012) adopted a dual approach, which included interviews with general practitioners and a focus group with a practice nurse and people with T2DM. By using a combination of methods, the latter study's overall aim was to explore the importance of social support in providing care for people with T2DM. In addition, four studies used semi-structured topic guides in order to carry out in-depth interviews (Janice et al., 2010; Crotty et al., 2015; Jeragh-Alhaddad et al., 2015; Knutsen et al., 2015).

A study conducted by Mathew et al. (2012) recruited 35 participants with T2DM and facilitated five focus groups and nine individual interviews for the purpose of elaborating on the multi-dimensional aspects of diabetes self-management for both genders. A comparative analysis was also undertaken in order to acquire a better understanding of the different experiences men and women were exposed to (Mathew et al., 2012). Kaltman et al. (2015) undertook a combination of interviews with HCPs (a medical director, a primary care provider, a diabetes educator and a medical assistant) and focus groups with people with T2DM and their families, in order to gain an understanding of the challenges facing this patient cohort, who also had a depression diagnosis. This assists in terms of self-management, as well as identifying the most effective interventions to implement so as to effectively respond to both patient and client needs (Kaltman et al., 2015).

Several studies used face-to-face interviews to explore the role HCPs play in encouraging patients with T2DM to improve their diabetes self-care activities and also to examine the effect of social support on engaging in such activities. Additionally, in-depth interviews help to facilitate the collection of rich data that can be used to answer research questions, aims and objectives (Smith & Firth, 2011).

### *Mixed methods*

Five studies used a mixed methods approach to obtain data from participants (Mayberry & Osborn, 2012; Chlebowy et al., 2013; Venkatesh & Weatherspoon, 2013; Baumann et al., 2015; Vissenberg et al., 2017). The study by Vissenberg et al. (2017) used both quantitative



and qualitative approaches to explore the effects of a particular intervention on self-management behaviours. The researchers evaluated the intervention by using a quasi-experimental study, based on a mixed methods approach. They included 131 participants with T2DM in their study, who were then sub-divided into an intervention group comprising 69 participants, while 62 participants were assigned to the control group. Twenty-seven people participated in qualitative in-depth interviews (Vissenberg et al., 2017). The study conducted by Venkatesh and Weatherspoon (2013) also used mixed methods in order to determine the impact of social and HCP support on diabetes self-management in Indians living in the US. The researchers used a self-care survey and semi-structured in-depth interviews to assess the diabetes self-management behaviours of patients with T2DM, as well as the effect of social and HCP support on diabetes self-management. In addition, Chlebowy et al. (2010) used quantitative and qualitative methods to identify barriers and facilitators of self-management behaviours among African-Americans with T2DM. For data collection purposes, they surveyed 38 participants and held a focus group with seven participants. Moreover, Mayberry and Osborn (2012) distributed questionnaires to 61 people with T2DM and conducted two focus groups in order to explore the relationship between patient perceptions of family members' diabetes-specific supportive and non-supportive behaviours, medication adherence and glycaemic control.

Overall, only five studies used mixed methods. These studies employed both quantitative and qualitative methods for the purposes of creating a research outcome that is stronger than one single approach alone (Malina, Nørreklit & Selto, 2011). Generally, combining both approaches enables exploration of the more complex aspects of human relationships and the social world (Malina et al., 2011). The strengths associated with quantitative studies include the techniques applied to minimise confusion and the generalisability of the results, if based on samples that are both representative and sufficiently large. It remains the controlling paradigm in health research (Tariq & Woodman, 2010). On the other hand, in-depth qualitative research is designed to deliver a rich tapestry of opinions, beliefs and meaning (Murphy, Dingwall, Greatbatch, Parker & Watson, 1998). Additionally, it tends to acknowledge the investigator's role and context in forming and creating the data. Baumann et al. (2015), for example, discussed issues regarding a short-term intervention support programme for patients with T2DM and their partners, in order to improve diabetes self-care behaviours, glycaemic control, social support and emotional well-being, along with creating linkages with HCPs.

## **Results**

Various structured results emerged from the studies in relation to the role of HCPs, social support and diabetes self-care activities among people with T2DM (see Table 2).

Table 2: Summary of literature findings

NO	
1	Patient activation of self-care activities and lower HbA1c levels are linked to support provided by family and friends.
2	Social support is important in improving the quality of life of patients with T2DM and in helping them to engage in self-care activities.
3	Spouse support is a key cornerstone in diet adherence for T2DM management. Gender differences emerged in terms of spouse support, thus affecting participation in self-care activities among patients with T2DM.
4	Negative experiences with non-supportive families are associated with reduced adherence by patients to diabetes self-care activities.
5	Delineation of social support and the role of coping styles are useful factors in identifying T2DM patients' need for specific counselling and support, in order to improve self-care activities and HbA1c levels.
6	Spiritual, religious and sociocultural beliefs of people with T2DM and their self-efficacy levels affect diabetes self-care activities.
7	Patients with T2DM who receive support from HCPs and have a good relationship with their physicians demonstrate improved HbA1c levels and increased participation in diabetes self-care activities.
8	Risk factors, such as exposure to highly stressful life events and depression, are significantly correlated with higher HbA1c levels.
9	Barriers and challenges to self-care behaviours: internal factors, such as fears associated with glucose monitoring, lack of individual control of diabetes and failure to self-control dietary habits; and external factors, such as social support from family/friends/spouse and HCPs positively influence adherence behaviours by providing knowledge, reinforcement, cues to action and direct assistance.

10	The empowerment of patients improved their diabetes self-care behaviours and increased their glycaemic control.
11	HCP support and patient-provider communication are necessary to strengthen motivation among people with T2DM to engage in self-management strategies.

### **Ethical considerations**

Obtaining ethical approval is essential in adhering to good practice when conducting quantitative studies. Fifteen studies obtained ethical approval from a recognised ethical committee, while three studies did not allude to undertaking this process (Schjøtz et al., 2012; Stephens et al., 2013; Badedi et al., 2016). All qualitative studies obtained ethical approval, while of the five studies using mixed methods, four obtained ethical approval, with only one failing to specifically mention it (Venkatesh & Weatherspoon, 2013).

### **3.5. Summary of analysis of themes and findings from the literature review**

The literature review has highlighted the importance of HCPs and social support provided by family, friends and spouses, along with how this is associated with self-care activities in patients with T2DM. The need for such support is also explicated in this chapter, as T2DM management often requires complex treatment regimes that place demands on patients and their families to actively participate and adhere to different self-care behaviours involving complex daily self-care tasks (Janice et al., 2010; Mayberry & Osborn, 2014). Moreover, the influence of HCPs has been positively associated with diabetes self-care activities (Ofstedal et al., 2010; Venkatesh & Weatherspoon, 2013). Furthermore, practical advice and information provided by HCPs has assisted and motivated patients with T2DM to participate in the self-care and management of their condition (Ofstedal et al., 2010; Venkatesh & Weatherspoon, 2013).

All of the literature reviewed recognises the need for continuing support for patients with T2DM, in order for them to engage in diabetes self-care activities and manage their condition. A summary of themes and findings from the literature review is presented in Table 3 below.

Table 3: Summary of themes from the literature review

Setting	Author/Data	Key themes and findings from the literature review
Brazil; Denmark; Europe; Germany; Iran; Japan; the Lebanon; Malaysia; the Netherlands; New Zealand; Nigeria; Taiwan; Uganda; United States of America (USA).	Baumann et al., 2015; Goetz et al., 2012; Gomes-Villas Boas et al., 2012; Harvey et al., 2017; Huang et al., 2013; Janice et al., 2010; Knutsen et al., 2015; Komar-Samardzija et al., 2012; Mayberry & Osborn, 2012; Mayberry & Osborn, 2014; Odume et al., 2015; Schiøtz et al., 2012; Shayeghiana et al., 2015; Smalls et al., 2015; Song et al., 2012; Stephens et al., 2013; Sukkarieh-Haraty & Howard, 2014; Vissenberg et al., 2017; Watanabe et al., 2010; Watkins et al., 2013.	Theme 1. Social support for patients with T2DM and self-care activities.
Australia; China; Norway; USA.	Crotty et al., 2015; Gao et al., 2013; Oftedal et al., 2010; Venkatesh & Weatherspoon, 2013.	Theme 2. HCP support for patients with T2DM and self-care activities.
Canada; Kuwait; Malaysia; Portugal; Saudi Arabia; Turkey; USA.	Badedi et al., 2016; Chlebowy et al., 2010; Jeragh-Alhaddad et al., 2015; Kaltman et al., 2015; Laranjo et al., 2015; Mathew et al., 2012; McEwen et al., 2010; Puziah, Hamidah & Azian, 2016; Sürücü et al., 2017.	Theme 3. Facilitators and barriers to self-care activities.

The following section will discuss the three key themes and findings from the literature review of studies listed in Table 3, namely: Theme 1. Social support for patients with T2DM and self-care activities; Theme 2. HCP support for patients with T2DM and self-care activities; and Theme 3. Facilitators and barriers to self-care activities.

### **Theme 1: Social support for patients with T2DM and self-care activities**

Various sources of social support were identified under this theme, including family, friends and spousal support. This theme provided evidence of the importance of social support in adhering to self-care activities. This has been supported by 17 studies: 12 quantitative studies (Gomes-Villas Boas et al., 2012; Harvey et al., 2017; Huang et al., 2013; Komar-Samardzija et al., 2012; Mayberry & Osborn, 2014; Odume et al., 2015; Schiøtz et al., 2012; Shayeghiana et al., 2015; Smalls et al., 2015 Stephens et al., 2013; Watanabe et al., 2010; Watkins et al., 2013); two mixed methods studies (Baumann et al., 2015; Mayberry & Osborn, 2012); and three qualitative studies (Goetz et al., 2012; Janice et al., 2010; Knutsen et al., 2015). As can be seen below, no studies were sourced that had been undertaken within a Saudi Arabian context. While investigations have focused on the importance of social support from family, spouse and friends to assist patients with T2DM to adhere to self-care in a range of countries, this must be examined from a Saudi Arabian context. This would help to build an evidence base and improve our understanding of the importance of social support for Saudi Arabian patients who are managing their T2DM.

The overall importance of social support for patients with T2DM in assisting adherence to self-care has been highlighted in two quantitative studies (Shayeghiana et al., 2015; Smalls et al., 2015), while six studies have provided specific evidence of the importance of support from families and friends in promoting such compliance. Of the six studies, two are qualitative (Janice et al., 2010; Knutsen et al., 2015), three are quantitative (Harvey et al., 2017; Mayberry & Osborn, 2014; Odume et al., 2015) and one adopted a mixed methods approach (Baumann et al., 2015).

Focusing initially with studies examining social support in general, Smalls et al. (2015) drew on survey data to demonstrate that social support and glycaemic control are connected. The authors highlighted the significant overall effects on diabetes self-care activity that occurred through social support and access to healthy foods. Furthermore, the results showed that neighbourhood aesthetics and self-care behaviours have a direct effect on glycaemic control

(Smalls et al., 2015). Similarly, a quantitative study conducted in Iran underlined the importance of social support in adherence to self-care behaviour among people with T2DM (Shayeghiana et al., 2015). The latter authors also indicated that social support has a moderating role in the relationship between diabetes self-care activities and HbA1c control. Furthermore, they found that an association existed between coping styles, social support, self-care activities and HbA1c among this cohort.

Several studies have provided evidence to reinforce the importance of support from families and friends to encourage T2DM patients' adherence to self-care regimes. A survey conducted by Mayberry and Osborn (2014) suggested that supportive family behaviours are associated with high self-care compliance, whereas the opposite is true of obstructive family behaviours. However, a descriptive and cross-sectional study conducted in Nigeria by Odume et al. (2015) found that physical and emotional family support for patients enhanced their glycaemic levels. They discovered that a significant correlation existed between family function, social support and glycaemic control. This notion has also been supported by Baumann et al. (2015), who conducted a four-month peer intervention study, which involved purchasing mobile phones for peer support purposes, establishing a pre-paid closed network user group and logging peer contact. They found that peer intervention enhanced diabetes care among T2DM patients, with participants showing positive behavioural and physiological outcomes and significant improvements in Hb1Ac levels.

Janice et al. (2010) conducted semi-structured interviews in order to understand the day-to-day lived experiences of adults with Type 2 diabetes, in particular their historical and current ability to self-manage their illness. Participants in this study reported that self-management support was more strongly connected to spiritual beliefs and the support of family and friends, rather than being influenced by HCPs. This notion has also been supported by another quantitative study conducted by Harvey et al. (2017), who found that African-American females with T2DM were more likely to adhere to a specific diabetes diet to regulate their glucose levels. Furthermore, this study indicated that social interactions with friends and family play an important role in diabetes management. Qualitative research by Knutsen et al. (2015) revealed that social supports, founded on familial relationships and knowledge, influence self-management practices among patients with T2DM.

These findings suggest that social support plays an important role in adherence to self-care activities among patients with T2DM. However, no study to date has examined the role

social support performs in promoting self-care among a Saudi Arabian cohort, despite the high national prevalence rates of this condition. This research gap is surprising, given the Saudi Arabian societal context, which is characterised by a collectivist culture, meaning that family members, neighbours, friends and, occasionally, the wider community play a pivotal role in supporting and caring for one another (Al-Balad, 2014).

A number of studies further differentiate self-care behaviours. The importance of social support in encouraging T2DM patients to adhere to self-care regimes, such as diet, exercise and medications, was noted in six studies: one qualitative study (Goetz et al., 2012); four quantitative studies (Huang et al., 2013; Gomes-Villas Boas et al., 2012; Sukkarieh-Haraty & Howard, 2014; Watkins et al., 2013); and one mixed methods study (Vissenberg et al., 2017). Research conducted in Taiwan and Germany found that social support plays a key role in participation levels in physical exercise among T2DM patients (Goetz et al., 2012; Huang et al., 2013). More specifically, the Taiwanese study reported that patients' adherence to medication, dieting and regular exercise regimes was related to the highest possible levels of social support (Huang et al., 2013). The key finding from this study is that physical exercise is a crucial determinant in influencing self-care behaviours among T2DM patients, quality of life and social support. Goetz et al. (2012) found that social support was essential for T2DM patients in order to enable them to change their lifestyle habits, for instance, engaging in physical activities and altering their diet. The findings showed that a significant relationship existed between social support and adherence to diet and food care, and that old age was significantly linked to dietary adherence (Watkins et al., 2013). A quantitative study conducted by Gomes-Villas Boas et al. (2012) found that social support can be beneficial in achieving adherence to non-medication treatments (such as diet and physical exercise), medication treatment compliance and the clinical-metabolic control of T2DM patients at outpatient follow-up. However, no statistically significant correlation was observed between social support and metabolic control.

Furthermore, two studies conducted in Lebanon and the Netherlands found that social support and social networks were important in adhering to diabetes self-care activities (such as diet and physical exercise) and glycaemic control among patients with T2DM (Sukkarieh-Haraty & Howard, 2014; Vissenberg et al., 2017). The former authors reported that adherence to dietary measures revealed a statistically significant relationship with HbA1c, and social support was also positively related to glycaemic control. Vissenberg et al. (2017)

recommended that education programmes on diabetes management and self-management be provided to enhance patient self-efficacy and skills.

The importance of the provision of familial support to ensure T2DM patients adhere to diet, exercise and medications has also been highlighted in three studies: two quantitative studies (Komar-Samardzija et al., 2012; Watanabe et al., 2010); and one mixed methods study (Mayberry & Osborn, 2012). A study conducted in the USA by Komar-Samardzija et al. (2012) suggested that higher levels of physical exercise, self-efficacy, family support to engage in exercise and a decrease in physical environmental barriers (lack of exercise accessibility and availability) may assist in increasing physical exercise levels in this population. Watanabe et al. (2010) found that a significant relationship existed between HbA1c levels and family nutritional support. Patients receiving family nutritional support displayed significantly lower HbA1c levels than those without this support (Watanabe et al., 2010). Mayberry and Osborn (2012) found that non-supportive behaviours exhibited by family members correlated with low adherence to diabetes medication regimes. This is indicative that patients with T2DM emphasised the importance of instrumental assistance in participating in diabetes self-care activities, where they reported that non-supportive family behaviours reduced the likelihood of engaging in positive behaviours. Furthermore, the study found that self-care behaviours correlated with improved glycaemic control and the prevention of diabetes-related complications (Mayberry & Osborn, 2012).

A number of studies conducted in Saudi Arabia have focused on the medical aspects of DM (such as prevalence and complications), self-management, education and participation in self-care activities (Sharaf, Midhet & Al-Mohaimed, 2012; Abu Sabbah et al., 2014; Ahmed, Khalil, & Al-Qahtani, 2016). However, no Saudi Arabian-based studies have examined or investigated these issues in relation to social support and self-care activities. Given the benefits of social support reported in the international literature in relation to adherence to diet, exercise and medication, this is an area that clearly warrants further investigation within a Saudi Arabian context.

The importance of spousal support and gender differences for patients with T2DM in terms of adherence to self-care activities have been demonstrated in three quantitative studies (Schjøtz et al., 2012; Song et al., 2012; Stephens et al., 2013), one qualitative study (Mathew et al., 2012) and one mixed methods study (Baumann et al., 2015). A quantitative study conducted by Song et al. (2012) found that the primary source of social support differed



according to gender. One possible explanation for this is that patients reported limited social support. However, males with T2DM have been shown to obtain greater spousal support from their wives, thus aiding them in self-care activity adherence, whereas females reported lower support levels (Song et al., 2012). They attributed this finding to socially determined gender roles, whereby women are more likely to assume responsibility for food preparation than males within the family (Song et al., 2012). This finding is of interest, given that traditional female roles in terms of food preparation continue to prevail in Saudi Arabia (Rawas, Yates, Windsor & Clark, 2012). Similarly, a quantitative study conducted in the USA by Stephens et al. (2013), using multilevel modelling, found that the provision of diet-related support by partners increased patient adherence levels, whereas conversely, diet-related pressures and persuasion were associated with decreased compliance. These findings were supported by a cross-sectional survey conducted in Denmark, where Schiøtz et al. (2012) reported that living with a partner was related to lower HbA1c levels.

A qualitative study by Mathew et al. (2012) provided further insights into gender variations in self-management, in particular highlighting the needs, barriers and challenges facing men and women living with T2DM. The latter authors reported that female T2DM patients were more inclined to engage in the personal management of their daily lives, whereas men had a greater tendency to share this management responsibility with family members and friends. Moreover, males were more likely to concentrate on practical aspects, such as blood glucose self-monitoring, as a means by which to manage their diabetes and reduce their medication intake, whereas women typically emphasised the elements associated with effective blood glucose self-monitoring (Mathew et al., 2012).

As is the case with the other literature outlined above, there is an absence of Saudi Arabian studies that examine the role of spousal support or gender differences in a T2DM cohort. This is significant due to the high marriage rate in Saudi Arabia, where the vast majority of adults are married. In addition, clearly defined gender roles exist; the traditional Saudi Arabian family is patriarchal in nature, where the head of the family is male and the females are expected to manage the household and take care of the children.

Generally, most of the literature has emphasised the importance of social support provision from the family, spouses and friends of T2DM patients, as it enhances the likelihood of engaging in self-care activities. However, to the best of my knowledge, no studies have been conducted within a Saudi Arabian context to investigate social support and diabetes self-

care activities among T2DM patients. This suggests that a need exists to investigate this specific area, in terms of improved patient adherence to self-care activities as a means by which to manage their condition. This is important given the high prevalence of T2DM in Saudi Arabia, but also because of its unique environmental factors. More specifically, it cannot simply be assumed that social support for T2DM will work in the same way across different social, cultural, legal and healthcare contexts. As such, social support and self-care needs to be better understood within the Saudi Arabian context, so that HCPs can identify how best to approach it, thus assisting patients to take the necessary steps to improve their diabetes management and overall care.

### **Theme 2: HCP support for patients with T2DM and self-care activities**

Evidence to demonstrate the importance of HCPs in supporting adherence to self-care for patients with T2DM has emerged in four studies: two qualitative studies (Ofstedal et al., 2010; Crotty et al., 2015), one mixed methods study (Venkatesh & Weatherspoon, 2013) and one quantitative study (Gao et al., 2013). Research conducted in Norway and the USA has found that the main support provided by HCPs to T2DM patients was in offering practical advice, information and education programmes, which motivated them to implement diabetes self-management strategies (Ofstedal et al., 2010; Venkatesh & Weatherspoon, 2013). A qualitative study undertaken by Ofstedal et al. (2010) found that participants typically regarded the support provided by HCPs as a motivating factor in undertaking diabetes self-management activities.

This notion has also been supported by a mixed methods study conducted by Venkatesh and Weatherspoon (2013), who analysed social and HCP support in relation to Indian T2DM patients' involvement in diabetes self-management. Their results emphasised the support that physicians can offer in terms of providing education in relation to diabetes self-management behaviours (Venkatesh & Weatherspoon, 2013). More specifically, a study conducted in China by Gao et al. (2013) highlighted the importance of patient-provider communication in adherence to self-care activities. Analysis of their survey data found that patient-provider communication, self-efficacy and social support exerted a direct effect on diabetes self-care activities among Chinese T2DM patients. A qualitative study conducted by Crotty et al. (2015) found that patients with no spousal support showed greater dependency on professional and paid caregivers in the daily care and self-management of their condition.

Overall, these studies highlight the association between good patient-HCP relationships and improved diabetes self-care practice, not least through motivation, practical advice, information and education. However, within a Saudi Arabian context, there is an absence of literature that examines the role of HCPs in facilitating diabetes self-care. This is significant not only in light of the social context prevailing in Saudi Arabia, but also as healthcare systems differ internationally. Without having conducted research in Saudi Arabia, it is impossible to say whether HCPs can play a similar role within its internal health system. Therefore, investigating the function HCPs can perform in relation to diabetes self-care practice within this setting can help to lay a solid foundation for improved self-care activities.

### **Theme 3: Facilitators and barriers to self-care activities**

This theme describes the facilitators and barriers to self-care activities. Eight studies provided information in relation to this theme. One study adopted a mixed methods approach (Chlebowy et al., 2010), four were qualitative in nature (Jeragh-Alhaddad et al., 2015; Kaltman et al., 2015; Laranjo et al., 2015; Puziah et al., 2016), while three studies were quantitative (Badedi et al., 2016; McEwen et al., 2010; Sürücü et al., 2017). The findings showed that factors facilitating T2DM patient self-management included acceptance of diabetes, acquiring greater information and knowledge about the condition and patient empowerment. Barriers to self-care included inadequate family support, lack of self-control over dietary habits, memory failure and cultural constraints.

Facilitators of self-management behaviours among patients with T2DM in Portugal and the USA included independence, acceptance of diabetes and having access to greater information and knowledge (Chlebowy et al., 2010; Laranjo et al., 2015). On the other hand, barriers to self-management included poor diet due to lack of motivation, cost-related factors and insufficient culinary knowledge (Chlebowy et al., 2010; Laranjo et al., 2015). The same authors identified other barriers including memory failure, inadequate family support and insufficient exercise. Quantitative and qualitative studies conducted in Malaysia and Turkey have emphasised the importance of patient empowerment in facilitating self-care activities (Puziah et al., 2016; Sürücü et al., 2017). More specifically, these studies have suggested that patient empowerment (including development of personal responsibility and disease management) during an education process, led by HCPs, was significant in enhancing adherence to diabetes self-care activities among T2DM patients.

Kuwaiti and USA based studies have identified cultural barriers to diet and medication adherence among patients with T2DM (Jeragh-Alhaddad et al., 2015; Kaltman et al., 2015). For example, Jeragh-Alhaddad et al. (2015) found that ten percent of patients reported not taking their medication in front of others to avoid experiencing diabetes-related stigma. The cultural challenges of adhering to diets for diabetic patients were reported by Kaltman et al. (2015). The notion of cultural dynamics has also been supported by a quantitative study conducted by McEwen et al. (2010). They highlighted the importance of ensuring treatments are adapted culturally for T2DM patients, in a manner that would improve self-management behaviours and knowledge and diminish diabetes-related distress. Other barriers affecting adherence to self-care among patients with T2DM were reported by Badedi et al. (2016), who demonstrated that factors such as low educational levels, smoking and failing to complete a course of medication and adhere to diet or exercise requirements were significantly associated with higher HbA1c levels.

An extensive body of literature is available on the facilitators and barriers to self-care activities. This research highlights that social support from family/spouse/friends and HCPs is the most critical factor in supporting patients to adhere to diabetes self-care activities to control their condition. The literature has also highlighted how factors such as lack of social support from family and HCPs can negatively affect adherence to self-management behaviours among patients with T2DM. However, within a Saudi Arabian context, to date only one study has been conducted that analyses the variables associated with glycaemic control among T2DM patients. Therefore, it is reasonable to assume that this is a highly under-researched area in Saudi Arabia. In addition, the literature review has clearly highlighted that patients with T2DM in other parts of the world have faced challenges and difficulties in adhering to self-care activities due to factors such as religious beliefs, sociocultural issues, HCPs and diet. These determinants require further investigation within a Saudi Arabian context, given the role of Islam, Saudi culture and diet and work practices among HCPs.

## **Theory**

In total, while 33 studies were reviewed, only four employed an explicit theoretical framework (Gao et al., 2013; Oftedal et al., 2010; Puziah et al., 2016; Song et al., 2012). One study was underpinned by constructivist grounded theory, drawing on symbolic interactionism and interpretivism, and reflecting the basic beliefs of constructionism as an

analytical model (Puziah et al., 2016). Song et al. (2012) used social cognitive theory to guide their study, and to offer an explanation for the complex interplay between individual, cultural and environmental determinants and behaviour, in terms of T2DM self-care activities, social support and cultural factors. Similarly, Gao et al. (2013) adopted cognitive theory, specifically in relation to the construction of self-efficacy. This theory focuses on the degree of confidence required to undertake a given behaviour, while also highlighting the interplay between individual and environmental variables, for instance, the way in which social support shapes behaviour. Research conducted by Oftedal et al. (2010) explored the expectancy-value theory of motivation and social support theory in considering diabetes management and the significant improvement through education, with a wide array of educational aspects identified as important. They applied social support theory to explain how social support offered by HCPs to T2DM patients would assist in managing their diabetes.

Of all these theories, social support appears to display the most potential within a Saudi Arabian context, as it appears to align with the country's collectivist society. Furthermore, self-efficacy may possibly inform a theoretical framework for the study of T2DM within this setting, as previously discussed in the Introduction, given that Saudi Arabian prevalence rates rank among the top ten countries internationally (IDF, 2011). This implies that patients need to have high self-efficacy levels, both to help achieve the best possible personal outcomes and to avoid placing undue strain on the health system.

### **Evidence gaps**

Various studies have specifically centred on the importance of self-care activity engagement and social support for T2DM patients. In addition, several studies have examined the impact of HCP education on diabetes self-care activities. However, all Saudi Arabian studies to date have tended to focus on the medical aspects of T2DM (such as its prevalence and complications), as well as effective self-management and educational support programmes. This evidence gap reinforces the need to design Saudi Arabian-based studies, as little is currently known about the role of social support provided by family, spouse and friends to individuals with T2DM, as well as challenges facing HCPs in the provision of care and the delivery of self-care management education. Therefore, the present study seeks to address this critical evidence gap, while also exploring gender differences between HCPs and patients.

This research is needed to build an evidence base and a greater understanding of the role social support and self-care activities play in diabetes management among Saudi Arabian-based patients with T2DM. As noted above, the transferability of findings from other international contexts is limited at best. Thus, this research aims to investigate the role social support performs in identifying factors conducive to adherence to diabetes self-care activities within a Saudi Arabian context, such as religion, culture, stigma and gender. This is important, as no study is currently available that examines social support provided to Saudi Arabian patients with T2DM. Essentially, this means that HCPs cannot access a robust evidence base detailing how to effectively promote self-care management.

Overall, the following key themes have been highlighted:

- Social support plays a significant role in enhancing diabetes self-care activities among patients with T2DM;
- Spousal support has proven to be a cornerstone in dietary adherence, acting as a means by which to manage T2DM;
- Insufficient social support for T2DM patients is associated with reduced adherence to diabetes self-care activities;
- Patient empowerment through HCPs enhances their engagement levels in diabetes self-care activities;
- HCP support for patients motivates them to manage their condition and to engage in diabetes self-care activities;
- Barriers and challenges to self-care were identified, for example insufficient knowledge of diabetes, limited support and sociocultural factors.

### **3.6. Conclusion**

This chapter has presented a systematic literature review, thus highlighting and analysing the literature pertinent to this research topic. The majority of the research findings have stressed the significance of social support derived from HCPs, family, spouses and friends of T2DM patients in enhancing participation in self-care activities. Nevertheless, relevant data on the issue of diabetes self-care practices within a Saudi Arabian context is particularly limited, while literature exploring the relationship between self-care and social support is absent. Consequently, research was not available on social support within a Saudi Arabian context, resulting in a lack of clarity surrounding its impact on diabetes self-care in this

country. This evidence gap has reinforced the need for research to be undertaken to analyse the extent to which HCPs and social supports act as determinants of self-care among Saudi Arabian adults diagnosed with T2DM. Currently, few research studies have sought to resolve the problem of non-adherence to self-care activities in Saudi Arabia. It appears that diabetes self-care activities and social support may play an important role in managing T2DM. Consequently, social support strategies must be considered in relation to potential individual barriers to self-care activities among this cohort.

Much of the existing literature has highlighted the significant function social support performs through HCPs, family, spouses and friends in enhancing T2DM patient self-care activities. Therefore, it is imperative that these variables are examined specifically within a Saudi Arabian context. Furthermore, the research process and findings from the literature review should be applied in Saudi Arabia, as HCPs can provide evidence-based knowledge to guide the implementation of strategies to promote social support and self-care activities among T2DM patients. Specifically, the absence of Saudi Arabia-focused studies in this field in terms of social support and self-care activities is apparent. However, reviewing this literature can support Saudi Arabia-based HCPs to develop healthcare services and social support systems that include health education programmes centring on individual patient needs and conditions. Thus, great emphasis should be placed on the development of diabetes patient care that supports this cohort to implement effective self-management regimes, on a daily basis.

The following chapter will detail the methodological rationale for this study, and set out the research design, ethical considerations and data collection.

## **CHAPTER FOUR: METHODOLOGY**

### **4.1. Introduction**

This chapter discusses the research methodology used in this study in order to investigate the extent to which the roles played by healthcare professionals and social support act as determinants of self-care among adults diagnosed with T2DM in Riyadh. A solid research methodology helps to provide a framework for the investigator and defines the resources that can assist in examining the research question. According to Saunders, Lewis, and Thornhill (2007), no single method is necessarily better than another, though some are more suitable for a specific situation and thus help answer the research question at hand. This chapter is divided into two main parts. The first part covers the research philosophy, while the second part discusses the research design, including the methodology, rationale, ethical considerations, research setting, sampling, and data collection.

A mixed methods approach was used in this research, for a number of reasons. Importantly, combining qualitative and quantitative methods can overcome the weaknesses of each method and emphasise their strengths. Mixing qualitative and quantitative data also helps provide strong evidence for conclusions. Triangulating the data using different approaches also increases the validity of the outcomes and conclusions, as the advantages of one approach can be used to compensate for the deficits of the other (Creswell, 2007; Creswell & Clark, 2011).

### **4.2. Research philosophy**

The focus of a research philosophy must be “The development of knowledge and nature of knowledge” (Saunders et al., 2012, p. 127). The manner in which an analyst evaluates or perceives reality and their surroundings is an important individual expectation that underpins the developed understanding. Additionally, the way in which hypotheses are devised, as well as how studies are planned and undertaken, are all influenced by perceptions of reality, individual understanding, and an analyst’s views of their surroundings as based on their personal frame of comprehension with regard to the study philosophy (Saunders & Tosey,



2012). An analyst can utilise a number of research philosophies: axiology emphasises value assessments made during the course of the study; epistemology is related to positivism, interpretivism, realism, and pragmatism; while ontology is concerned with subjective or objective perceptions of reality (Saunders & Tosey, 2012). The study's goals, objectives and potential conclusions should be assessed by the analyst in order to identify the study's structure or paradigm, however, as not all studies can follow the same methodology (Saunders & Tosey, 2012).

Three main queries help to identify the research philosophy. The ontology should be considered in terms of the character and manner of reality. Then, the epistemology must be assessed, examining the association between knowledge and the seeker of knowledge. Finally, the methodology must be considered, to ask by what means knowledge can be acquired (Esterby-Smith, Thorpe & Lowe, 2002; Pickard, 2013).

There are a number of reasons why a distinct research philosophy is crucial. If an analyst has not previously adopted a particular research approach, it will be more straightforward for them to achieve this by considering their research philosophy. The study findings can also be associated with successful research design through the research philosophy, and a clear and effective study design may be formulated. Ultimately, epistemology and ontology are associated with, and underpin, the research philosophy (Esterby-Smith et al., 2002). In order to support a solid, multi-layered investigation with effective procedures and stages, the study methodology should thus be characterised and framed on the basis of its epistemology and ontology (Esterby-Smith et al., 2002).

#### **4.2.1. Ontology**

The dynamics of reality are the concern of ontology (Bryman & Bell, 2011; Saunders & Tosey, 2012; Pickard, 2013), and an analysis of the research context must be made by the analyst to support comprehension of, and generate queries relating to, the processes of the surrounding environment. Objectivism and subjectivism are the two main ontological forms (Saunders & Tosey, 2012).

##### **Objectivism**

Objectivism is typically adopted in parallel with positivism to assess and elucidate existing theories (Saunders & Tosey, 2012). Objectivism holds that the true nature of social

structures is outside of, and autonomous from, social actors (Saunders & Tosey, 2012). Objectivism has also been defined as the ontological belief that social actors are autonomous from social occurrences and their significance (Bryman & Bell, 2011). Consequently, the understanding of a pre-set system and phenomena as extraneous reality that is pervasively experienced, and defined as realism is emphasised by objectivism (Sexton, 2003).

### **Subjectivism**

Social phenomena that incorporate social actions are the concern of subjectivism, wherein the comprehension of context is made on the basis of the procedure, the event, and actors' connections, with the event's effect and the explanations for the effect also being considered (Saunders & Tosey, 2012). Interpretivism and subjectivism are commonly combined (Saunders & Tosey, 2012), and overall, idealism is emphasised by subjectivism, which suggests that people experience and view reality in various ways so that it is inherently enigmatic (Sexton, 2003).

In this study, both types of ontology were used. Objective reality was employed when observing statistical realities via questionnaires using the SDSCA scale, while subjective reality was employed when examining the role of HCPs and social support from families, spouses, and friends in the lives of patients with T2DM based on interviews with HCPs and patients with T2DM. As a result, an appropriate epistemology that would work with these two types of ontology was determined.

#### **4.2.2. Epistemology: pragmatism**

Epistemology is defined as a philosophical position on the means through which reality may be comprehended (Pickard, 2013), and it concerns the characterisation of what is acceptable data and knowledge (Saunders & Tosey, 2012). Such knowledge's shortcomings, origins, characteristics, and potential are all issues addressed by epistemology, which denotes a philosophical concern with the origins of knowledge (Dudovskiy, 2011). Epistemology has a number of primary forms:

Positivism adopts empirical techniques and rational thinking to undertake academic inquiry. Positivism disregards study participants' experiences and conduct, emphasising rational thinking, overall understanding, and attempts to understand the character of meaning, reality, and science (Saunders & Tosey, 2012).

Interpretivism seeks to comprehend personal activities and their significance (Pickard, 2013). In this regard, the environment within which a perspective or assessment of an activity or phenomenon is made, which produces such meaning, is considered significant (Dey, 1993). Therefore, social activity and social sciences typically use interpretivism, based on their emphasis on individuals.

Pragmatism is the incorporation of interpretivism and positivism to help comprehend activity (Saunders et al., 2012). In mixed methods studies, the favoured epistemological approach is pragmatism (Kelemen & Rumens, 2008; Creswell, 2011). According to Teddlie and Tashakkori (2003, p. 21), “pragmatist researchers consider the research question to be more important than either the method they use or the paradigm that underlies the method”.

This study is located in the pragmatic paradigm and investigates the impact of HCPs and social support on diabetes self-care activities among individuals with T2DM; pragmatism thus provides a sound foundation for the study. The chosen mixed methods design contains two parallel approaches. The first is the quantitative method survey questionnaire completed by people with T2DM to help explore whether age, gender, education, marital status, employment, and income impact on diabetes self-care management. The second method is qualitative semi-structured interviews with people with T2DM and HCPs to examine the effects of family and social support on self-care-management among Saudi people diagnosed with T2DM, and to determine the role of healthcare professionals in promoting diabetes self-care-management.

Rather than pre-established perspectives relating to study paradigms, it is the study queries that are most likely to influence the techniques and strategies adopted by analysts undertaking mixed methods studies (Johnson & Onwuegbuzie, 2004). Given the limitations of the positivism-constructivism distinction, mixed methods research has a sound philosophical underpinning in the form of pragmatism (Teddlie & Johnson, 2009). Thus, the study query and practical context of the research are factored into the assessment when pragmatism is adopted as an alternative to constructivism or positivism. Comprehension of an issue thus adopts any strategy that may be effective, with the issue itself being the foremost concern rather than the research techniques; thus, it is context, activities, and implications that shape pragmatism’s perceptions of knowledge (Creswell, 2003). *How* and *what* concerns relating to the study problem are therefore emphasised by pragmatist analysts (Creswell, 2003), and no particular research method is shown philosophical allegiance, as

data obtainment and analytical techniques are adopted on the basis of their utility in terms of achieving understanding; this ensures that the study query is fundamental to the process (Mackenzie & Knipe, 2006).

### **4.3. Research approaches**

Mixed methods, qualitative and quantitative approaches are the three main research approaches.

#### **4.3.1. Quantitative**

Quantitative methods are defined as being concerned with calculating numerical information and adopting statistical methods for assessing data in order to determine associations between a study's variables (Saunders et al., 2012). The formulation of a study's hypotheses and identification of the study's goals can be facilitated through a theoretical system drawing on a literature review (Dawson, 2013; Pickard, 2013). The evaluation of theories is commonly undertaken by combining deductive or positivist strategies with quantitative methods, although during the formulation of theory, such methods are also compatible with inductive strategies (Saunders et al., 2012).

#### **4.3.2. Qualitative**

Experiences, perspectives, and conduct are explored through qualitative studies, with the preferred data collection methods primarily being focus groups and interviews (Dawson, 2013). However, the conceptual approach may be devised on the basis of various data obtainment methods and analytical processes that allow researchers to comprehend the study subjects' associations and perspectives (Saunders et al., 2012). To produce models or theories, inductive strategies and interpretivism are typically used in qualitative studies (Saunders et al., 2012)

#### **4.3.3. Mixed Methods**

A comprehensive understanding of a study's dynamics and enquiry avenues may be obtained by incorporating quantitative and qualitative techniques in a mixed methods strategy (Creswell, 2007; Creswell & Clark, 2011; Saunders et al., 2012). With both quantitative and qualitative information sought, a number of data obtainment methods are required in a mixed methods study (Creswell & Clark, 2011; Saunders et al., 2012). A number of strengths and

weaknesses can therefore be identified: the strengths of mixed methods research as outlined by Creswell and Clark (2011) are that it is an applied technique that enables study results to be presented in both a textual and numerical manner; instead of a single perspective, numerous perspectives of the world may be obtained; the tension between qualitative and quantitative research may be resolved; the research issue may be analysed further based on the advantage of having a greater amount of information; the benefits of qualitative and quantitative methods can be emphasised and disadvantages mitigated; and where qualitative or quantitative enquiry alone is not sufficient to respond to a study problem, combining the methods may be beneficial. However, a number of weaknesses in the mixed methods approach, must be considered in order to avoid any impact: result transferability, experiment regulation, validity, and dependability are aspects of quantitative methods that the researcher must comprehend, while determining the study queries and characterising the event under investigation are aspects of qualitative study that must be comprehended; qualitative and quantitative research data obtainment and analysis methods must also be properly comprehended by the analyst, who should ideally have used qualitative and quantitative approaches previously (Creswell & Clark, 2011).

Ultimately, study queries can be effectively responded to on the basis of the research results from a mixed methods approach where data collection and analysis strategies provide an in-depth perspective (Saunders et al., 2012). Data collection and analysis typically have two distinct stages in a mixed methods study: qualitative research is undertaken initially, followed by quantitative research (Creswell, 2011; Saunders et al., 2012). Qualitative and quantitative techniques may, however, be incorporated using a number of approaches; this combination has been considered as proceeding on the basis of six approaches, according to Creswell (2003): the part that the theoretical standpoint plays; the incorporation phase of qualitative and quantitative data obtainment and analysis; and priority, alongside the introduction process.

The approaches that may be used are:

1. A sequential explanatory approach, where the initial stage of data obtainment and analysis is the quantitative one, with the qualitative aspects undertaken afterwards. At the interpretation phase, the methods are combined, although emphasis is placed on quantitative information. A particular theoretical viewpoint may be adopted, although this is not necessary.

2. A sequential exploratory approach, wherein the quantitative information obtainment and analysis process comes second, with the initial stage being qualitative research. At the interpretation phase, the methods are combined, although emphasis is placed on qualitative information. A particular theoretical viewpoint may be adopted, although this is not necessary.
3. A sequential transformative approach, which is comprised of two data obtainment stages. Quantitative and qualitative information may both be emphasised, or one may be focused on in preference to the other, and either can be undertaken initially. At the interpretation phase, incorporation of the two methods occurs. The research is directed through a theoretical viewpoint.
4. A concurrent triangulation approach, wherein consecutive obtainment and analysis of quantitative and qualitative information occurs. Neither method is emphasised during the research, and at the interpretation phase, incorporation of the methods is undertaken.
5. A concurrent nested approach, wherein consecutive obtainment and analysis of quantitative and qualitative information occurs. Emphasis is given to either quantitative or qualitative processes. During the information analysis phase, integration is undertaken. A particular theoretical viewpoint may be taken with this approach.
6. A concurrent transformative approach, during which consecutive obtainment of quantitative and qualitative information occurs; emphasis may be given to one form of data or they may be treated equally. During the interpretation phase, integration may be undertaken, although this typically occurs while during data analysis. A particular theoretical standpoint will be adopted by the analyst.

#### **4.4. Research design**

This study uses a concurrent triangulation design, combining quantitative and qualitative methods to ascertain the best available data to develop a better understanding of the research problem (Giddings, 2006). The concurrent triangulation design is the most utilised and popular design in mixed methods research in part because it offers an opportunity to confirm or corroborate outcomes within a single study (Creswell, 2003). Additionally, this design is described as a QUAN + QUAL strategy, which signifies that the two methods are used

concurrently; the capitalisation implies that the significance is equal between the two methods (Creswell, 2009; Polit & Beck, 2012).

Thus, the researcher collects and analyses both qualitative and quantitative data at the same time in this research process (Creswell, 2009). A concurrent triangulation approach design was used in this study, and the quantitative and qualitative data were combined in the interpretation phase after being given equal emphasis (Creswell, 2007). The rationale for using a concurrent triangulation design in this study was that it enabled the investigator to use different data types in the same study to achieve a better understanding of the research problem (Creswell, 2007).

Conducting mixed methods research offered the advantage of assisting in generating an understanding of and exploring the impact of the role of healthcare professionals and social support as determinants of self-care among adults diagnosed with T2DM, which was not possible to explore or investigate by means of a single method (Tashakkori & Teddlie, 2003).

For this research study, mixed methods offered the researcher both breadth and depth of response concerning support systems for adults with type 2 diabetes. Moreover, it offered not only quantifiable responses, but also explanations and contextual information. In addition, the concurrent triangulation design allowed exploration of the influence of healthcare professionals and social support on self-care among adults diagnosed with type 2 diabetes. The justification for using both quantitative and qualitative data was to “confirm, cross validate or corroborate findings within a single study” (Creswell, 2003, p. 217). Thus, both quantitative and qualitative data collection took place within the same stage of the study and the outcomes were combined during the result interpretation phase to help explain divergent or strengthen the supportive results.

The study objectives include

- Exploring whether age, gender, education, marital status, employment, or income impact diabetes self-care management
- Examining the effect of family and social support on self-care-management among Saudi people diagnosed with T2DM
- Determining the role of healthcare professionals in promoting diabetes self-care-management

### **Advantages and Disadvantages of Concurrent Triangulation Design**

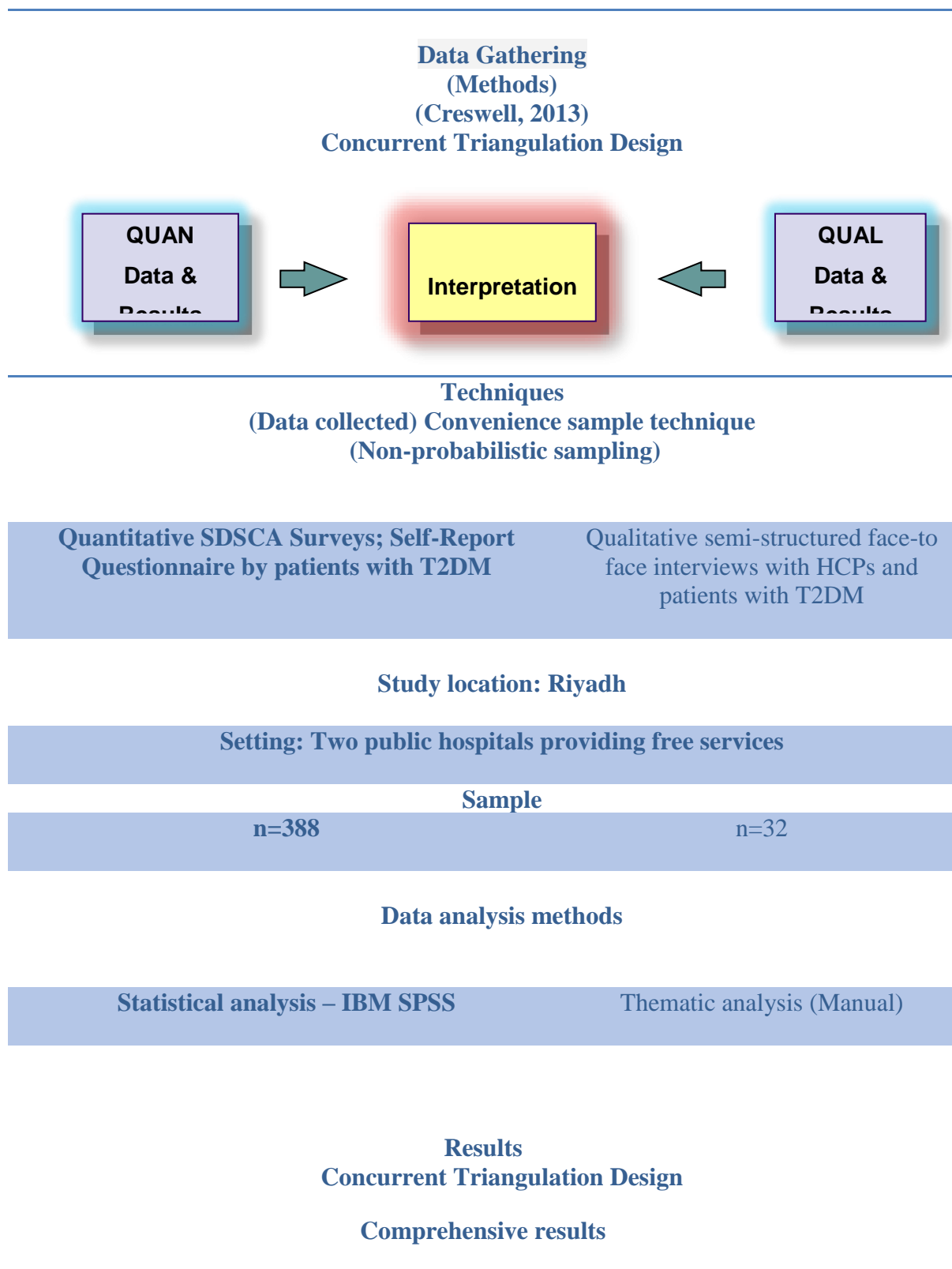
There are a number of advantages to using a Concurrent Triangulation Design. This methodology is familiar to most researchers and often generates well-validated results and substantiated findings (Creswell & Plano Clark, 2007; Creswell, 2009). Concurrent data collection results in a shorter data collection time period than sequential design, as quantitative and qualitative data are collected at the same time at the research site (Creswell & Plano Clark, 2007; Creswell, 2009). The disadvantages of this design are that significant amounts of effort and expertise are required for concurrent triangulation design, as two separate methods of analysis are applied to the study of a single phenomenon (Creswell, 2009). It can also be hard to compare the results of analyses conducted in completely different ways (Creswell, 2009), and the researcher may be uncertain about how to resolve differences that arise when comparing the results (Creswell, 2009).

### **Justification for choosing a mixed methods research approach**

The use of the mixed methods approach was driven by the need for both quantitative and qualitative data to comprehensively explore individuals self-care activity statuses and their demographic and characteristics. The aims of the quantitative approach, using a questionnaire survey, were to measure uptake of five self-care activities: diet control, physical activity, glucose testing, diabetic medication adherence, and foot care, as well as to allow the researcher to determine participants' demographic information to examine self-care activity management effects for people with type 2 diabetes. For the qualitative approach, semi-structured (face-to-face) interviews were used in order to explore the impact of the role of healthcare providers and family/social support on effective self-care management among individuals with type 2 diabetes. The aim is to evaluate the nature of support given to people with type 2 diabetes to enable them to adhere to the prescribed diabetes self-care regimen; in the former context, this was intended to assess how people with type 2 diabetes perceive the efficacy of the support they receive from healthcare professionals. The combination of quantitative and qualitative methods used in this study should support others in exploring and evaluating in depth the nature of support given to people with type 2 diabetes from both medical and social perspectives, and allow analysis of the impact of this support on self-care activity.



The research includes both quantitative and qualitative elements in order to investigate self-care activities among adults diagnosed with T2DM in Riyadh, Saudi Arabia, and test in depth the role of healthcare professionals and social support as determinants of self-care among adults diagnosed with T2DM. However, within the constructivist method, when the problem has not been considered previously, the qualitative module should receive more emphasis so that more realities can be shown and constructed (Guba & Lincoln, 1994). In this study, using a quantitative survey helps provide a clear picture of how people with type 2 diabetes manage their conditions by taking greater responsibility for self-management on a day-to-day basis. Conversely, quantitative data about a multidimensional problem allows a more robust confirmation-based implications to be drawn (Polit, Beck & Hungler, 2001). In addition, numerical data from the questionnaire allows for generalisation of certain ideas and constructions found using qualitative tools, while the use of qualitative tools increases the depth and breadth of the assembly of reality regarding the role of healthcare professionals support and social support for people diagnosed with T2DM, and the impact this has on self-care management (Gillis & Jackson, 2002). In the context of this study, this helps demonstrate the nature of professional support offered to service users and how people with T2DM perceive such support systems offered by their family, social, and healthcare professionals and how these support systems can, in fact, improve diabetes self-care management (see Figure 3).



**Figure 3: Research design map**

There are five broad reasons for selecting a mixed methods research design (Greene, Caracelli & Graham, 1989). These are complementary and can be set out within the context of the present study as shown below.

1) **Triangulation:** the main objective of using triangulation is to improve the confidence and validity of study results (Thurmond, 2001). According to Oppermann (2000), triangulation can help to verify results and minimise study biases arising from methodology, data, or the investigator. Triangulation is a process whereby both approaches can corroborate each other's results. According to Polit and Beck (2006), qualitative data contextualises and improves the evaluation of the generalisability of findings. In this study, a mixed methods approach was used to determine whether professional, social, and family support do in fact improve diabetes self-care management among people with T2DM in Riyadh, Saudi Arabia. The researcher was keen to determine whether practitioners and the diabetes service users share similar ideas or worries about diabetes management. The outcome of this study could thus provide a solid evidential foundation for the navigation of future approaches to diabetes self-care.

2) **Complementary:** both approaches can improve, explain, or elaborate on study outcomes (Greene et al., 1989). As an extension of data combination in respect of support outcomes, the researcher believes that experiences of giving care to people with DM may allow elaboration on the results and deliver a deeper data analysis.

3) **Development:** this uses the outcomes from one method to assist in the development of the other (Greene et al., 1989). The quantitative survey's SDSCA questionnaires completed by people with T2DM and the qualitative face-to-face interviews with people with T2DM and healthcare professionals can be compared with each other to help to improve the interpretation and description of the study results or outcomes.

4) **Initiation:** this helps to discover any paradoxical and contradictory elements, exploring the new standpoints of both frameworks, and allowing the reorganisation of questions as well as comparing the results of one method with those of the other (Greene et al., 1989).

5) **Expansion:** this facilitates the extension of the range and scope of inquiry by utilising diverse approaches for different inquiry methodologies (Greene et al., 1989). As suggested by Creswell and Plano Clark (2010), the application of mixed methods research assists in answering complex questions more effectively than mono-method research. The researcher,

has identified that diabetes self-care activities in Saudi Arabia will have different levels of support from both healthcare professionals and family/spouses/friends for people with T2DM. Healthcare teams such as diabetic educators and diabetic nurses in Saudi Arabia will also have different views on diabetes care, education, and support skills when compared to people with T2DM.

### **Quality in Qualitative Research**

It has been queried whether particular principles for ensuring a high standard of research need to be devised in relation to mixed methods, or whether established principles may be applied due to the challenges posed in characterising such principles (Brannen, 2005). Replication, dependability, validity, and transferability are significant factors for judging standard quantitative studies (Spencer et al., 2003, cited in Brannen, 2005), while verifiability, appropriateness, integrity, and veracity were noted by Brannen (2005) as being vital in relation to qualitative studies; these are generally analogous to the quantitative principles. Ultimately, the form of data analysis adopted in an investigation and the significance of quantitative or qualitative approaches most significantly affect the quality principles applied (Bryman, 2006). For quantitative data, the researcher used instruments that are appropriate and clear to participants. The content validity tools for quantitative and qualitative studies were also strengthened through review by an expert panel. In addition, this study used mixed methods and data collection from two settings to make the study's findings more generalisable.

### **Credibility and ensuring trustworthiness**

The significance of a qualitative investigation's results can be determined on the basis of its trustworthiness (Lincoln & Guba, 1985). In contrast to the rigour and validity of research, trustworthiness is a less established principle, however. Verifiability, dependability, generalisability, and credibility are four dynamics of trustworthiness within a qualitative study (Lincoln & Guba, 1985). Lincoln and Guba (1985) explored these dynamics in greater depth, noting that credibility is concerned with the extent to which the information provided by research subjects can be considered as being reliably reflected in the researchers' analysis and study results. The extent to which other situations and circumstances can be explained based on the study results indicates generalisability. Information collection, analysis, and theory production as an amalgamated procedure may be evaluated in terms of a standard that indicates

dependability. Finally, the extent to which the obtained information accords with the results provides an assessment of verifiability (Lincoln & Guba, 1985).

## **4.5. Research Procedures**

### **4.5.1. Ethical Considerations**

This section deals with the ethical dimension of the study. Ethics is defined as “a system of moral values that is concerned with the degree to which research procedures adhere to professional, legal, and social obligations to the study participants” (Polit & Beck, 2012, p. 727). The study adhered to the strict ethical framework in agreement with Burns and Grove's (2004) suggestion that the successful conduct of research goes beyond research expertise and diligence, requiring honesty and integrity in addition. The presentation of ethics in research is mainly concerned with protecting participants in the study, confirming that they will not come to any harm and that their rights are protected. Honesty and integrity epitomise this, and Orb, Eisenhauer, and Wynaden (2000, p.93) offer an effective synopsis of this complex issue in that "ethics pertains to doing good and avoiding harm".

The research procedure was formulated based on guidelines provided in relation to ethics involved in research by the University of Salford. An outline of the proposed procedure, which explained the purpose of the study, the methods of data collection, and the research tools, was therefore sent to the Research Ethics Department of the University of Salford for approval (see Appendix 7), and ethical approval for the research was obtained from the University on 11 January 2016; the outline was also submitted, along with an Arabic translation, to the Ministry of Health, Saudi Arabia, to receive ethical approval from the Ministry. This approval was also received (see Appendix 8).

As an international student working in a healthcare setting located in Riyadh, Saudi Arabia, the researcher was made aware by the supervisor of the importance of several key concepts such as autonomy, confidentiality, and consent in clinical practice, which needed to be applied with equal rigour in this study. This led the researcher to investigate the six principles of research ethics outlined by the Royal College of Nursing (RCN) (2004):

**Informed consent:** This principle ensures that all participants give informed consent prior to participating in the study. This was achieved when each participant was given a detailed participant information sheet outlining their role in the study. Each participant was also given the researcher's contact details and those of the research supervisor in case they needed to make contact at any stage of the research.

**Confidentiality:** After being provided with clarification of the purpose of the study, each participant was assured that the data obtained would be kept in the strictest of confidence. They were also assured that their information would not be recognisable in any way, being made aware that their names would not be attached to the questionnaires or the interview transcripts, being replaced by codes, the meaning of which is only be known to the researcher. Furthermore, participants were informed that the consent forms bearing their details would be kept separately from the other documents.

**Data protection:** Participants were assured that their data would be protected by both the laws of the United Kingdom and those of Saudi Arabia governing the collection, retention, and dissemination of data. Documented and recorded data were saved and backed up using a password protected computer, and the hard disk backup also had these security features, with passwords known only to the researcher.

**Voluntary participation:** It was explained to each respondent that participation in the study was voluntary. They were further informed that once they had agreed to take part, they remained free to withdraw at any point without any consequences. This was also stated in the formal consent form.

**Potential benefits:** As this study did not involve human testing or any specific interventions, the potential risk of any harm was negligible. Following minor corrections, the study was therefore approved by the Research Ethics Committee at the University of Salford and the Ministry of Health in Saudi Arabia.

**Avoiding deception:** To ensure the integrity of the study, the research suggestions were developed and submitted for review to the ethics committees at the University of Salford and the ministry of Health in Saudi Arabia. The researcher also met with a number of key stakeholders in Saudi Arabia to seek approval to collect data. These included the Hospital Director, the Medical Director, the Director of the Diabetes Centre, the Head Nurse and the

Nurse in Charge at Hospital A. At Hospital B, it was necessary to obtain approval from the Head of the Training Department, the Head of the Diabetes Centre and the Diabetes Educator and her team.

Additionally, the people with type 2 diabetes and healthcare professionals invited to participate were given an information sheet (see Appendices 9 and 10) explaining the research study, and were asked to sign a consent form. The researcher informed all the participants that participation was voluntary and that they could withdraw from the study at any time, and that such withdrawal would not affect the healthcare services provided to them, nor attract any comment or penalty.

The participants were also assured that comprehensive confidentiality would be maintained throughout the study.

#### **4.5.2. Data Collection**

This section outlines and elaborates on the research process used for data collection, choosing the research setting, sampling, recruitment for the study, the pilot study, designing research instruments, ensuring the validity and reliability of SDSCA, instrument translation into Arabic, and data management.

##### **4.5.2.1. Research Setting**

This study was undertaken in two of the largest government hospitals in the city of Riyadh, Saudi Arabia; this is the capital city and the largest city in Saudi Arabia. The researcher selected two different settings to increase the generalisability of the study findings (Polit & Hungler, 1999). The two hospitals chosen are the biggest providers of care for people with DM, with the Diabetic Centre in Hospital A being one of the biggest diabetes centres in Riyadh. All hospitals that provide free healthcare services are overseen by the Ministry of Health, and as a healthcare professional for over 25 years, the researcher was fully conversant with the hospitals' policy, protocols, and administration rules for healthcare professionals (such as doctors, nurses, clinical diabetic educators, and dieticians) and patients. This meant that the requirements for access to these settings were known, and the researcher was fully aware of the potential difficulties in gaining access to these hospital settings for research purposes without obtaining

permission from the hospital administration. An overview of the diabetes centres in each of the hospitals is presented below:

### **Diabetes Centre in Hospital A**

The Diabetes Centre in Hospital A, which opened on 11<sup>th</sup> December 2010, was as one of the first large centres opened to provide diabetes care services to people in Riyadh diagnosed with this metabolic condition. As well as being a research hub, this centre is also designed to provide training according to the national plan to educate the community on the topic of diabetes mellitus. Within the centre there are three diabetes clinics for males, three for females, dietetic clinics for both males and females, three foot care clinics, and three diabetic educators (one for males, one for females, and one for children). The centre also has specialist clinics that cater for gestational diabetes, neurology, psychology, cardiology, urology, kidney disease, and endocrine disorders, and three optical clinics. In addition to these clinics, there are several other sections such as a pharmacy, a physiotherapy department, a laboratory, sports facilities, and an education hall that can accommodate 45 delegates at any one given time. In 2015, 33,908 people who had been diagnosed and registered with diabetes attended the centre.

### **Hospital B Setting**

Located in the south of Riyadh, Hospital B is a general medical hospital that was built in 1994 and operationalised in 1996. This centre provides high quality care in various medical disciplines such as Obstetrics and Gynaecology, Paediatrics, Medicine, Neurology, Urology, ENT, Nutrition, Ophthalmology, and Physiotherapy. Hospital B was created under a Joint Commission Creation in 2012, and as a general hospital, it serves a large number of people in the city. The Outpatient Department (OPD) was built separately in 2007, and the diabetes clinic is one of the core departments there. According to the 2015 database, there were 65,000 people registered as having diabetes attending the hospital. Unfortunately, the typology of these conditions was not noted.

### **Gaining Access to Hospitals**

#### **Hospital A**

The researcher first met with the Medical Director of the hospital, who scrutinised the ethics approval obtained from the Ministry of Health in Saudi Arabia and the University of Salford.



Subsequently, a summary of the study, including its aims, objectives, and data collection methods was provided. After that, approval to collect data was obtained from the hospital director and the researcher was assured of the full cooperation and support of all staff members in the diabetes centre. Thereafter, another meeting was arranged with the Director of the Diabetes Centre and the head nurse, who were keen to look at the data collection tools. The Director of the Diabetes Centre gave the researcher an introduction to the diabetes centre and requested an overview of the research tools used for the research. After instruction from the approval letter for the Nursing Director of the Diabetes Centre, a further meeting took place with the Nursing Department Administration team to discuss the process of data collection. Prior to collecting data, it was deemed most appropriate for the researcher to spend two days in the diabetes centre to gain first-hand experience of how the clinic was managed.

### **Hospital B**

The sequence of events that took place at Hospital B was somewhat similar to that seen in Hospital A. After submitting the relevant documents, the researcher met with the Head of the Training Department, who requested an explanation of the study. Thereafter, the researcher met with the Head of the Diabetes Centre, who had been in the post for more than 20 years. As in Hospital A, an orientation period was arranged, but in this case over three days instead of two days as the diabetic clinic was very busy, and the extra day allowed the researcher a better chance to meet with the staff.

Both experiences were very useful, demonstrating the importance of effective communication with gate keepers and the need to gain their co-operation in order to facilitate data collection in research.

#### **4.5.2.2. Sampling**

Sampling is an integral part of research, involving the selection of chosen parts of a population (Polit & Beck, 2012); a sample is thus always a subset of the population. There are two main types of sampling, probability and non-probability sampling. In probability sampling, each individual in a group has an equal chance of being selected. Non-probability sampling, on the other hand, aims to determine a typical unit from the population and thus not every member has an equal chance of being included (Polit & Beck, 2012). This study used a non-probability convenience sample. The following categories were included:

- People with T2DM
- Health Care Professionals (HCPs) (diabetic educators, diabetic nurses, and staff nurses working with diabetic patients).

### **Criteria for selection of participants**

The researcher obtained a list of individuals in the target populations of patients with T2DM and HCPs. The individuals with T2DM were approached for the survey and both individuals with T2DM and HCPs for semi-structured interviews. The following inclusion and exclusion criteria were then applied:

#### **Inclusion criteria**

1. Patients with T2DM, aged 18 and above, who had been registered and diagnosed with type 2 diabetes mellitus for more than one year; and
2. HCPs who had experience of giving care to people with DM for at least one year.

#### **Exclusion criteria**

1. Patients with T1DM and children.
2. Patients with gestational diabetes.
3. HCPs not working with diabetic patients.

The period of data collection was two and a half months (from 25<sup>th</sup> January 2016 to 11<sup>th</sup> April 2016), and the number of respondents was 388 for the questionnaires on self-care activities and 10 males and 10 females (n=20) with type 2 diabetes for the semi-structured interviews, along with 12 healthcare professionals. Patients were eligible for participation in this study if they were 18 years of age or above, and if they had been registered as being diagnosed with type 2 diabetes mellitus for more than one year. The healthcare professional participants were those who had experience giving care to people with DM for at least one year. Further demographic information was gained through the questionnaires, such as gender, age, marital status, education level, employment and monthly income.

As the research subjects were approached with regard to involvement in the investigation while waiting for their standard diabetes check-ups, this may have contributed to the strong participation level in the research, which is a notable aspect of this study. Two hundred and

fifty copies of the questionnaire were distributed to each hospital (total number of copies, 500) and the final number of returned questionnaires was 388, equivalent to a response rate of 77.6% (212 from Hospital A and 176 from Hospital B).

#### **4.5.2.3. Research Instrument**

The researcher used the Summary of Diabetes Self-Care Activities (SDSCA) (Appendix 11), which was then translated into Arabic; a demographic assessment was also prepared by the investigator that included age, gender, marital status, employment, monthly income, and educational level. The SDSCA tool is a brief self-report questionnaire consisting of 12 items including self-care activities, diet measure adherence, assessment of physical activities, and glucose testing (Schmitt et al., 2013). Toobert, Hampson, and Glasgow (2000) performed a study that provided information about the validity and reliability of SDSCA by examining correlations with nutritional logs, recording of glucose levels, behaviour records, and interviews. Based on the 12 items, the researcher thus formulated demographic participant questionnaires (1 to 6), and then developed questions 7 to 33, which covered all five activities defined as self-care based on the adapted version of the SDSCA as a self-administered questionnaire (Toobert et al., 2000). Approval to use the SDSCA questionnaires was secured from the author (see Appendix 12).

The questionnaire was divided into two parts. As noted, questions 1 to 6 were personal demographic questions, which included gender, age, marital status, educational level, employment, and monthly income, while questions 7 to 33 concerned self-care activities for type 2 diabetes, with a focus on diet, physical exercise, blood sugar testing, foot care, and taking medication. The SDSCA tool was used to measure the behaviours of the persons with diabetes, and more specifically, their self-care activity levels for the last seven days.

The SDSCA is the most widely used self-reporting tool for measuring diabetes self-management in adults (Toobert et al., 2000), and numerous studies have measured the validity and reliability of SDSCA. Toobert et al.'s (2000) study provided information about the validity and reliability of SDSCA based on correlations with nutritional logs, records of glucose levels, behaviour records, and interviews. Seven different studies were reviewed to measure reliability and validity, comparing results for a total of 1,988 individuals with diabetes mellitus, and this work delivered a revised version of the SDSCA scale (Toobert et al., 2000). Validity approximations for diet and exercise were created based on several approaches to self-reporting

(such as self-monitoring and food records) (Toobert et al., 2000). Prior studies have also described important correlations of SDSCA subscales with other standard measures (Toobert et al., 2000). Significantly for this research, two studies have also used the questionnaire in Arabic in the context of the Middle East. These quantitative PhD studies used SDSCA questionnaires in Lebanon and Saudi Arabia, respectively (Aljohanis, 2011; Sukkarieh, 2011).

## **SDSCA Instrument Translation into Arabic**

### **Translation and Validation of the Instrument: Phase 1: Process of translation**

In order to obtain precise, clear, and understandable information from the participants, the questionnaire was translated into Arabic. The translation process provided in the WHO guidelines for instrument translation was followed (WHO, 2008). Translation and validation of the questionnaire was thus done via a three-step process:

#### **1. Forward Translation**

In the first step, the English version of the SDSCA questionnaire was translated into Arabic. Forward translations of the complete set of SDSCA tools (33 items) were delegated to a professional independent translator, who performed the translation for a fee. The translation was processed over four days, and the result was labelled as forward translation Version 1 – Arabic SDSCA.

#### **2. Expert Panels and Backward Translation**

##### **A - Modification by Expert Panel**

The second step of translation involved modification of the Arabic version of SDSCA by an expert panel. Version 1 was reviewed by the researcher and two senior nurses, who were specialists in administration and education. They questioned the accuracy of some vocabulary, especially the words connected to healthcare that may be interpreted differently by participants because of the various idioms common in Arabic-speaking countries; however, they did not suggest alternative translations or vocabulary.

## B - Assessment of Content Validity by Expert Panel

The third step in creating the Arabic version consisted of content validation. The content validity assessment was an important step, as it helped with drawing conclusions about the quality of the scale. The content validity index developed by Lynn (1986) was used in this process to compute the relevance of the translated items. The researcher established an expert panel by contacting three panel members, a lecturer at the college of nursing's female section and two senior nurse educators/nurse specialists (Table 4). The panel was asked to rate the Arabic version of the translation on a 4-point scale. Within this process, the representativeness domain was first examined to test whether the items represented the domain of the content. Next, the clarity domain was checked to ensure it related to the applicability of the tool's expression, and further clarification was applied. The researcher asked the panel members to rate the potential scale items; the criteria to be used in rating the scale were sent to the panel along with the questionnaires, as recommended by Polit and Beck (2006). This technique used a 4-point ordinal scale: (1) = Not at all representative/clear; (2) = slightly representative/clear and item needs major revision; (3) = Mostly representative/clear and item needs minor revision; (4) = Item representative/clear. Table 5 shows that columns for comments and suggestions were also provided. After the researcher received the rankings from panel members, a summary of the dichotomous variables was derived by breaking the results into two categories, and including ratings of 1 and 2 in category one, unsatisfactory, and those of 3 and 4 in category 2, satisfactory.

### **Content Validity Index Report**

In the content validation process, all 33 items were found to demonstrate 100% representativeness. As a result, all the items were preserved in the translated questionnaires. While the clarity scores of three items did not reach perfect clarity, the remaining 30 items did receive a 100% score. The three items were modified accordingly to achieve a 100% score in representativeness (Tables 4 and 5).

Table 4: Characteristics of Expert Panel

Number	Professional	Working area	Degree of Qualification	Years of experience
1	Lecturer at King Saud University Riyadh, Saudi Arabia	Ministry of Higher Education	Master's Degree	25 years
2	Senior Nurse Educator / Nurse Specialist, Riyadh, Saudi Arabia	Ministry of Health, Riyadh, Saudi Arabia.	Master's Degree	14 years
3	Senior Nurse, specialises in administration and education streams, Riyadh, Saudi Arabia	Ministry of Health	Master's Degree	20 years

Table 5: Example of Content Validity

Item	Representativeness				Comments
	1 Not at all Representative	2 Slightly Representative	3 Mostly Representative	4 Representative	
On how many of the last seven days did you inspect the inside of your shoes?					
	Clarity				Comments
	1 Not at all Clear	2 Slightly Clear	3 Mostly Clear	4 Clear	

### C. Back Translation (Second Independent Professional Translator)

A back translation was the third step in the process of translation. The SDSCA Arabic version was translated back into English by an independent translator so it could be compared with the original English SDSCA for the purpose of detecting any discrepancies. The outcome of the back translation was remarkably similar to the original version.

### Phase 2: Pre-Testing and Cognitive Interviewing

The purpose of this step was to examine the validity of the instruments through pilot testing with ten people suffering from type 2 diabetes mellitus (five males and five females). Another goal of this step was to check the validity and reliability of the data collection process and instruments used.

#### **4.5.2.4. Pilot Study**

A pilot study is defined as a small-scale version or sample run designed to test the approaches to be used in a larger study (Polit & Beck, 2012). Before starting the data collection process for the main study, a pilot study was thus carried out in order to ensure that the data collection tools were clearly understood by every participant. The aims for conducting the pilot study included minimising any difficulties in wording and evaluating the length of time each contributor would require to answer all the questionnaires (Cohen et al., 2000). The pilot study was carried out in diabetes clinics while the patients with T2DM were present for their routine follow-ups. The pilot study was conducted on 20<sup>th</sup> and 21<sup>st</sup> January 2016 with a group of people suffering from type two diabetes mellitus (n=10; five males and five females) from both hospitals.

Each participant completed the pen and paper questionnaire after the researcher had explained the study's aims. All the participants completed the questionnaire in approximately 30 minutes while the researcher waited. The participants had no difficulty in understanding and answering the questions; furthermore, the general feedback from the participants was positive. Face-to-face interviews were also held in the pilot study with six people with diabetes (three participants from each hospital) as well as two healthcare professionals (one from each hospital); each interview took approximately 45 to 60 minutes. The pilot study offered many advantages for the research in terms of the face-to-face interviews by providing the researcher with a chance to learn how to conduct a face-to-face interview, as well as offering an opportunity for the researcher to develop their interview techniques.

#### **4.5.2.5. Data Collection**

The main phase of data collection was between January 2016 and April 2016. A total of 388 people with T2DM completed SDSCA questionnaires and 20 people with T2DM and 12 healthcare professionals participated in one-to-one interviews. The first survey for questionnaires and interviews was conducted on 25<sup>th</sup> January 2016, and the last interview and survey was completed on 11<sup>th</sup> April 2016.

#### **Process of Data Collection**

As mentioned previously, this study used a concurrent triangulation design, combining quantitative and qualitative methods to ascertain the best available data to gain a better understanding of the research problem (Giddings, 2006). Quantitative data collection was conducted through the use of a questionnaire, and the qualitative method involved collecting data by means of face-to-face semi-structured interviews. Although the approaches selected for data collection are important to the success of any research, in this study, the type and relevance of the questions in the questionnaires and the semi-structured interview were deemed equally important. An analysis was thus conducted to ensure that the information obtained was relevant to the original aims and objectives of the research prior to data collection at both hospitals in Riyadh.

## **Quantitative and Qualitative data collection**

### **Recruitment for the study**

The researcher met the participants in the waiting areas at both clinics and explained the nature of the study while the participants were waiting for their appointments. Once agreement to participate had been given, each person was given an envelope containing an information sheet and a consent form along with a copy of the questionnaire. The recruitment procedure occurred in a private room, and those who completed the questionnaires were offered the chance to take part in the interviews; the researcher took their contact details in order to schedule these interviews. Signed consent was obtained from each participant before they completed the questionnaires and before each interview commenced.

With regard to the healthcare professionals, those considered eligible who were thus contacted and invited to participate were those who had experience of giving at least one year of care to people with DM. Again, an explanation of the purpose of the study was provided and all participants received an envelope containing the invitation letter and information sheet and a consent form. Those who agreed to participate were also asked to sign the consent form before the semi-structured interview began. When the participants had completed the questionnaires, the researcher asked them if they wished to take part in an interview, and once agreement was reached, the consent form was signed and the recruitment procedure occurred in a private room. The HCP recruitment procedure occurred in their own offices, but those who agreed to participate were also asked to sign the consent form before the semi-structured interviews began.



## **Interview**

An interview is an activity that is conducted for a specific purpose and has a particular structure and interview guide (see Appendices 14 and 15). In this setting, the interviewer sought responses from the interviewees in order to fulfil a particular objective (Gillham, 2000). An interview is usually held between two people, and the type and structure of the interview is based on its specific purpose. One of the forms of interview is a research interview, which is conducted with the objective of gaining in-depth understanding of the problems related to the main purpose of the research and which aims to gather knowledge regarding the research questions (Denscombe, 2007). An interview is the most useful method of obtaining information on people's perspective, viewpoints, and experiences. However, such interviews need to be well structured and planned in advance, as they are completely different from normal conversation (Oates, 2006). Interviews fall mainly into three categories: structured interviews, semi-structured interviews, and unstructured interviews. For the purpose of data collection in this research study, face-to-face semi-structured interviews were conducted, as the semi-structured interview is flexible and can be varied for clarification depending on the information received from participants.

## **Interview Setting**

This section discusses the importance of the interview setting. As an activity, the structure of an interview, which generally occurs between two individuals, is designed to obtain sufficient responses to achieve a particular objective (Gillham, 2000). It is therefore important to ensure that the environment is conducive to such conversation transactions (Jacob and Furgerson, 2012). Ideally, the researcher would have preferred to conduct the interviews in comfortable and neutral locations, somewhere that was neither the interviewee's home nor the hospital. Unfortunately, the location and prevailing cultural traditions prevented this from happening. To this end, and following due negotiation with appropriate personnel and the surmounting of a number of hurdles presented by certain gate keepers, the researcher was able to secure a peaceful and comfortable room located within the hospital grounds away from the main hospital activities at both hospitals. Located on the first floor, the interview room, which was designed to hold three people, contained a round table and three comfortable chairs. Additional amenities included air-conditioning, a water cooler, and flowery curtains and carpets. In addition, the researcher provided hot and cold drinks, which were offered to the participants

prior to the start of the data collection process. The private location of the room meant that the participants felt more comfortable, especially the female interviewees. As a female, the researcher also had the advantage that the female participants did not need to wear their complete set of cultural clothing, such as the Niqab (face cover) and Tarha (head cover), during the interview period. The interviewer, however, wore traditional outdoor dress (black Abaya and Tarha), covering the whole body, hair, and face. This was seen as particularly important for any female person or researcher in this area, particularly in the context of collecting data in a private room with no chaperone. In this instance, the door of the room was also left slightly ajar to illustrate that nothing untoward was taking place.

The required instruments for the interviews, such as a voice recorder and notebook, were previously arranged. The times and places of the interviews were pre-determined and agreed upon, and each interview began with a brief introduction along with an explanation of the research study being provided to the participants. The interviewees were simultaneously provided with information about the topic of the interview and their rights.

In this cultural context, as the researcher is female, this interviews were sensitive in nature, especially for male participants. The use of certain words such as *ok* and *yes* was emphasised to express attention to their responses and to reassure them that their responses were acceptable within the context of this collective society. During the interviews with male participants, the conservative culture was recognised and respected (Hawamdeh & Raigangar, 2014); for instance, the place and time preferred by the male participants was respected in the context of the interviews. The doors were also kept open while interviewing males according to their preference and with regard to the conservative culture.

Interview participants must be provided with a comfortable and suitable environment so that they are able to give the best responses and avoid any interference and distractions (Jacob & Furgerson, 2012). Along with a peaceful setting, proper time should be given to allow conduct of the interview in a way that allows recording of the best responses. Participants should thus be given permission to select a quiet and peaceful environment.

the researcher was able to secure a peaceful and quiet setting in both hospitals (Hospital A and Hospital B), and the rooms in both hospitals were quite close to the diabetes centres. Patients are used to coming for their general check-up to these centres and to having follow up sessions about their medical states. In order to motivate and encourage free interaction with the

interviewees, sufficient space was maintained between the interviewer and the participants, and to increase rapport and trust, the researcher shook hands with the female participants, while avoiding this activity with male participants.

As the researcher and a Saudi female, the researcher also had an awareness of the impact of local non-verbal communication during the interview process (Holloway, Wheeler, & Holloway, 2010). During the interview process, the researcher thus attempted to always speak clearly and confidently, as according to BARRIBALL and WHILE (1994), positive self-presentation of the interviewer in terms of dress, style and etiquette may place the interviewee at ease and help overcome the characteristic special effects of gender differences.

This contributed to increasing trust and showing respect, which generated rapport in the context of local culture. The subjects' interests and general issues were discussed initially in each case for the purpose of breaking the ice. Subsequently, the substantive part of the interviews was commenced using the prompt sheet (see Appendices 13 and 14). This included general questions such as *in your opinion, what does it mean when we say that someone is healthy?* and *What was it that made you go to see the doctor?*. The interviewer's main role was as a facilitator, to ask probing questions when necessary and to motivate the interviewees to communicate freely.

Based on conversation flows and study concerns, the researcher listened to and interacted with the interviewees, making best efforts to represent the experience of the interviewees by mirroring their dialect; this made the participants more relaxed in the chosen environment. The methods of finishing the interviews were decided in advance, and notes were taken during each interview. Interviewees were also offered the option to add any points they thought were relevant (Myers & Newman, 2007).

Before interview data collection, the researcher asked each participant to sign the consent form and they received a basic information sheet about the study. Each interview began with a common Islamic phrase from the Holy Qur'an, "In the Name of God; the most Gracious; the Merciful", and each participant was asked what he or she preferred to be called during the interview as a sign of respect. Some of them chose their own name, while most said that they preferred to be known with reference to the name of their oldest son or daughter, such as example the father of Fahad (Abo Fahad) or the mother of Fahad (Um Fahad).

The researcher asked permission from each participant to tape-record the interview; the participants were asked to sign the consent form if they agreed. A digital recorder was used to record the interviews, and before the researcher started tape-recording, to avoid any interruptions, each participant was asked to turn their mobile phone to silent and a sign was put on the door (do not disturb, interview in progress). After permission to record the interview was received, each session began with a record of the participants' code, the date and start time of the interview. Participants were thanked for taking part in the interview at the end. Most interviews took between 60 and 90 minutes. The anonymity of all participants was retained. The researcher took notes during each interview after ensuring that this did not upset any of the participants.

### **Recording and Transcription**

The digital recorder was tested before each interview was recorded, in order to avoid tape-recording errors. On completion, each interview was downloaded to the researcher's personal laptop where it was stored in one of two folders, one for healthcare professionals and the other for people with T2DM. For safety purposes, a backup of the files was kept on two spare USB drives, which were stored in a safe and secure place.

Two audio recorders were used to increase reliability, and all local language transcriptions (local Saudi dialect) were carried out by a native Saudi Arabian. To confirm the reliability and accuracy, comparisons between the two recorders were made by the researcher and the one with the clearest audio used in each case. The researcher reviewed and checked each word in every single line in transcription against the results from the first recorder and then compared each word with the second recorder in order to ensure reliability and accuracy. One of the advantages of transcribing and recording interviews is that it provides the opportunity to evaluate the answers of the participants via repeated listening. It also reduces limitations such as placing different meanings of what the interviewee has said after the conduction of the interview. Evaluating the process by revisiting the researcher's or other researchers' audio recordings, and checking and transcribing the recordings are therefore necessary, albeit time consuming, activities (Bryman, 2012).

All interviews were translated into English by an external translator. The original transcriptions enabled a comparison and review of the translated interviews. This helped ensure the accuracy

of the interviews. All field notes were also transcribed into English so that the supervisors had an opportunity to read in detail what was observed.

This research used a strategy to reduce the risk of translation errors in the research interviews; however, there might be a difference in meaning when the translation is carried out from Arabic to English, especially due to the ways of expressing emotions in Saudi culture (Kayyal & Russell, 2013). Thus, certain differences might occur between the narration in Arabic or stories in English (Albared, Omar, Ab Aziz, & Nazri, 2010). Translation of one language to another involves a risk of losing the meaning of a particular text or matter in qualitative research. Therefore, interviews, transcription, and the analysis of data should be carried out in the same language where possible (Van Nes, Abma, Jonsson, & Deeg, 2010).

#### **4.5.2.6. Thematic coding development process**

A theme is a way to organise ideas that are common in the data, and it can help in answering a research question (Vaismoradi, Jones, Turunen & Snelgrove, 2016). A theme can be divided into sub-themes to enable a more detailed understanding of the data (Aronson, 1995). Some researchers fail to completely analyse their data, which results in themes that are not clear, and in these cases, the adequacy of the data analysis process cannot be clearly assessed (Vaismoradi et al., 2016). The process of qualitative data analysis is iterative, and several steps must be repeated in order to derive high quality findings from the data (Vaismoradi et al., 2016). This study relied on the four phase qualitative analysis method developed by Vaismoradi et al. (2016). The first phase was initialisation, the second phase construction, the third phase rectification, and the fourth phase finalisation. The stages performed in each phase are summarised in Table 6.

Table 6: Thematic coding development process

Phases	Stages
Initialisation	Reading transcripts and understanding the data Coding and identifying respondents' explanations Adding notes to help understand data
Construction	Carrying out classifications Conducting comparisons Translation Definition
Rectification	Linking developed themes to current knowledge Stabilisation
Finalisation	Developing a story from the data

### **Phase 1: Initialisation**

The main objective in this phase was to read the data several times in order to gain an understanding that would be valuable in subsequent steps. In the reading and understanding stage, interest centred on carefully reading the data and identifying any ideas and issues that were repeated in the data. In the coding stage, the concern shifted to carefully organising the data. Coding of data was split into small sections to simplify management. In the adding notes stage, notes were added to reflect the researcher's thoughts on the data.

This primary step of data analysis began during the conduction of the interviews, and continued through the ordering of transcriptions of the digital recording, then the checking of those transcripts for accuracy. Transcriptions were ordered on a daily basis, and the majority of the interviews were transcribed immediately after the researcher returned home. Transcribing took almost two months, with data collection ongoing during this time. For each transcribed interview, the participant's interview code was attached: for people with T2DM, the prefix PT was used, such that PT1 refers to interview number one, and for healthcare professionals, HCP was used, such that HCP12 refers to interview number twelve in that set. The transcribed interviews were checked against the voice files and for accuracy. Each transcript was anonymised to protect the participants' identities, which included removing the names of

people and places and any information that would readily identify participants. In this stage, the researcher highlighted emerging ideas and important and recurring themes within the transcripts; these were then grouped under the initial main themes.

### **Phase 2: Construction**

In this phase, the objective was to organise codes into groups and to create links between code groups and research questions. In the classification stage, many codes were grouped together based on similarities, while in the comparison stage, the main concern was to revise and connect themes with the aim of developing the main themes. In the translation stage, the concern was to create the links between the codes and the researcher's knowledge, while in the definition stage, the focus was on ensuring there were no duplicate themes.

### **Phase 3: Rectification phase**

In the rectification phase, more analysis was conducted to ensure the process of data analysis was complete. The themes were also rechecked to ensure they were well developed (see Appendix 16).

### **Phase 4: Finalisation**

In the finalisation phase, a report was prepared to present the connections between the themes and answers to the research questions (see Appendix 17).

A thematic coding framework, shown in Table 6, was also developed to help in the organisation and analysis of the interviews.

#### **4.5.2.7. Data management**

The data were entered into the most widely used software for survey analysis, IBM SPSS (Version 22.0). Descriptive statistics were used to analyse self-care activity and statistical tests such as the T-test of two independent samples, One Way Analysis of Variance (ANOVA), and a post hoc test were performed. Qualitative data were analysed using manual thematic analysis. The two sets of data were then compared in order to reach a conclusion on the findings.

In analysing the quantitative data, descriptive and inferential statistics were used in the analysis of self-care activity. In analysing the interviews with HCPs and patients with T2DM, manual

thematic analysis was used, and the thematic framework developed by Vaismoradi, Jones, Turunen and Snelgrove (2016) was used in the process of analysing the interviews. These findings can thus be presented as integrated quantitative and qualitative data.

#### **4.6. Conclusion**

The aim of this study was to investigate the extent to which healthcare professionals and social support act as determinants of self-care among adults diagnosed with T2DM in Riyadh, Saudi Arabia. This chapter discussed a wide range of subjects, beginning with the research philosophy, along with a clarification of quantitative, qualitative, and mixed methods research approaches. The research design and the justification for choosing the mixed methods research approach employed in this study were also presented. Furthermore, the ethical considerations, data collection process, translation, and validation of the instrument were explained.

Mixed methods research was used in this study: the quantitative approach was used in order to explore the impact of demographic factors on diabetes self-care activities among individuals with T2DM, while the qualitative approach was used to evaluate the nature of support given to people with type 2 diabetes to enable them to adhere to their prescribed diabetes self-care regimens. The quantitative method involved the use of self-report SDSCA questionnaires completed by patients with T2DM. The qualitative method involved semi-structured face-to-face interviews conducted with patients with T2DM and HCPs. Combining the findings from the quantitative and qualitative approaches strengthens the validity of this study, which used a concurrent triangulation design. This was the most effective design for this study, as it enabled the researcher to investigate participants' demographic factors, as well as to examine self-care activities in Saudi persons with T2DM and to evaluate the nature of support given to individuals with T2DM to enable them to adhere to their prescribed diabetes self-care activities.

The following chapter will present the findings from an integration of the quantitative data and qualitative data.



## CHAPTER FIVE: FINDINGS

### 5.1. Introduction

This chapter will discuss the results of the data collected from the surveys and interviews within the applied mixed methods approach. As discussed above, there is a clear need for robust research, and particularly for studies that use large samples of patients to contribute towards reducing the rapidly increasing incidence of DM and preventing DM complications among the Saudi population. It is for this reason that this study utilises two types of data collection in the form of surveys and interviews. This chapter reports the findings for both the quantitative surveys and qualitative interviews. The aim of this study is to investigate the extent to which the role of healthcare professionals and social support act as determinants of self-care among adults diagnosed with T2DM in Riyadh, Saudi Arabia, by integrating the findings from quantitative and qualitative components. The integration will assist the researcher and readers in understanding self-care and social support in Saudi Arabia. Moreover, the integration of these methods facilitates our evaluation of the level of performing diabetes self-care activities, and the nature of the support given to people with type 2 diabetes in order to enable them to adhere to the prescribed self-care regimen. The purpose of SDSCA and demographic surveys is to explore whether age, gender, education level, marital status, employment and income impact diabetes self-care management.

The interviews with HCPs and people with T2DM were undertaken to gain a richer understanding of the level of self-care activity among diabetes patients, examine the effect of family and social support on self-care, and identify the challenges faced by HCPs in diabetes self-care among patients with T2DM. Practice of diabetes self-care activities, culture and religion, and social support are qualitative themes supported by quantitative findings, while the themes of stigma and healthcare environment are qualitative only.

## 5.2. Profile of Participants

### Profile of Participants (Survey and Interviews)

As shown in Table 7 below, just over half of the survey participants were from Hospital A (n=212) compared to Hospital B (n=176). Collectively, more than half of the participants were either female (n=225); 50 years of age and older (n=253); married (n=305); unemployed (n=287); or had an income of less than 4000 Saudi Riyals per month (n=203). About half of the participants had a primary level of education (n=195).<sup>1</sup>

Table 7: Profile of participants (N=388)

Profile		N	%		
Setting	Hospital A	212	54.64		
	Hospital B	176	45.36		
Gender	Male	163	42.01		
	Female	225	57.99		
Age Group	18-29 yrs. Old	5	1.29		
	30-39 yrs. Old	38	9.79		
	40-49 yrs. Old	92	23.71		
	50-59 yrs. Old	149	38.40		
	60-69 yrs. Old	67	17.27		
	70 yrs. and older	37	9.54		
Marital Status	Single	10	2.58		
	Married	305	78.61		
	Divorced	23	5.93		
	Widowed	50	12.89		
Education Level	Primary	195	50.26		
	Intermediate	56	14.43		
	Secondary	72	18.56		
	Technical Degree	26	6.70		
	Bachelor's Degree	39	10.05		
Employment Status	Employed	100	25.8		
	Unemployed	205	52.8		
	Retired	83	21.4		
Monthly Income	Less than 4000 SAR	203	52.32		
	4000-8000 SAR	90	23.20		
	9000-13000 SAR	51	13.14		
	14000-18000 SAR	27	6.96		
	19000 SAR or above	17	4.38		
	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>HbA1C</b>	388	5.10	14.90	8.41	1.71

<sup>1</sup> The current exchange rate British Pound ↔ Saudi Arabian Riyal is 1 GBP = 4.79 SAR

The slight over-representation of females in the sample must be understood in the context of Saudi Arabia as an Islamic country. More specifically, this culture prescribes that an unnecessary private meeting between a man and a woman who are not legally related to each other should be avoided. Therefore, some male patients refused to participate in this study with a female researcher. It is also unsurprising that most participants were married (n=305), as Saudi Arabia is an Islamic country where the vast majority of adults are married. Under Islam, it is not permitted for men and women to have a sexual relationship outside of marriage, and individuals are encouraged to get married at an early age. Additionally, most participants were unemployed (n=287) with an income of less than 4000 Saudi Riyals per month (n=203). About half of the participants were educated to a primary level only (n=195). This is to be expected in this majority-female where most were aged 50 years and older. In Saudi Arabia, women are more likely to be housewives, have low education levels, and be unemployed, and this is especially prevalent in this age group. The target level of HbA1C is 7% or lower. Half (50%) of patients had HbA1c of 8.2 or lower, while 25% of patients had HbA1c below 7.2%. Of the interview participants there were 20 patients with T2DM, being 10 females and 10 males, who were over 30 years old, married, with differing levels of education, employment status and monthly income. Among the HCPs interviewed, there were nine diabetes educators, two diabetic nurses and one staff nurse. The HCPs had varying degrees of work experience.

The diverse characteristics of the participants in the sample will allow this study to gain more in-depth information (see appendix 18).

### **5.3. Findings**

This study consists of two data sets (data from a survey on T2DM patients' self-care activities and interviews with patients and HCPs). The findings are presented as an integration of the quantitative and qualitative data. The five themes are based on the qualitative findings, while the quantitative findings are used to provide further explanation and context for these themes. As the five themes emerged inductively from the qualitative data, and could not be predicted during the process of the survey design, the quantitative data reflects only some of the derived themes (such as practice of diabetes self-care activities, social support, and culture and religion). Where it is relevant, quantitative data is presented to give further context and an explanation of the qualitative findings.

### **Identification of qualitative findings for further quantitative exploration**

The themes that emerged from the qualitative semi-structured interviews were generated from the thematic analysis of verbatim quotes from translated transcripts. Five themes were identified, some of which were more influential than others in a Saudi context, particularly in terms of culture and religion, stigma, and social support in the practice of diabetes self-care activities. The emergent themes and their relevant sub-themes drawn from the qualitative semi-structured interviews are shown in Table 8. As mentioned in the methodology chapter, data from the qualitative and quantitative interviews were triangulated to produce more robust evidence on self-care and social support in Saudi Arabia.

Self-care and social support are presented within the five themes and a certain number of sub-themes developed from the data. The theme of healthcare environment is only related to social support while the remaining themes are related to both self-care and social support. The data on perceived levels of self-care demonstrates how certain demographic factors impact self-care management, and evidences how social support from healthcare professionals, family members, spouses and friends improve diabetes self-care management. Qualitative and quantitative findings from this study showed that culture and religion, stigma, social support, and healthcare environment influenced diabetic self-care activities in Saudi Arabia, as well as the poor adherence to self-care activities among Saudi people with T2DM. Table 5 outlines the qualitative themes and sub-themes, and supporting quantitative data.

Table 8: Themes and sub-themes

<b>Qualitative main themes</b>		<b>Quantitative responses</b>
<b>Theme</b>	<b>Sub-theme</b>	
Theme 1: Practice of diabetes self-care activities	Adherence to diet	Indicates strong agreement on low level of adherence to diabetes self-care activities. The majority of participants did not follow the recommended diet, exercise and blood testing regimes.
	Adherence to physical exercise	
	Adherence to medication	
	Self-monitoring of blood sugar	
	Adherence to Foot care	
Theme 2: Social Support	Demographic characteristics and self-care	There is a statistically significant difference between males and females. Males had higher scores in diet, exercise and blood sugar compared to females.
	Support from family	
	Support from friends	
Theme 3: Culture and Religion	Support from healthcare providers	64.7% of the respondents had not followed the recommended diet.
	Diet	
	Gender	
Theme 4: Stigma	Social environment	Interaction within family and the community. Healthcare professionals
Theme 5: Healthcare environment	Challenges faced by HCPs	
	Changes needed in patient management	

### **Theme 1: Practice of diabetes self-care activities**

The qualitative findings demonstrated that self-care activities were the cornerstone of diabetes control for patients with T2DM. This finding was corroborated in the quantitative findings, which also provided an insight into each participant's level of self-care practice. Perceived

levels of self-care activities (27 items in the SDSCA survey) are divided into six domains (diet; exercise; taking medication; testing blood sugar; foot care and dietary fat reduction). Participants were asked to identify how often they participated in self-care activities over the past seven days. The self-care survey also included six questions concerning the participants' demographic information. These demographic characteristics are examined in order to identify their impact on the practice of diabetes self-care activities among patients with T2DM.

### **Adherence to diet**

The qualitative findings reveal that patients did not adhere to their prescribed diet due to the lack of appropriate diabetic food in their home, leading them to continue their traditional diet (rice with camel meat or lamb). The quantitative variables on diet practice further clarify the qualitative findings, where 61.4% of surveyed patients had not followed the recommended diet.

The interview responses also reveal that many patients experienced problems with adherence to the recommended diet due to cultural barriers, as food appropriate for diabetic patients was not prepared at home. Moreover, they found it difficult to change their dietary habits because they had been following their traditional diet since childhood, and therefore preferred the taste of this food. One patient reported eating traditional food that was not suitable for her condition.

*“I cook what my family likes, which is rice with meat, our traditional food. I also eat with them because this is the only food I have eaten since I was a child, and I know how to cook it very well. I know this kind of food is not healthy” (PT18, female, 50 years old).*

Interviews with HCPs reveal their belief that following a healthy diet as recommended by HCPs was not easy for patients.

*“The majority of the patients do not follow the dietary guidelines recommended; they eat too much kabsa and mandi (both are dishes of rice with lamb). We (HCPs) give instructions to eat high-fibre bread and oats, but many of the patients claimed that they were struggling to follow diets recommended by HCPs...” (HCP7).*

A male patient reported that he worried about low blood sugar, because he was always forgetting to eat food.

*“I feel worried about low blood sugar because I always forget to eat food.” (PT4, male, 52 years old).*

In the quantitative data regarding adherence to diet, the diet scale is divided into five items (see Table 9). The data indicated that a relatively small proportion of respondents (18.9%) reported that they had followed the recommended diabetes diet for the entirety of the previous seven days (see Table 9). However, this was the second most frequent response following zero days. Indeed, more than half (61.4%) of the respondents had not followed the recommended diet for any of the previous seven days. This finding shows that patients were experiencing difficulties in adhering to the recommended diet. Similarly, almost two-thirds of respondents (64.7%) had not followed the eating plan for any of the seven days in the previous week. Only a relatively small proportion of respondents had followed the eating plan for all seven days in the previous week (18.6%).

Table 9: Patients’ diet in the last week

In the last seven days		0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
Have you followed your diabetes diet as recommended by the diabetes care team?	n	237	16	18	20	17	4	2	73
	%	61.2	4.1	4.7	5.2	4.4	1.0	0.5	18.9
On average, over the past month, how many days per week have you followed your eating plan?	n	251	10	12	19	14	6	4	72
	%	64.7	2.6	3.1	4.9	3.6	1.5	1.0	18.6
On how many of the last seven days did you eat foods such as fresh fruits, fresh vegetables, whole grain bread, dried beans and bran?	n	31	16	58	37	36	13	4	193
	%	8.0	4.1	14.9	9.5	9.3	3.4	1.0	49.7
On how many of the last seven days did your meals include sweets and desserts such as cakes, soft drinks, biscuits, jams, chocolates and fruit juices?	n	93	32	44	19	13	4	2	181
	%	24.0	8.2	11.3	4.9	3.4	1.0	0.5	46.6
On how many of the last seven days did you eat food such as red meat and dairy products?	n	121	77	85	43	23	5	0	34
	%	31.2	19.8	21.9	11.1	5.9	1.3		8.8

Analysis of the data showed that a high number of respondents (82.2 %) reported that they had discussed with their healthcare team the need to reduce fat in their diet, however there is a proportion of patients (17.8 %) who had not discussed this with their healthcare team. This is a gap that needs to be closed by ensuring that all patients are aware of the importance of reducing fat in their diet (see Table 10).

Nevertheless, the proportion of respondents (62.1%) reporting that they were reducing fat in their diet was lower than the proportion of patients who had discussed this with their healthcare team. This also shows that some patients were facing difficulties in reducing the amount of fat in their diet despite discussing this with a HCP.

Table 10: Diabetes care team has discussed the need to reduce fat in the diet.

Has your diabetes healthcare team discussed with you the need to reduce the amount of fat in your diet?		
	N	%
Yes	319	82.2
No	69	17.8
Total	388	100.0

Are you presently reducing the amount of fat in your diet?		
	N	%
Yes	241	62.1
No	147	37.9

### **Adherence to physical exercise**

The qualitative findings reveal that patients did not adhere to their physical exercise routine due to a lack of an appropriate places to exercise (such as a lack of places for walking or exercising in their community), as well as their medical conditions (such as pain in the legs and weakness in the body). Some patients also reported that they did not perform physical exercise for financial reasons, such that they could not afford to register at a gym. The quantitative data relating to adherence to physical exercise corresponds with the qualitative findings. More than half of the patients (53.6%) did not perform the suggested amount of exercise on any of the previous seven days.



The following transcripts from patient interviews reveal that they did not perform their physical exercise routines.

*“I do not do any physical exercise because I cannot walk for a long duration, as I have pain in my legs” (PT1, male, 70 years old).*

Female patients found it difficult to exercise because there were no female-only exercise areas.

*“I try to practise physical exercise as recommended by my HCPs, but as a female it is not easy to do due to a lack of suitable places” (PT8, female, 45 years old).*

HCP interviews also reveal that patients faced other challenges, such as not having anybody to take them to an area for a walk, a financial inability to register at a gym, and a lack of suitable exercise areas in their community.

*“They do not have someone to take them for a walk at a park, or do not have money to register at the gym” (HCP 3).*

Conversely, other patients reported taking responsibility for their diabetes management through physical exercise. Regular exercise is part of diabetes management because it helps to control blood glucose levels. These patient interviews showed that exercise took different forms, such as walking regularly, walking for an hour every day, or walking for more than 30 minutes three times a week.

One patient reported exercise in the form of walking for an hour a day with friends.

*“We (friends) do physical exercises together, such as walking for one hour every day” (PT5, male, 30 years old).*

However, there were some patients who had difficulty walking for long periods, and so could only walk for a few minutes. The benefits of their exercise were losing weight and controlling blood sugar.

*“I exercise to lose weight because the doctor told me that I must lose weight, as I am overweight” (PT9, male, 67 years old).*

HCPs reported that patients were aware of the benefit of diabetes self-care activities such as exercise in managing their diabetes, and that this awareness had been increasing recently.

*“In recent days, the effectiveness of the activity and self-care, among diabetic persons and people in general, has increased, as we see many people who exercise, walk and a large number of gym members. People with diabetes have become aware of the importance of sports and follow a proper diet as well” (HCP 3).*

The quantitative data shows that most patients (86.6%) reported that the diabetes care team had recommended doing exercise for a specific amount of time. Concerningly, some patients (12.1%) did not receive any recommendations regarding the duration of performing exercise, while 1.3% of respondents could no longer remember the suggestions of the team. This result shows that exercise is essential for diabetes management (Table 11).

Table 11: Healthcare team recommendation to exercise

Has the diabetes care team suggested that you exercise for a specific amount of time?

	N	%
Yes	336	86.6
No	47	12.1
I can't remember	5	1.3
Total	388	100.0

More than half of the patients (53.6%) did not perform the suggested amount of exercise on any of the previous seven days. Only a relatively small proportion of respondents (16.2%) exercised on all of the previous seven days. The number of patients who had exercised for three or more days was much lower than the number of patients who had exercised for fewer than two days. These findings show that of the patients surveyed the level of exercise was low, and patients were facing difficulties in their attempts to exercise, but the findings do not tell us what these exact difficulties were (Table 12).

An even greater number of respondents (62.9%) did not carry out at least 30 minutes of exercise on any of the previous seven days. Just 11.3% of the respondents carried out a 30-minute period of exercise on each day of the previous seven-day period.

Almost two thirds of patients (65.5%) did not perform any exercise besides their usual household or work activities on any of the seven previous days. Only a relatively small proportion of respondents (11.9%) had performed an exercise beyond their usual activities for

the previous seven days. These findings reinforce the earlier finding that the level of exercise among patients was low.

Table 12: Patients' exercise habits in the last week

Of the last seven days		0	1	2	3	4	5	6	7
On how many of the last seven days did you exercise the amount suggested by your diabetes care team?	n	208	20	44	29	15	6	3	63
	%	53.6	5.2	11.3	7.5	3.9	1.5	0.8	16.2
On how many of the last seven days did you carry out at least 30 minutes of exercise (total minutes of continuous activity, including walking)?	n	244	21	36	25	12	3	3	44
	%	62.9	5.4	9.3	6.4	3.1	0.8	0.8	11.3
On how many of the last seven days did you take part in a specific exercise session (such as swimming, walking), other than what you do around the house or as part of your work?	n	254	17	35	19	11	3	3	46
	%	65.5	4.4	9.0	4.9	2.8	0.8	0.8	11.9

### Adherence to medication

The qualitative findings reveal that patients adhered to taking their medication, and the quantitative results also support this finding. The majority of the patients (84.0%) adhered to their medication regime for the previous seven days. However, in the qualitative results some patients reported that they were missing their medication, so there is a disparity between these results and the quantitative findings. The patient interviews show that they had knowledge regarding the importance of taking medication. Both quantitative and qualitative results reveal similar findings: that patients were taking their medication regularly. All patients agreed that taking their medication frequently as prescribed by their doctors was necessary to control blood glucose level, manage diabetes and prevent diabetes complications. Patients found that taking medication was the easiest of the self-care activities.

*“I take the pills regularly, to control my diabetes” (PT12, female, 31 years old).*

*“I think taking the medication is the easiest aspect of diabetes self-management.” (PT1, male, 70 years old).*

One patient reported that they took pills together with insulin injections. Another patient reported that they were committed to insulin injections, while another patient reported that they constantly injected with insulin to ensure the body had an adequate supply. These patterns show that patients are committed to taking their medication as instructed and they understand the importance of following their medication as prescribed. HCPs felt that patients preferred taking medication to following a diet or doing physical exercise.

*“I think patients prefer to take medication rather than diet or exercise. It is clear that those patients do not like diet or physical exercise information” (HCP 3).*

Several attitudes towards prescribed medication emerged. One patient reported taking pills because they were worried about complications arising from diabetes. Another patient reported taking his prescribed medicine regularly.

*“I am taking my pills regularly to avoid diabetes complications” (PT3, male, 56 years old).*

This patient further revealed that they would not be able to walk or engage in any social activity without taking medication. Another patient reported that they preferred taking medicine, however the reason for this preference was not revealed. Another patient reported a preference for taking medicine because they found it was the easiest way to control their blood glucose level.

The interviews with patients reveal that some patients faced challenges in adhering to their medication, which negatively impacted their diabetes management. Some patients felt that they were not able to take their medication at the right time due to work and social travel commitments, forgetfulness, waking up late, and meals not being prepared at the right time.

*“I do not take my medication on time, nor am I regular, because I am travelling too much due to the nature of my work” (PT4, male, 52 years old).*

HCPs reported that patients missed their dosage because food was not prepared regularly. Another reason patients missed their medication was that they woke up later in the day on school holidays.

*“Patients want to manage their diabetes, but the environment at home makes that a difficult task for them, such as food not being prepared at regular times, and patients missing a dosage*

*of their medication for that reason. During school holidays, the majority of patients have unhealthy behaviour, because they are getting out of bed late and missing their morning dosage” (HCP 8).*

These findings show that patients were very concerned about taking prescribed medication. Therefore, HCPs need to openly and exhaustively address the importance of other self-care activities such as diet control, exercise and checking blood glucose levels, both for diabetes management and also to prevent diabetes complications. HCPs reported that there were many patients who favoured taking medication in order to control their diabetes. However, due to the importance of community in Saudi Arabian society, people regularly meet to eat and drink, and patients face the challenge of missing their medication while travelling for these occasions.

The quantitative findings show that most people with T2DM needed an oral drug to reduce the risk of hyperglycaemia. The result shows that 57.7% of the respondents used tablets to control their diabetes, whereas 33.8% used a combination of tablets and insulin, and 8.5% used insulin alone to manage their diabetes (see Table 13).

Table 13: Medication to control diabetes

	N	%
Tablet	224	57.7
Insulin	31	8.5
Tablet and insulin	133	33.8
Total	388	100.0

The medication variable has three components (see Table 14). The level of adherence to medication was high, as most patients reported they had taken their medication as required on all of the seven previous days, and just over four in five (84.0%) complied in taking their diabetes medication seven days per week. There was a small proportion of patients who reported they had not adhered to medication on any of the seven previous days (10.1%), showing that there are still existing challenges that prevent some patients from adhering to their prescribed medication. Taking medication as required had a higher level of adherence compared to the other diabetes management activities, such as diet, exercise, foot care and blood sugar testing. The level of non-adherence to insulin injections was high, as most patients reported they may not have needed insulin injections.

Table 14: Patients' medication and insulin consumption in the last week

	Took your recommended diabetes medication as prescribed by your physician		Took your recommended insulin injections	
	N	%	N	%
0 days	39	10.1	228	58.8
1 day	0	0	1	.3
2 days	4	1.0	0	0
3 days	5	1.3	0	0
4 days	1	.3	1	.3
5 days	8	2.1	2	.5
6 days	5	1.3	3	.8
7 days	326	84.0	153	39.4

### Self-monitoring of blood sugar

The qualitative and quantitative findings were similar with regard to self-monitoring of blood sugar. The qualitative results reveal that patients had poor adherence to self-monitoring of their blood sugar. Similarly, the quantitative results showed that more than half (52.8%) the patients were not able to test their blood sugar as recommended by HCPs.

The patient interviews reveal that patients monitored their blood glucose to enable them to better manage their diabetes. Measuring blood glucose helped patients take the correct dose of their medication and monitor their blood glucose levels before and after meals.

*“The most important thing is to continue the blood sugar test at home, as it is very important. It helps me to know the sugar level and also makes sure that the medicine dose is correct” (PT3, male, 56 years old).*

Patients reported that in cases where their blood glucose was not at the right level, corrective measures were taken, such as exercise and avoiding certain foods.

*“I always check my blood sugar level before meals, so if it is normal I eat, if not I do not eat. Eating is always scary for me. I do a blood sugar test five to nine times daily.” (PT13, female, 39 years old).*

One patient reported that they self-checked their blood sugar while another patient reported that his wife checked his blood sugar. This finding shows that there are patients who have taken

on the responsibility of managing their diabetes independently, and there are patients who are managing their diabetes with support. Receiving support should not be construed as an abdication of self-care. Another patient reported that they had attended all appointments to have their blood sugar checked and discussed the results with the doctor, which demonstrates that some patients have taken full responsibility for managing their blood sugar.

HCPs reported that some patients used the results of their blood sugar tests as a guide for their diet and their intake of medication. Blood sugar levels are a key guideline on which diabetic patients depend. For instance, if blood sugar is high, they will refrain from eating too much and will take their medication. For this reason, they keep an eye on their blood sugar level to ascertain how they should manage their diabetes.

*“Most of the patients are checking their blood glucose level at home” (HCP 6).*

Blood sugar results are used by patients in different ways. Some patients reported that they used blood sugar results to ensure their medication dose was correct, while other patients reported that they checked their blood sugar before and after meals. One patient reported that they used their blood sugar results to ascertain when to exercise. These findings are evidence of the efforts of HCPs in encouraging patients to take charge of their blood glucose.

The patients’ own views are reflected in the way they self-monitor their blood sugar levels. Diabetic patients depend on the result of their blood sugar level to take action in terms of what to eat and when to take their medications.

The most important control systems for patients with T2DM are following recommended self-care activities in terms of diet, blood glucose monitoring, exercise, and medication administration. Taking medication and monitoring blood sugar levels are considered the most important responsibilities for patients, yet for patients, taking prescription medications is seen as the easiest of the diabetic self-care activities.

In the quantitative results, the blood sugar testing variable has four components (see Tables 15 and 16). As can be seen in Table 15, the majority of patients (85.6%) reported that the diabetes care team had recommended self-testing of blood sugar. However, 12.6% of patients had not received this advice. This is a concerning result, as blood sugar testing is critical for diabetes management.

Less than half of the patients (43.8%) reported that they had received a recommendation to self-test blood sugar on a daily basis. There were other patients who had received a recommendation to test blood sugar twice a week (9.3%). However, more than a third of patients (36.4%) had not received any guidelines on the frequency of blood sugar testing. Thus, there is a clear disparity in guidance on blood sugar testing, which is surprising given the importance of this activity for managing diabetes and preventing complications.

Table 15: Medical teams' recommendations for testing blood sugar

Has your diabetes care team recommended that you test your blood sugar?		
	N	%
Yes	332	85.6
No	49	12.6
I can't remember	7	1.8
Total	388	100.0
How often has your diabetes care team recommended that you test your blood sugar?		
	N	%
Every day	170	43.8
Twice a week	36	9.3
Every other day	41	10.6
No guidelines given	141	36.4
Total	388	100.0

When questioned on the actual frequency of blood sugar testing in the last week (Table 16), the largest group of respondents was those who did not test blood glucose on any of the previous seven days (35.3%). Overall, more than half of the patients tested their blood sugar on two days in the last week or less. These low levels of testing may be explained in part by the number of patients who had not received a recommendation to test blood sugar, or a recommendation on the frequency of testing their blood sugar. However, the results also show that patients did not always follow the guidance they received. This shows a low adherence to testing blood sugar but the factors that caused this low level of adherence are unknown (see Table 16).

More than half of the patients were not able to test their blood sugar as recommended, with only a relatively small proportion of respondents testing their blood sugar as recommended on all of the previous seven days.



Table 16: Frequency of testing blood sugar during the last week

	On how many of the last seven days did you test your blood sugar?		On how many of the last seven days did you test your blood sugar as recommended by your diabetes care team?	
	N	%	N	%
0 days	137	35.3	205	52.8
1 day	36	9.3	24	6.2
2 days	68	17.5	43	11.1
3 days	34	8.8	22	5.7
4 days	14	3.6	12	3.1
5 days	6	1.5	9	2.3
6 days	3	0.8	0	0.0
7 days	90.0	23.2	73.00	18.8

### Adherence to foot care

The qualitative findings reveal that patients regularly performed foot care as is necessary in order to avoid foot problems. Patients reported carrying out regular foot examinations to avoid limb amputation. These results were supported by quantitative results which showed that most patients (69.3%) performed foot care, including washing, drying and applying cream to their feet every day. One patient reported worrying so much about diabetic foot complications leading to amputation that he checked his feet continuously.

*“I am so worried about amputation of limbs, so I always check my legs and feet for signs of injury or swelling” (PT20, male, 30 years old).*

Other patients gave similar explanations for why they believe that regular foot examination is essential. Another patient reported feeling shocked and worried about the possibility of leg and foot amputation and, as a result, made best efforts to take care of them.

*“I do not want to have my legs amputated. So, therefore I take very good care of my legs and feet. I feel shocked and worried about limb amputation and it scares me, too” (PT17, male, 30 years old).*

Patient interviews showed that many patients had a positive attitude towards foot care. HCPs reported that patients cared for their feet because they were fearful of limb amputation. Another factor that motivates patients to practise daily foot care is *al-wuḍū'* (washing the hands, face, feet and passing a wet hand over the head). Since this takes place before prayer, Muslims practise this five times a day.

*“Most of the patients try to avoid foot problems, so they conduct proper foot care to reduce any risk of injury that could cause amputations” (HCP 10).*

The interviews show that the patients have a clear awareness of the importance of foot care for avoiding diabetic foot complications. For example, one patient reported that it was necessary to engage in foot care, because any problem could cause amputation. The same outlook was common among other patients, who offered a similar justification. It is clear that many patients engaged in foot care because they were particularly worried about limb amputation. HCPs reported that patients took responsibility for foot care due to having understood well the complications that can arise from diabetes. The religious requirement to wash five times a day before prayer was also a motivating factor.

The quantitative results show that the foot care variable has five components (see Tables 17 and 18).

An analysis of this data indicates that more than half of the respondents (62.3%) received advice from the diabetes care team about the importance of looking after their feet (see Table 15). Meanwhile, 35.1% did not receive any advice and 2.6% could not remember if they had received advice. Additionally, most of the respondents (73.5%) reported that they saw a chiropodist only when they felt there was a need. Only a relatively small proportion of respondents (13.1%) reported that they saw a chiropodist once every twelve months. Most respondents (69.3%) performed foot care (washing, drying and applying cream to their feet) every day. Others performed foot care when necessary (25.8%), every other day (2.3%), at least twice a week (0.8%) and at least once a week (1.3%).

Table 17: Patients' communication with chiropodist

Has your diabetes care team discussed with you the importance of looking after your feet?		
	N	%
Yes	242	62.3
No	136	35.1
I can't remember	10	2.6
Total	388	100.0
On average, how often do you see your chiropodist (podiatrist)?		
	N	%
Once every two weeks	14	3.6
Once every month	8	2.1
Once every three months	20	5.2
Once every six months	10	2.6
Once every twelve months	51	13.1
When I think it is necessary	285	73.5
Total	388	100.0
In between appointments with my chiropodist, I wash my feet with warm water and use a recommended mild soap. I then dry between my toes. I apply a skin cream. I do this:		
	N	%
Every day	269	69.3
Every other day of the week	9	2.3
At least twice a week	3	.8
At least once a week	5	1.3
When I think it is necessary	100	25.8
Total	386	100.0

When questioned on the frequency of foot care activities, 50.5% of the respondents had not performed foot care at all in the last seven days, while 36.7% had checked and taken care of their feet every day in the last week (see Table 18). While most patients (76.5%) reported they had checked the inside of their shoes on all of the previous seven days, a significant minority of patients (19.3%) had not checked them at all during this period. Only a relatively small proportion of respondents (4.6%) reported that they had checked and taken care of their feet on one day in the last week, while only 0.3% of the respondents had checked and taken care of their feet on six days in the last week.

Table 18: Patients' checking of their feet in the last week

	On how many of the last seven days did you check and take care of your feet?		On how many of the last seven days did you inspect the inside of your shoes?	
	N	%	N	%
0 days	196	50.5	75	19.3
1 day	18	4.6	6	1.5
2 days	18	4.6	5	1.3
3 days	6	1.5	3	0.8
4 days	4	1.0	1	0.3
5 days	3	0.8	1	0.3
6 days	1	0.3	0	0
7 days	142	36.7	297	76.5
Total	388	100.0	388	100.0

## Demographic characteristics and self-care

### *Age and Self-Care Activities*

One-way ANOVA was used to examine the differences in self-care activities between different age groups that were measured on a continuous level. The results in Table 19 show that there are significant differences between age intervals with regard to how they manage their diet ( $P < 0.05$ ), with those aged 60-69 having the highest score. No significant difference was found between age groups when examining exercise, blood sugar, foot care and medication measures ( $P > 0.05$ ). Using Bonferroni post-hoc tests for differences between age groups in diet, all comparisons were not significant ( $P > 0.05$ ).

Table 19: ANOVA table showing the significance of the differences between age groups across all self-care measures

		Sum of Squares	df	Mean Square	F	Sig.
Diet	Between Groups	20.711	5	4.142	2.319	.043
	Within Groups	682.260	382	1.786		
	Total	702.971	387			
Exercise	Between Groups	20.251	5	4.050	.765	.576
	Within Groups	2023.110	382	5.296		
	Total	2043.361	387			
Blood sugar	Between Groups	44.351	5	8.870	1.350	.243
	Within Groups	2510.263	382	6.571		
	Total	2554.613	387			
Foot care	Between Groups	8.560	5	1.712	.328	.896
	Within Groups	1994.357	382	5.221		
	Total	2002.918	387	-		
Medication	Between Groups	25.699	5	5.140	1.666	.142
	Within Groups	1178.499	382	3.085		
	Total	1204.198	387			

Furthermore, a chi-squared test was used to examine the association between age group and some self-care activities that were measured at a categorical level. A significant association between both variables was noticed ( $X^2(25) = 43.66$ ,  $P < 0.012$ ). It is clear that in the older age categories, patients have been trying to reduce fat in their diet for a longer period of time.

The patient interviews reveal differences between age groups in the duration and continuity of dietary control, with older patients more likely to adhere to a diet than younger patients because of the latter group's more active social life, such as meeting friends and eating with them outside the home (something that often involves exposure to unsuitable foods). A 67-year-old patient reported that he was trying to avoid eating outside the home in order to avoid eating inappropriate food:

*"I eat food that is suitable for diabetes. I never eat outside the home" (PT9, male, 67 years old).*

### *Gender and self-care activities*

The qualitative findings revealed that Saudi females with T2DM find the diet and exercise aspects of self-care difficult to achieve because they need to take care of their families (cooking food that their family enjoys and eating with them on a daily basis), and there are no suitable places for them to exercise. The quantitative results support these findings, with the sample showing that more males than females undertake physical activity and follow a specific diet plan. As this female stated:

*“In my opinion, doing physical exercise and changing eating habits are the most difficult tasks” (PT2, FEMALE, 50 YEARS OLD).*

An independent t-test was used in the qualitative results to examine the differences between males and females in relation to self-care activities that were measured on a continuous level. As shown in Table 20 below, the differences in total scores showed that males scored more highly in diet, exercise, and blood sugar compared to females. However, females had a significantly higher score in foot care and adherence to medication compared to males.

Table 20 also shows that, compared to females, males had significantly higher rates of following the diabetic diet as recommended by the diabetic team ( $P < 0.001$ ), following the eating plan ( $P < 0.001$ ), performing the amount of exercise suggested by the diabetes care team ( $P < 0.001$ ), carrying out at least 30 minutes of exercise ( $P < 0.0001$ ), testing blood sugar ( $P < 0.001$ ), and taking part in a specific exercise session (such as swimming or walking) ( $P < 0.007$ ). In addition, compared to males, females had significantly higher rates of checking and taking care of their feet ( $P < 0.001$ ), and taking recommended diabetes medication (insulin) as prescribed by their physician ( $P < 0.017$ ).

Table 20: Independent samples t-test outcomes for gender effect on self-care measures

Self-care activities	Male (mean, SD)	Female (mean, SD)	t value	P value
Diet	4.34 (1.34)	3.47 (1.20)	6.65	P<0.001
Exercise	3.47 (2.66)	1.93 (1.73)	6.89	p<0.001
Blood sugar	3.63 (2.57)	3.06 (2.54)	2.19	P<0.029
Foot care	4.23 (1.77)	5.80 (2.37)	-7.10	P<0.001
DM Medication	5.21 (1.58)	5.68 (1.86)	-2.59	P<0.010

***Marital status and self-care activities***

One-way ANOVA (including post hoc) was used to examine the impact of different marital statuses on self-care activities that were measured on a continuous level. As shown in Table 21 below, marital status has a significant effect on physical activity (P<0.003) and diet (P<0.001), depending on whether the person is married, divorced or widowed. No significant effect of marital status was found on the measures of blood sugar testing, foot care and medication. To determine the significant effects of marital status, a Bonferroni post-hoc test was conducted to examine the differences between the effects of marital status on any two categories. With regard to diet, a significant difference was found between the married group and the widowed group only, while a significant difference was also found between the two groups only when assessing physical health.

Table 21: ANOVA table showing the significance of the differences between marital status groups across all self-care measures

Self-care activities	Single (mean, SD)	Married (mean, SD)	Divorced (mean, SD)	Widowed (mean, SD)	F value	P value
Diet	3.14 (1.34)	3.95 (1.36)	4.01 (1.31)	3.21 (1.11)	5.58	P<0.001
Exercise	3.00 (2.90)	2.78 (2.40)	1.68 (1.62)	1.68 (1.31)	4.75	P<0.003
Blood sugar	2.80 (2.39)	3.45 (2.60)	2.45 (2.22)	2.86 (2.44)	1.83	*N/A .140
Foot care	4.35 (2.69)	5.06 (2.22)	6.08 (2.42)	5.33 (2.37)	1.96	*N/A .120
Medication	4.85 (1.10)	5.42 (1.69)	6.32 (1.78)	5.62 (2.13)	2.41	*N/A .066

\*Married=M, widowed=W, Not statistically significant=N/A

A chi-squared test was used to examine the association between marital status and some self-care activities that were measured as a categorical level,  $X^2(12)=27.58$ ,  $P<0.024$ . As most participants were married it is difficult to form a conclusion on this association.

### ***Educational level and self-care activities***

One-way ANOVA (including post hoc) was used to examine the impact of different education levels on self-care activities that were measured on a continuous level.

These ANOVA results are outlined in Table 22 below, where it is clear that educational level has a significant impact on three self-care management measures, namely diet ( $P<0.002$ ), exercise ( $P<0.001$ ) and blood sugar testing ( $P<0.003$ ). Education level has no significant effect on foot care or medication ( $P>0.05$ ). By examining the significant results further with a post-hoc test, it is revealed that there is a significant difference in diet management between those



with a primary education level and those with a bachelor's degree ( $P < 0.001$ ), while there is no significant difference between other groups ( $p > 0.05$ ). When assessing exercise, it is clear that the primary education group has a significantly different score compared to those with technical degrees ( $P < 0.023$ ) or bachelor's degrees ( $P < 0.005$ ). Finally, the only significant difference found in blood sugar testing is between those with a primary education level and those with bachelor's degrees ( $P < 0.014$ ), with no significant differences between other categories ( $p > 0.05$ ).

Table 22: ANOVA table showing the significance of the differences between education levels across all self-care measures

Self-care activities	Primary	Inter-mediate	Secondary	Technical	Bachelor's	F value	P value
Diet	3.16 (1.31)	3.85 (1.24)	4.00 (1.33)	4.05 (1.54)	4.52 (1.31)	4.39	$P < 0.002$
Exercise	2.17 (2.06)	2.71 (2.30)	2.69 (2.30)	3.61 (2.17)	3.55 (2.94)	4.87	$P < 0.001$
Blood sugar testing	2.91 (2.49)	3.32 (2.42)	3.37 (2.41)	4.40 (2.89)	4.34 (2.77)	4.03	$P < 0.003$
Foot care	5.38 (2.42)	4.83 (2.23)	4.89 (2.15)	4.53 (1.44)	5.24 (2.12)	1.52	*N/A $P > .194$
Medication	5.71 (1.77)	5.34 (1.71)	53.27 (1.87)	5.19 (1.70)	5.14 (1.51)	1.72	*N/A $p > .143$

\* Bachelor's=B, Intermediate=I, Primary=P, Not statistically significant=N/A

### ***Employment and self-care activities***

One-way ANOVA (including post hoc) was used to examine the impact of different employment statuses (full time, unemployed, retired) on self-care activities that were measured on a continuous level. Calculating the average score for each self-care activity showed that there are significant differences between employment categories in diet ( $P < 0.001$ ), exercise ( $P < 0.001$ ), foot care ( $P < 0.001$ ) and medication ( $P < 0.011$ ). No significant differences across employment categories were found in blood sugar testing. The average scores for each of the employment categories across each of the self-care activities are illustrated in Table 23. A Bonferroni post-hoc test in the diet measure showed a significant difference between full-time employed and unemployed participants ( $P < 0.002$ ) and between full-time employed and retired individuals ( $P < 0.039$ ). Moreover, unemployed individuals had significantly different scores from retired individuals ( $P < 0.001$ ).

In the exercise measure, a significant difference is found between those in full-time employment and those who are unemployed ( $P < 0.001$ ), and between those in the unemployed category and those in the retired category ( $P < 0.001$ ). No difference is found between full-time and retired individuals ( $P > 0.05$ ).

In foot care, a significant difference is found between the full-time employed and the unemployed ( $P < 0.001$ ), and between the unemployed and retired individuals ( $P < 0.001$ ). There is no difference between full-time and retired individuals ( $P > 0.05$ ). In the medication measure, the only significant difference found is between full-time and unemployed individuals ( $P < 0.009$ ). There are no significant differences in other comparisons ( $P > 0.05$ ).

Table 23: ANOVA table showing differences across employment categories in self-care measures

Self-care activities	Full time (mean, SD)	Unemployed (mean, SD)	Retired (mean, SD)	F value	P value
Diet	4.02 (1.355)	3.48 (1.25)	4.50 (1.28)	19.67	0.001
Exercise	3.23 (2.67)	1.96 (1.72)	3.22 (2.62)	17.28	0.001
Blood sugar	3.63 (2.56)	3.11 (2.56)	3.37 (2.58)	1.42	0.243
Foot care	4.39 (2.23)	5.69 (2.33)	4.68 (1.78)	14.13	0.001
DM Medication	5.09 (1.72)	5.72 (1.82)	5.38 (1.57)	4.61	0.011

### ***Income and self-care activities***

The qualitative findings reveal that income level affects patient adherence to diet. The quantitative results also supported this. This female patient reported that she could not buy fruit, vegetables, or fish because they were too expensive.

*“I cannot buy fruits, vegetables, or fish. These things are too expensive for my family” (PT18, FEMALE, 50 YEARS OLD)*

In the quantitative results, one-way ANOVA (including post hoc) was used to examine the impact of different income levels on the self-care activities that were measured on a continuous level. Participants’ income was measured in five categories, and in this section, ANOVA was conducted to measure the differences between all five categories with regard to each of the five measures of self-care. The results in Table 24 show that income has a significant impact on the

diet measure ( $P < 0.005$ ), the exercise measure ( $P < 0.017$ ), the foot care measure ( $P < 0.011$ ) and the medication measure ( $P < 0.001$ ). A Bonferroni post-hoc test shows that concerning the diet measure, there are no significant differences between any two categories of income ( $P > 0.05$ ).

In examining the exercise measure of self-care management, it is found that there are no differences between any categories ( $P > 0.05$ ) except between those earning 4000 SAR or less per month and those earning 14000-18000 SAR per month ( $P < 0.038$ ). Concerning foot care, the only significant difference found is between those earning 4000 SAR or less per month and those earning 9000-13000 SAR per month ( $P < 0.010$ ).

In the medication measure, the post hoc test shows that there is a significant difference between those earning 4000 SAR or less monthly compared to those earning 4000-8000 ( $P < 0.035$ ), those earning 9000-13000 ( $P < 0.015$ ), and those earning 14000-18000 monthly ( $P < 0.001$ ). No differences are found when assessing other comparisons ( $p > 0.05$ ).

Table 24: ANOVA showing differences between income categories in self-care measures

Self-care activities	Less than 4000  (mean, SD)	4000-8000  (mean, SD)	9000-13000  (mean, SD)	14000-18000  (mean, SD)	19000 and above  (mean, SD)	F value	P value
Diet	3.65  (1.34)	3.79  (1.29)	4.20  (1.34)	4.23  (1.12)	4.56  (1.49)	3.82	0.005
Exercise	2.31  (2.18)	2.60  (2.25)	2.75  (2.13)	3.66  (2.72)	3.50  (2.98)	3.04	0.017
Blood sugar	3.11  (2.60)	3.05  (2.41)	4.01  (2.59)	4.09  (2.49)	3.47  (2.55)	2.15	0.074
Foot care	5.46  (2.29)	5.10  (2.45)	4.29  (1.94)	4.57  (1.96)	5.00  (1.60)	3.32	0.011
DM Medication	5.87  (1.83)	5.23  (1.72)	5.01  (1.37)	4.27  (1.21)	5.52  (1.76)	7.42	0.001

In summary, both the questionnaires completed by and interviews conducted with HCPs and patients with T2DM show a poor adherence to diabetes self-care activities. In particular, there is low adherence to following a healthy diet, physical exercise and testing blood sugar levels, while the levels of adherence to oral medication and foot care are high. In addition, both the questionnaires and the interviews show that demographic factors such as age, gender, education, marital status, employment and income impact on diabetes self-care activities.

### **Theme 2: Social Support**

Social support plays an important part in the management of T2DM. The interview responses from patients and HCPs show that support comes from a variety of sources, such as HCPs, family, and friends, which all have an impact on diabetes self-care activities. This support and assistance should be provided in the early stages of diagnosis.

## **Support from family**

In order to manage T2DM, patients are required to adapt their behaviour and take part in diabetic self-care activities, and patients often rely on family support in order to do so. In this study, patients reported that they received family support, which helped them manage their diabetes. Sometimes this support was given by a family member's insistence on and preparation of healthy food. Another participant reported receiving words of encouragement and psychological support. Support was found by performing self-care activities with family members, such as exercising together and checking blood sugar levels. One patient explained how her family encouraged her to practise diabetes self-care activities and eat healthy food to manage her condition.

*“My family members always assist me to eat healthy food, they encourage me to do self-care activities and avoid any sugar or fat in my food. They are trying to make me comfortable” (PT8, female, 45 years old).*

One patient reported that her children help her to cope with and manage her diabetes. Another patient expressed how his family gives him the best support, and that his self-care activities are practised on a family level because his son is a fellow sufferer of the condition.

*“In my case my family gives me the best support; my family is my life. They assist me to maintain and improve my health, and especially because there are two members of the family living with diabetes, me and my son, that encourages us to continue our diabetes self-care activities” (PT3, male, 56 years old).*

HCPs felt that support from the family was very important, especially where more than one family member is managing diabetes. They noted that patients receive more support when more than one member is diabetic:

*“I think family support differs from one family to another. Some families have experience with the disease and they help the patients in diabetes self-care management. It is noted that patients receive more support from their family when another member of the family has diabetes” (HCP10).*

HCPs felt that family support plays an important role in helping patients to practise daily diabetes self-care activities and adhere to their diets:

*“Family support in preparing healthy food and daily self-care activities helps patients to manage their diabetes” (HCP4).*

Overall, HCPs felt that support from the family was critical in helping patients manage their diabetes.

*“I think family support is very important, especially psychological support. In my opinion, family support is the first line and the most basic thing that supports patients in diabetes self-care management” (HCP5).*

Family support has an impact on assisting with and motivating patients to practise diabetic self-care activities. Patients also reported several ways in which their families failed to provide this support, as some found that they were missing the psychological care and motivation from family members to engage in self-care activities.

*“Now my children have grown up, and they always bring unhealthy food from restaurants. They do not even support me to do physical exercise, such as walking. As a result, I have difficulties in controlling my diabetes” (PT19, female, 55 years old).*

One HCP noted that there was no support for patients from the family or the community.

*“I do not see any support for patients, whether from the family or the community” (HCP1).*

Another HCP explained that a patient’s condition improves when they are admitted to hospital because HCPs take care of them, but when they are discharged from hospital they deteriorate due to a lack of care at home.

*“With many patients, their diabetes improves when they are admitted to hospital, but as soon as they are discharged from hospital and they go home, their condition deteriorates or worsens, because no one takes care of them at home” (HCP10).*

There were some patients who felt family and friends were not offering them any support, and so they felt isolated. Isolation also presented itself in the form of patients avoiding visiting or talking to their family and friends.

*“I avoid attending any social event or visiting family and friends since being diagnosed with diabetes” (PT19, female, 55 years old).*

In summary, the interviews with patients and HCPs reveal that family support has a significant impact on diabetes management and the practice of diabetic self-care activities. Patients reported that support for their health was given in the form of preparing healthy food, and being made to feel comfortable with their self-care activities. Significantly, family support was more effective for those patients with another diabetic family member.

### **Support from friends**

The interviews with patients reveal that they received support from friends in the course of their diabetes management. Support was given in the form of checking their health status and encouragement in blood sugar control.

*“My friends are constantly supporting me and asking about my health. They encourage me to control my blood sugar level” (PT6, female, 45 years old).*

Other forms of support came in the encouragement to perform physical exercise, follow a diet and be self-sufficient. Another patient reported that his friends motivated him to eat healthy food and perform physical exercises because they have the same condition.

*“Some of them have diabetes; we encourage each other to follow a diet and exercise” (PT20, male, 30 years old).*

HCPs felt that support from friends is important for patients in order to encourage and motivate them to perform self-care activities and manage their diabetes.

*“Friend support is important for patients with diabetes to encourage and motivate them to continue to perform self-care activities and manage their diabetes” (HCP 4).*

Based on these qualitative responses, it is clear that support from friends has a positive effect on patients' control of their diabetes. Friends encourage and motivate patients to practise their diabetes self-care activities, and HCPs report that patients are positively influenced by their friends as they practised diabetes care behaviours together.

### **Support from healthcare providers**

The qualitative findings indicate that HCPs provide information and education for the patients that support them in managing their diabetes. The quantitative results support the qualitative

findings, as the majority of the participants had been given advice regarding adherence to self-care activities by their HCPs, with 86.6% of patients being given advice about exercise. The qualitative findings report that most patients believe that delivery of services is the most support that they have received from their HCPs. The patient interviews reveal that they receive support from healthcare providers to help them to manage their diabetes. This support came in a variety of forms, such as prescribing medication, conducting blood tests, creating diabetes awareness among patients and receiving direct information and education. Patients report that prescribed treatment and performed blood tests constituted important support that they received from their healthcare team. One patient explained that his healthcare team prescribed medication, performed blood sugar tests, and gave him instructions concerning diabetes self-care.

*“The diabetic care team, such as the doctors, prescribe the treatment and administer blood tests and give me a blood sugar measuring device, and also give instructions about diabetes self-care” (PT14, male, 67 years old).*

The vast majority of respondents agree that prescribing medication and conducting blood tests are the most important ways that HCPs support them. One patient reported that:

*“The most important support I receive from them is dispensing medication and conducting blood sugar tests.” (PT6, female, 45 years old).*

The basic role of HCPs is to prescribe medication to treat and control the disease. HCPs report that they stimulate their patients to take their medication and teach them how to check their blood sugar at home.

*“I inspire patients to take their medication as prescribed by their doctors. Also, I teach them how to check their blood glucose level at home”(HCP5).*

It is observed that healthcare teams provide support for individuals with T2DM by prescribing medication, and making recommendations such as the performance of regular home blood tests and advising on diabetes management.

The second form of support was the promotion of diabetes awareness among patients and the receipt of direct information from their HCPs. Interviews with HCPs reveal which types of knowledge were important to a diabetic patient. To successfully manage their diabetes, patients



need to know what diet is right for them, how to check their blood glucose level, the symptoms of high or low blood glucose, and what complications may arise from diabetes. Patients reported that they received instructions that increased their awareness about diabetes, and this helped them to control their blood glucose level and choose the right food.

*“The diabetic educator tells me all the information that I need to control my blood sugar level. Also, the dieticians help me to select healthy food” (PT13, female, 39 years old).*

HCPs report that their responsibility is to guide and direct patients. They give their patients the necessary information to increase their awareness of and control over their diabetes.

*“My patients are very important to me. I try to provide them all with the necessary information and encourage them to control their diabetes” (HCP3).*

Interviews with both patients and HCPs showed that it was the responsibility of HCPs to provide all the information necessary for patients to manage their diabetes and to increase their awareness of the disease.

Another form of support is education. Patients report that they received information from their physicians, diabetic nurse and diabetic educators about recognising normal blood sugar levels, how to take their medication and how to check blood sugar levels at home. They mainly received teaching and education from diabetic nurses and diabetic educators through lectures about self-management.

Patients reported receiving a programme of education. One patient reported how attending an education programme increased their awareness of diabetes management.

*“I always participate and attend each education class. It assists me to adopt healthy habits that help me to control diabetes, such as taking my medication, eating healthy food and checking my blood sugar level. The education programme encourages me to continue diabetes self-care activities and also encourages me to control my disease” (PT12, female, 31 years old).*

HCPs reported that patients received an initial education upon being diagnosed with diabetes, designed to help them to understand their condition. HCPs reported that patient education encouraged them make a more conscious effort in managing their diabetes.

*“I believe very strongly that educating patients about their diabetes helps them to be more aware of managing their diabetes. Educating patients is important to improve their knowledge and talents, which enables them to control their diabetes and participate more in effective diabetes self-care activities” (HCP6).*

Therefore, it is clear that education is improving diabetes management. Patients reported that attending diabetic education programmes helped them to adapt their health habits to their condition in a variety of ways, including taking medication, controlling their diet, and self-monitoring their blood glucose levels. HCPs are confident that educating patients allows them to gain the knowledge and skills that will support them in practising their self-care activities and in controlling their diabetes.

Prescribing medication, conducting blood tests, delivering knowledge and educating patients were four of the most commonly reported types of support. The majority of the participants reported that knowledge gained about their disease, and their education in how to manage their blood sugar level and take their medication were of great assistance in controlling their diabetes.

The quantitative results show that the majority of the participants had been given advice regarding adherence to diabetes self-care activities by their HCPs, and the physician, diabetic educator and dietician were the key sources of this information. With HCPs they discussed: following a diet plan, exercising regularly, taking medication, testing blood sugar levels, and appropriate foot care. The most frequent advice given to patients concerned diet plans, while the least frequent advice concerned foot care (Table 25).

Table 25: Number of days in previous week: patients’ self-care activity as recommended by the diabetes care teams as a percentage (%)

Self-care activities	0 Days	1 Days	2 Days	3 Days	4 Days	5 Days	6 Days	7 Days
Diet	61.1	4.1	4.6	5.2	4.4	1.0	0.5	18.8
Exercise	53.6	5.2	11.3	7.5	3.9	1.5	0.8	16.2
Blood sugar	35.3	9.3	17.5	8.8	3.6	1.5	0.8	23.2
Foot care	50.5	4.6	4.6%	1.5	1.0	0.8	0.3	36.6
Medication :								
Tablets	10.1	0	1.0	1.3	0.3	2.1	1.3	84.0
Insulin	58.8	0.3	0	0	0.3	0.5	0.8	39.4

### **Theme 3: Culture and Religion**

The qualitative findings reveal that patients did not adhere to their diet and the quantitative results support this, showing that 64.7% of the respondents had not followed their diet plan. One of the key findings of this study is that among patients with T2DM, their cultural and religious practices present challenges to their diabetes self-care activities and effectively manage their diabetes. Culture and religion can dictate a patient's ability to exercise and conduct a healthy diet due to factors such as a patient's gender, social environment, and the expectations surrounding traditional foods. These factors are raised in the interviews with patients and HCPs and are discussed below.

#### **Diet**

The qualitative results reveal that patients did not adhere to a recommended diet, and the quantitative results indicate that 64.7% of the respondents did not follow the recommended diet for any of the previous seven days. The HCP interviews indicate a belief that Saudi Arabia's food culture is a challenge in diabetes management, because food that is appropriate for diabetic patients is not prepared in the home due to lack of awareness of appropriate food for diabetic patients. Moreover, due to a culture of eating out at family restaurants, patients may make unhealthy food choices in both their homes and their community. There is a lack of awareness about diabetes-appropriate foods, and the cultural expectations of what to eat are extremely influential.

*“I think the diet culture is a barrier to diabetes management. The majority of the patients do not follow the dietary guidelines recommended, they eat too much kabsa and mandi (both are dishes of rice with lamb). We (HCPs) give instructions to eat high-fibre bread and oats, but many of the patients claim that they are struggling to follow diets recommended by HCPs. Patients' diets are connected to their eating of a cultural food that is not suitable for individuals with DM, such as rice with meat. In general, there is an awakening among diabetes patients with self-care activities such as taking medicine and carrying out blood glucose tests, but regarding the diet, there are still deficiencies in following it...” (HCP7).*

The diet culture in Saudi Arabia is high in fat and carbohydrates. The high consumption of rice with meat is problematic for people with DM. HCPs recommend reducing the amount of kabsa and mandi, which contain meat with rice, and instead have more high-fibre foods. Most of the

patients struggle to follow the dietary recommendations which are important for diabetes management. As previously stated, other self-care activities such as taking medication and carrying out blood glucose tests are less difficult for patients to follow than dietary guidelines.

*“My family do not prepare healthy food for me. They cook our traditional meal kabsa (rice with meat, which is rich in carbohydrates and fat). I eat it and I know that it causes me to have high blood sugar.” (PT14, male, 67 years old).*

There is a lack of suitable food available for diabetic patients, which is particularly due to their food culture. These cultural barriers were often recognised in the interviews with HCPs and patients.

*“... Diet regimen is the most repeated topic that is discussed with the patients. I think they just prefer taking their medication to manage their diabetes rather than eating healthy food. You know as Saudi citizens, eating healthily is affected by diet culture. Also, at home, food is prepared that is not suitable for diabetic patients and this affects their management of their diabetes. I think many patients suffer from high blood sugar because of their diet.” (HCP5).*

This finding exposes the lack of awareness or concern among family members and outside caterers for diabetes patients.

One patient reported that she had attempted to consume healthy food, although she found it challenging. In Saudi Arabia, females are responsible for cooking for all members of the family; therefore, it was difficult for her to cook healthy food for herself. According to several patients, it is too expensive to cook healthy food separately, and so they choose to eat with their family.

*“I try to eat healthily but I am struggling with that at home because of my family. They do not like to eat healthy food and it is difficult for me to cook a separate meal for myself; it is too expensive for me, so I eat with them. (PT6, female, 45 years old).*

Another patient reported that he blamed the culture that dictated he should eat together with his family. Because of this expectation, the patient reported that he was struggling to eat healthy food.

*“I am trying to change my lifestyle, change some habits in eating and obtain necessary habits such as exercising regularly, but I always fail due to our culture. I am always struggling to eat healthy food because I have to eat what is cooked for my family, which is our traditional food kabsa and meat, and so it is very difficult to eat healthy food”.* (P5, male, 30 years old).

The quantitative results indicated that patients did not adhere to their recommended diet over the previous month (see Table 26).

Table 26: Patients’ diet in the last week

In the last 7 days	0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
On average, over the past month, how many days per week have you followed your eating plan?	n 251	10	12	19	14	6	4	72
	% 64.7	2.6	3.1	4.9	3.6	1.5	1.0	18.6

## Gender

Patient interview reveal that there are cultural barriers related to gender that pose a challenge in diabetes self-care management. Due to the Saudi Arabian culture that requires the separation of males and females in public areas, female patients found it difficult to exercise because there are no female-only areas set aside for them to use.

*“I do not do any exercise because we do not have any appropriate place for females to do physical exercise.”* (PT18, female, 50 years old).

One female patient mentioned that the husband would go out to exercise alone, but that she would not go with him because of the culturally associated embarrassment and shame. Similarly, as Saudi culture expects women to be the sole cooks of the household, one mal patient noted he could not go to the kitchen to prepare diabetic-appropriate food.

*“I also feel embarrassed about going into the kitchen to prepare food for myself, as it is unusual.”* (PT1, male, 70 years old).

Patient interviews also show that there are differences among men and women in how they receive spousal support. Men frequently spoke of the ways in which their wives supported them in managing their diabetes. One patient was dependent on his wife for the performance of

diabetes self-care activities. He stated that his wife helped him to manage his diabetes and encouraged him to follow a diet and take medication. Moreover, she performed physical exercise with him to encourage him to do so.

*“I have support from my wife. She always encourages me to adopt better habits and prepares healthy food for me. We do physical exercises together, such as walking for one hour every day in the shopping mall. My wife gives me my medication and checks my blood sugar level every morning” (PT4, male, 52 years old).*

One male patient reported how his wife had helped him to adjust to his new lifestyle. Another patient claimed that he was able to effectively control his blood sugar level due to the fact that his wife took care of him.

*“My wife looks after me, and she knows what is right for diabetes as she is a nurse. She is constantly preparing healthy food for me, makes tea, always without sugar, and she keeps helping me to control my blood sugar” (PT20, male, 30 years old).*

HCPs stated that receiving support from a spouse is highly important.

*“The spouse, especially for male patients, is the biggest support person for them – their wives prepare healthy food and the medication as well. Some males state that the support from their wives helps them to manage their diabetes, while there is clearly lack of support for female patients from their husbands, the female patients are responsible for managing their diabetes without any support from their partner.” (HCP8).*

On the other hand, the female patients complained that they had a lack of support from their husbands and were therefore forced to manage their condition on their own. Conversely, no female patients reported that they received support from their husbands.

*“My husband is my family because I do not have children, but unfortunately, he does not help to take care of my health and he does not encourage me to follow a healthy diet nor do physical exercise.” (PT12, female, 31 years old).*

In another case a female patient was divorced by her husband because of her diabetic needs.

*“My marital life was affected because my husband did not accept my new condition. He divorced me.” (PT7, female, 56 years old).*

The structure of a traditional Saudi family affects women's health in multiple ways. Finances are strictly a male obligation, whereas women are assigned the most difficult household tasks. Marriage and motherhood are also highly valued in the community. In this culture, women are expected to take care of every family member, therefore, when a man becomes unwell, his wife usually becomes his caregiver, because this is part of her familial duty. In contrast, it is believed that the male's role lies outside of the domestic home, where he is expected to work and provide for his family. Therefore, if his wife becomes unwell, he will not agree to become her caregiver. According to Sharia law, a Muslim man may have four wives, provided that he can look after them financially and that he treats them all equally. Therefore, a man may decide to divorce his wife, and marry another woman, if she becomes ill. On the other hand, women have no choice but to care for their sick spouse, because it is especially difficult in Saudi Arabia for a woman to divorce and marry again, and divorced women are often rejected by Saudi society. Within a Saudi marriage, a lack of support from the husband is very common due to the fact that men can easily obtain a divorce and find another wife.

Within the sample of this study, it is clear that being a woman with DM had a direct effect on their social life. Some women felt embarrassed and ashamed of being diabetic, due to the negative reaction of the those around them. Some women with DM had hidden their medical condition from their family and friends, and took their medication privately. Others chose to dress in a different way for their follow up appointment in the diabetes clinic so that no one would recognise them.

*".... I believe being a female diagnosed with diabetes is difficult in our community. Females with DM worry about their marital and social life and feel embarrassed and ashamed about being diabetic. Some female patients take their medication in private at home or at work and do not share their diabetes diagnosis with their close family members such as their husband or children, as well as their friends. This situation leads to them not adhering to diabetes self-care management. I know some cases of female patients who wear their Aba in a different way so as to avoid anyone recognising them..." (HCP 6).*

The most important thing for effective diabetes self-care management, particularly for female patients, is stability in family life. For a woman living with DM, her family life (or even her ability to have a family) is immediately affected, and it will not be able to continue as it was before her diagnosis. For some women, a diabetes diagnosis means that they may also suffer

from family problems such as divorce, or her husband choosing to marry another woman. On the other hand, single females with diabetes also suffer from a cultural stigma, as it is unlikely they will receive a marriage proposal. In turn, these social problems have a negative impact on their diabetes management.

*“I worked with a lot of female patients that have diabetes ... well the family situation has been reflected in their diabetes self-care management. I still do not understand how, but I think it is a social culture issue, when female patients described that their family life after being diagnosed with DM was destroyed and that they saw their life as black (an Arabic expression of being desperate), due to divorce or their husband marrying another woman, or no one wanting to marry them because of DM. All this affects diabetes self-management. My main concern is not knowing their family problems. I am not a social worker, I am a diabetes educator, so my main concern is managing their diabetes and I know nothing that I can do to help them, except listen to them as a kind of support” (HCP 8).*

Patient-provider interaction is also affected by the social, religious and cultural background of both the provider and patient. Culture plays an important role in various aspects of an individual's life, such as behaviour, beliefs and attitudes towards illness and health, as well as dietary beliefs and practices that are sometimes difficult to change. Communication issues often occur between diabetes patients and care providers of a different gender. HCPs identify that cultures that promote gender segregation experience a negative impact on diabetic self-care management, while several female patients have stated that they often refuse to see a male doctor.

*“Sometimes I feel very annoyed when female patients ask me about their medication or dosage or why they are having to take these drugs. As a doctor, I can only answer their questions. On the other hand, I know the fact that Saudi females prefer female doctors, due to culture. The female patients feel very embarrassed to communicate with male doctors. From my point of view, cultural background on segregation of genders affects diabetes self-care management” (HCP 5).*

Another HCP reports that she found it difficult to educate male patients on their condition due to these cultural and religious issues.



*“It is difficult to educate male patients. Usually male patients do not talk to me or ask me questions because I am a female, due to the culture-religion issue” (HCP 8).*

Conclusively, Saudi Arabian cultural and religious beliefs influence the key facets of diabetes management in the areas of diet and exercise, and this is particularly complicated by the expectations of different gender roles. In Saudi Arabia, gender segregation prevents men from preparing their own food at home, while women cannot do physical exercise in public. In addition, female patients experience a lack of support from their husbands. For these reasons, gender segregation has a negative effect on patient health. It is integral for healthcare providers to acknowledge this and provide effective communications to patients of both genders.

The nature of spousal support amongst the participants in this study differs between men and women. Men reported that they received support from their wives, which helped them to manage their diabetes. While they identified their wives as their primary source of social support, they also evidenced how their family positively contributed towards their wellbeing. In contrast, female patients claimed that they did not receive any support from their husbands, highlighting the fact that in their culture, women are perceived as the caregivers in the familial household. Males, on the other hand, are expected to work in order to financially provide for the family. Saudi Arabia’s culture of binary gender roles presents a challenge to diabetes management. HCPs hold conflicting views regarding their interactions with patients depending on their gender, and several HCPs have perceived that the existing communication gaps are a product of Saudi Arabian culture. Several female patients reported that they felt that their families were ashamed of the fact that they had diabetes, stating how they often felt isolated and were sometimes excluded from family events. This is highly significant, especially for young women, as it may have a negative impact on their marriage prospects in the culture that where marriage is valued highly. It is evident that male patients with diabetes can marry without any difficulty since their culture bestows upon them greater power in comparison to their female counterparts, despite the fact that in the Qur’an, Muslim men and women are equal.

### **Social environment**

This study reveals that one challenge faced by patients is a lack of awareness and knowledge of how to manage DM in any given environment, for example, social events where patients are often encouraged to eat unhealthy food. In Saudi Arabian society, there are often social events where people meet to eat and drink, which also patients to remember to take their medication.

For cultural reasons, an individual is expected to attend any event organised by the family, which includes weddings, the welcoming of guests, graduation ceremonies, promotions, a safe return from a trip or simply an invitation into someone's home. It is seen as unacceptable to refuse an invitation to a religious or cultural gathering. The food offered at these gatherings is generally high in fat and carbohydrates. Culturally, it is difficult to decline any food that is served to you in Saudi Arabia, especially sweets and drinks, when visiting relatives or attending a special event. As previously mentioned, diabetic patients are also challenged by the large-scale consumption of rice and meat in Saudi Arabia, and often struggle to adjust their eating habits.

*“As a diabetic patient, I can control my blood sugar level and avoid complications and live with the illness safely, but my real problem is frequently attending a lot of social events and that affects my diabetes because I have to eat everything that is being served to me, as you know in our culture we cannot refuse it. So I eat food, drink, and eat sweets that are not appropriate for me” (PT 15, female, 45 years old).*

It is clear that this culture of social activity is a major challenge faced by patients while managing their disease. Patients experience difficulties in managing their illness when attending many social activities during which they are often served large portions of food with high fat and sugar content. However, the diabetes care team recognises the importance of educating patients on diabetes self-care management in these scenarios.

*“...well we need to understand the fact that patients with DM are struggling to practise diabetes self-care activities, especially with diet, in our society, which requires attending many events such as weddings, or meeting friends, or visiting families, where food and sweets are always served. Of course patients eat and drink anything that is served to them, because it is anti-cultural behaviour to refuse it. So, as a diabetes care team we do a lot of health education, but we still need to educate them more and more...” (HCP 3).*

Religious and cultural beliefs influence the type of treatment Saudi Arabian individuals wish to receive. Some patients often prefer to have access to alternative therapies to treat their diabetes, such as religious healing, which involves a consultation with a spiritual healer.

*“I believe medications prescribed by the doctor are not very safe. So, I am using traditional methods and medicine such as cupping and Habbatus sauda seeds, because it is Sunnah of the*

*Messenger of Allah and peace be upon him and he recommended to use it” (PT4, male, 52 years old).*

One patient reported that herbal medicine does not have any side effects, while several patients with particular religious and cultural beliefs reported that their diabetes medications are made up of chemicals that cause side effects that may damage their kidneys and liver. For this reason, they prefer to take traditional medicine as a natural alternative.

*“I believe taking diabetes medication regularly has side effects because is made from a chemical that will be poisonous to my body. Therefore, I like to take a lot of herbal medicine, because it does not have any side effects. So, I am managing my diabetes through taking alternative medicine rather than taking the medication or insulin injection” (PT10, male, 60 years old).*

Interviews with patients and HCPs show that patients prefer taking prescription or traditional medications to following a recommended diet, as many patients reported that taking medication is the easiest of the diabetes self-care activities.

Religious and cultural beliefs are another factor that influences a patient’s preference for alternative medications such as herbal treatments and cupping. Hijama (Arabic: حجامة, lit. “sucking”) is the Arabic term for wet cupping, where blood is drawn by vacuum from a small skin incision for therapeutic purposes. Cupping is a treatment that is recommended by the Messenger. The Messenger (Allah and peace be upon him) said “Indeed the best of remedies you have is cupping (hijama)...” Cupping, an ancient alternative therapy practised in the Middle East, has long been believed to boost blood flow, reduce inflammation, remove toxins from the body, and even heal diseases by drawing out impure blood from the body. The resulting vacuum inside the cups raises the skin and the blood vessels, which can often leave blotchy, circular marks. Some patients have experienced complications while being treated for their diabetes; therefore, they have resorted to undergoing traditional therapies in conjunction with, rather than in place of, prescribed medication.

*“Some patients use traditional medicine and do not take prescribed medicine, because they worry about side effects” (HCP 12).*

As this study as evidences, cultural and religious beliefs are factors that influence a patient's diet as well as their management of prescribed medications. As outlined above, patients and HCPs also report that social events such as weddings, funerals and invitations from friends and relatives are obstacles to patients who are advised to eat only healthy, nutritional food. Some patients preferred natural alternatives to medication that had been prescribed by HCPs.

Moreover, several patients reported that Ramadan (fasting month) was the month in which they ate the unhealthiest kind of food.

*"I think a lot of patients have difficulty controlling their diabetes during Ramadan because patients start to eat too many sweets and unhealthy food, and they do not take their medication at the right time. As you know, Ramadan is a month where a lot of food is consumed during the night and there is fasting all day for 30 days. As a result, most patients suffer from high or low blood sugar levels" (HCP 7).*

HCPs also reported that environmental factors could also present challenges in diabetes self-management.

*"I consider that environmental factors could be a barrier to diabetes self-management; there is no place to exercise or walk in our environment" (HCP 10).*

In Saudi Arabia, there is a lack of suitable exercise facilities for diabetic patients, and environmental factors also play a role in discouraging people from living healthier lifestyles. Communities do not have areas in which people can walk, such as parks and pedestrian walkways. HCPs report that environmental factors could present a number of challenges to patients in the management of their diabetes, as they cannot complete the recommended amount of physical exercise due to the lack of space to do so, and patients are often unable to afford the use of a gym.

In summary, patients and HCPs raised many issues in the course in their interviews that related to culture and religion, and the ways in which they negatively impacted a patient's ability to effectively manage their diabetes. Due to these various cultural barriers, patients were unable to exercise and follow a healthy diet.

## **Theme 4: Stigma**

A diabetes diagnosis may subject patients to possible stigmatisation by family members, friends and their communities. Diabetic patients reported a fear of been stigmatised, and so many patients chose not to disclose their disease to family members. The patient interviews showed that they faced social challenges in managing their diabetes, which affected their interactions within the family, community, and with healthcare professionals. These challenges are discussed below.

### **Interaction within the family and the community**

The patient interviews revealed that they faced various challenges in adjusting to their medication routine. Patients found that they were unable to take their medication at the right time because in their attempt to, they would be faced with negative remarks about their condition from their family and friends. As a result, these patients felt embarrassed and found it difficult to take their medicine in front of their friends and relatives.

*“I usually find it difficult to take my medicines in front of my relatives, friends, or at a social event, but at home, I take my medication” (PT1, male, 70 years old).*

Furthermore, it was noted by HCPs that the stigma associated with diabetes was the greatest obstacle that prevented patients from managing their diabetes effectively. A number of patients concealed their disease from everybody, while several patients reported that they were faced with social pressures from within their family that made them feel shameful about their diabetes.

*“I think the biggest obstacle for diabetes self-care management is the stigma around the diabetes. A number of patients do not want family, friends or people at work to know about their diabetes” (HCP 3).*

Some patients regarded diabetes as an illness that made their families and relatives socially vulnerable, and some patients felt that their families were concerned that they would not be able to fulfil their responsibilities as a family. A female patient reported that her children were taking over her role because they were concerned that they would be stigmatised as a family for failing to meet these responsibilities. If she tried to guide them, they insisted that she should rest because of her diabetes.

*“The family support is necessary, and I need my children guiding me to eat less. But they stigmatise my disease, which makes me upset” (PT7, female, 56 years old).*

Patients found it difficult to interact with friends, relatives and colleagues when they made comments about their diabetes. One female patient stated that she became upset when relatives and friends made negative comments about her appearance during social activities. As a result, she now refuses any invitations to events such as these, so as not to receive any comments from her social circle.

*“It upsets me when they pass comments, such as that my appearance has changed with diabetes, be careful it is a dangerous disease, you lost weight, you look older. Therefore, I prefer to be alone in my house.” (PT18, female, 50 years old).*

HCPs noted that a family carer may also leave a person with diabetes feeling stigmatised. One female patient felt upset when her daughter commented on the things that she should and should not eat, as her comments made her feel as though she was handicapped.

*“A grandmother complains that her daughter takes care of her, but she feels upset when she gives her orders concerning what she should or should not eat. She asks me all the time how I feel ...I am ok... all these things are killing me and upsetting me. I can take care of myself, I am not handicapped” (HCP 3).*

When family and friends criticise patients suffering from diabetes and make negative comments relating to the disease, it affects their ability to manage the disease effectively. Another case of perceived stigma involved patients feeling embarrassed to take their medicine in front of friends and relatives. A further issue reported by patients is that there are social pressures from within their family that make them frustrated with their diabetes. As evidenced above, one female patient was so upset due to comments made about her appearance by friends and family members that she became a recluse and avoided meeting people. Family carers may give orders to elderly patients that will have a negative effect on their welfare by making these patients feel debilitated.

The interviews with both patients and HCPs showed that their community was also unaccepting of their diagnosis with DM. One male patient claimed during the interview that it was too difficult to accept his son/daughter being married to someone with diabetes. In Saudi Arabian

culture, children cannot marry without first obtaining approval from their father, especially women. He hoped that his son or daughter would not marry someone with diabetes, since it may affect the health of their children.

*“I will not let my son/daughter get married to a diabetic patient, who is genetically affected” (PT20, male, 30 years old).*

Some young single females with diabetes are struggling to manage their illness because their parents are attempting to hide their diabetes from the rest of the family so that they can remain eligible for marriage.

*“A female patient, 20 years old and single, is struggling with managing her diabetes, because her parents are trying to keep her disease from the family, so that her sisters can get married.” (HCP 3).*

The female participants stated that their Saudi husbands often refuse to accept their diagnosis of diabetes, and several female patients were divorced by their husbands as a result. Moreover, Saudi Arabian culture often stigmatises those who suffer from diabetes and does not encourage people suffering from the disease to get married. This has a negative impact on young single Saudi females with diabetes who wish to get married, as it is much more difficult for them to find a husband.

### **Healthcare professionals**

In the course of the patient of interviews, it was clear that they felt stigmatised by the words and actions of several healthcare professionals. These experiences led to them feeling a sense of guilt over their diagnosis, which had a negative impact on their management of their condition. One patient reported that she did not feel comfortable with her HCPs because they made her feel that she was acting irresponsibly in the management of her diabetes.

*“I do not feel comfortable with them (HCPs), because sometimes they make me feel like I am a careless person and scold me if my blood sugar level is not at a normal level. “You will have health problems, because you are diabetic”. It hurts my pride, so I enter the clinic and leave without asking any questions so as to preserve my dignity (PT8, female, 45 years old).*

Several patients reported that HCPs were focusing too heavily on the education aspect of diabetes management, because their motivation is to reduce the complications associated with diabetes which have a negative impact on the patients' ability to manage their illness.

*“The healthcare team, all their education is about diabetes complications, and that causes me to have stress, which has a negative effect on my diabetes self-care activity” (PT17, male, 30 years old).*

One female patient reported that her HCPs blamed her for the state of her condition, and were verbally abusive. This experience may have a detrimental impact on the patient's progress in coping with the disease.

*“The health team prescribes treatment, gives advice, but some of them shout at me if my blood sugar level is higher, and they blame me too. This method does not support the patient; on the contrary, it might be a setback to the patient” (PT18, female, 50 years old).*

Several patients highlighted the impact of stigmatisation, claiming that it prevents them from effectively managing their diabetes. This prevented one patient from feeling able to ask questions about her illness in an effort to preserve her dignity, while another patient feels that the stigmatisation in patient care is the result of an over-focus on treatment and the management of complications. It is evident that stigmatisation from HCPs has a serious impact on patients' diabetes management.

### **Theme 5: Healthcare environment**

The working environment of a healthcare setting plays an important role in the ability of HCPs to deliver high quality care. Organised healthcare environments support HCPs in their work and allow them to give safe care to patients. HCPs emphasise that managing DM requires a collaborative, multidisciplinary team that works together. However, HCPs report several challenges that they face in the workplace that affects their ability to give patient care. This the following sections outline the challenges faced by HCPs and the changes needed in patient management.



## **Challenges faced by HCPs**

Interviews with HCPs revealed that they faced several challenges in their workplace, and these included: lack of time, patient denial, patient non-attendance, unmanageable workload, lack of training and resources.

### ***Lack of time***

In interviews with both patients and HCPs, time shortages are a commonly cited problem that affects the relationship between HCPs and their patients, which in turn negatively impacts on patient education and motivation in practising diabetes self-care activities. Patients reported that HCPs had insufficient time to listen to them adequately while HCPs reported that they had considerable amounts of work to complete in the clinic, resulting in a lack of time to commit to each patient's queries:

*“The relationship between patients and the healthcare team has not reached the required level of trust and listening to each other, because the healthcare team do not have enough time for the patients. I do not have enough time to motivate patients to practise diabetes self-care activities...I do not have enough time for patients' health education” (HCP1).*

The patient interviews suggest that HCPs are given insufficient time with the patients to discuss their condition or provide information regarding the management of their condition. One patient suggested his lack of health improvement was due to inadequate time spent with his HCP:

*“The doctor did not give me enough time” (PT15, male, 45 years old).*

This lack of time impacted on HCP-patient trust, as HCPs were unable to properly educate their patients.

### ***Patient denial***

Additionally, patient interviews show that they were often in denial about the nature of their disease and its threat to their life. These patients continued their daily life as usual, and reported forgetting their diabetes entirely and refusing to take it seriously.

*“I forgot that I had diabetes and I feel well, I am keeping following my daily life” (PT16, male, 40 years old).*

HCPs reported that a diabetes diagnosis is unexpected for patients without prior knowledge of the condition, and very often patients react first with shock, and then denial. HCPs noted that patients avoid discussing their diabetes due to denying their diagnosis, and this response subsequently delays their treatment. HCPs observed that patients found it challenging to acknowledge that diabetes is a chronic condition, with no curable treatment options available. HCPs explain that patients prefer to discuss different issues related to their health in order to avoid a conversation regarding their diabetes.

*“I find it difficult to stop and control discussions with this type of patient, who may avoid discussing their medical condition because they deny being diabetic” (HCP1).*

HCPs suggested that they face difficulties in educating their patients and providing them with care because many patients are in denial regarding their disease, and reported struggling particularly with those patients who refused to accept their diabetes diagnosis. HCPs report that denial occurs during the early stages of diagnosis, and that in response to this they attempt to explain the facts concerning chronic diabetes, alongside the possible treatment options.

HCPs have emphasised that denial of diabetes among patients, and progressing patients to acceptance and treatment of their condition, is the most challenging issue for them.

### ***Patients missing their appointments***

HCPs reported that patients who missed appointments frequently, at least two or three times, were at high risk for developing complications from diabetes. HCPs suggested that the reason patients missed appointments may have been due to a lack of funds, or having lifestyles associated with housing instability. HCPs reported feeling frustrated when their patients who failed to attend their appointments.

*“That is difficult when the patients do not come to their appointment, can you imagine?! I have been waiting for three or six months to see them, then no show, that makes me feel very frustrated, when patients do not come to their appointment” (HCP10).*

Patients also reported that missing clinic appointments was negatively affecting their ability to manage their diabetes. Several reasons were given for their non-attendance of clinic appointments. One patient claims that in going for to an appointment they were informed that their medical file was with another department and that they would have to take another appointment instead. Other reasons given for missing clinic appointments were: a lack of reminder system, the clinic being far away from their home, and the appointment coming once every six months.

*“I forget as the appointment is a long way off and it is once in every six months. Moreover, the diabetic clinic does not have any reminder system that supports the patients to remind them about their appointments. Therefore, I usually take the prescribed medicines without consulting the doctor” (PT3, male, 56 years old).*

There was a strong belief among patients and HCPs that failing to attend clinic appointments negatively affected diabetes management. Overall, it was identified that non-attendance of clinic appointments is likely the result of poor access to services, and no reminder system for appointments that are six months apart.

### ***Unmanageable workload***

A workplace problem commonly cited by patients is that clinics are too crowded and busy which affects the quality of patient care. HCPs have a heavy workload and many responsibilities in the clinic, which affects their role as diabetes educators. Their unmanageable workload is a barrier to effective care-giving, and takes time away from the health education and encourage of their patients in the practice of diabetes self-care activities.

*“ ... I work along the road, in the clinic and I have many patients that I should educate as individuals. Also, I have to write in patients’ files as routine documentation, as well as check on the computer to see the blood sugar test results and medication for each patient, plus a lot of work I have to do in the clinic such as make a patient census, request supplies and maintenance checks. The clinic is too busy and crowded and this is frustrating, because I cannot focus on my job as a diabetes educator ... thus that is not good and safe for the patient...” (HCP2).*

One diabetes education clinic is run by one staff member who is responsible for educating a large number of people with DM. This might be between 30 and 40 patients every day. This number increased when a diabetes screening clinic was opened. The crowded workplace environment affects their healthcare team's relationship with the patients, and this their patients' diabetes self-care activities.

*"...The number of patients in the clinic follow up and who have appointments is approximately 30 to 40 per day. The number increased after the opening of the diabetes screening clinic...unfortunately this situation in the workplace affects my relationship with the patients and I do not have enough time to activate diabetes self-care activities for the patient... I have a lot of work to do in the clinic and as a result, I do not have enough time for my patients"* (HCPI).

The patient interviews show that patients were suffering at the diabetic clinic due to overcrowding, which led to their HCPs being very preoccupied and failing to focus on patient care.

*"The diabetic clinic is very crowded. I have been waiting for my appointment for six months, and then my doctor is too busy to read my file, or see my blood result test on the computer. I feel upset about that because the doctor should have done that before I entered the clinic. Then the doctor is too busy to answer the phone and to answer the questions of other patients who enter the clinic and sign their prescriptions for them. So, I feel very upset at my doctor, when he gives a very short answer to any questions I ask. I feel upset about that because I think that as a patient, I deserve more care and attention from HCPs"* (PT18, female, 50 years old).

The heavy workload of HCPs is impacting upon the care they provide to patients, and the majority of the HCPs interviewed in this study have struggled with extending proper care to their patients. The workload faced by HCPs includes a number of administrative tasks in the clinic, which subtracts from the care that patients require. Furthermore, the majority of HCPs confirm that having too many patients only exacerbates problems such as these.

### ***Lack of training and resources***

The interviews with HCPs show that education and training for the diabetic care team is essential in order to improve on and acquire new skills. This training assists them in supporting

the implementation of diabetes self-care activities by their patients with diabetes. HCPs reported that they needed to update their information with new methods and self-care strategies because patients unresponsive to receiving the same information at every appointment.

*“I think diabetes care teams should be trained in order to improve and acquire new skills that support the patients to take the medication prescribed, follow a healthy diet, carry out physical activities and encourage them to check their blood sugar level” (HCP9).*

The majority of HCPs stated that they would like to perform these training requirements, believing that it would allow them to feel more confident, and possess greater skills, so that they could build a better relationship with their patients and deliver a more effective education. Some HCPs felt that they should attend a course or study for a diploma relating to diabetes, so as to enhance their skills and gain experience in this area.

*“I personally want to attend a course or diploma in diabetes outside Saudi Arabia in order to develop my skills and get more experience” (HCP2).*

*“I need to enrol on a training course on insulin pumps and footcare and also update my knowledge of the newest medicines to improve my ability to answer any questions, as I really feel very embarrassed if the patient asks about a new therapy that was prescribed for him and I do not know it” (HCP6).*

HCPs explained their need for further training in order to update their knowledge regarding diabetes self-management. They believe that such training would enhance patient care. HCPs must be knowledgeable regarding diverse types of diabetes treatment, while also being up to date on the most recent medicines, and HCPs report that engaging in continuous training has helped them to acquire new skills that supported their patients.

As previously highlighted by HCPs, patients also reported feeling very bored by the repetitive health education that they received from HCPs.

*“Diabetic educators repeated their education, there was nothing new and it became boring, because the healthcare team were not updating their information” (PT 11, female, 38 years old).*

HCPs explain that they require continuous training regarding the latest diabetes management approaches, because this is necessary for the provision of a strong care plan. Furthermore, such training authorises diabetic care teams to operate with greater confidence, with accurate and precise diabetes management information being provided, while avoiding any repetition of information that results in patients feeling bored. HCPs also emphasised the lack of appropriate facilities for educating patients, alongside the dearth of educational materials needed to teach them.

*“The patients are in different age categories, so they need different education resources that are suited to their age and gender” (HCP1).*

HCPs reported that they required educational resources that supported them in educating their patients. HCPs explain that their patients were from different age groups, thus necessitating a diverse range of educational materials in different media, such as posters and TV programmes. These materials must be suitable for teaching patients across different age groups, education levels and genders.

*“I do not have any materials that support me with patient education and teaching” (HCP10).*

One HCP felt that patients were being educated in an unsafe way, but did not go into detail on this assertion. Other HCPs felt that the elderly and children had difficulties in acquiring diabetes knowledge due to their age. With these education issue in mind, it is clear that a greater effort is needed to help such patients understand the complexities of their diabetes.

*“Some patients, such as the elderly and children, do not have any knowledge about diabetes self-care management due to their age, and have difficulty in understanding it” (HCP4).*

HCPs highlighted the crucial need for resources that could assist in educating patients, especially given the level of patient diversity across various age groups and education levels. Furthermore, they reported that without sufficient resources, continuous difficulties are faced in delivering vital information to patients.

### **Changes needed in patient management**

Interviews with HCPs revealed that there were several changes needed in in the current management of diabetic patients. The changes proposed were: collaboration among doctors,

dietitians and diabetic educators; communicating with patients while at home and using new technology; and training needs of HCPs. These reports are outlined below.

### ***Collaboration among doctors, dietitians and diabetic educators***

The interviews with HCPs reveal there is a lack of teamwork among health professionals that is affecting patient care. HCPs report that the diabetic care team present poor cooperation with other healthcare teams, and preferred to work independently. For example, HCPs felt frustrated when another doctor prescribed a new medication for a patient without informing them. Moreover, they felt embarrassed when patients enquired about this medication and they were not away they had been prescribed it. HCPs explained that they preferred to have group meetings with the diabetic care team, enabling regular discussion of the patients' problems and treatment plans, which would be helpful for HCPs and patients alike.

*“Having group meetings as a diabetes educator with the doctors as well as dietitians regularly to discuss patients' problems and treatment plans would be helpful for us, to teach the patients according to their needs” (HCP1).*

The patient interviews revealed a lack of teamwork among HCPs. As a result, patients felt confused concerning the information they received from HCPs. The interviews with patients also revealed that information provided by healthcare providers was deficient in certain areas. The information transfer between HCPs and patients was interactive, as HCPs educated patients on diabetes and patients asked questions. However, the information needs of each patient were different. One patient reported his confusion regarding the different instructions he had received from his doctor and the diabetic educator regarding his medication:

*“The diabetic educator gave all the information that I needed, but sometimes I was confused between her information and my doctor's instructions regarding my medication” (PT15, male, 45 years old).*

Of the different healthcare providers, patients felt they had more trust in the information provided by their doctors than the information provided by dietitians and diabetes educators.

*“I always trust my doctor's information regarding food and medication because the dietitian and diabetic educator's information confuses me sometimes” (PT10, male, 60 years old).*

Some patients felt that treatment information was not shared in a satisfactory way. They reported that the information provided was incomplete, outdated, confusing, and difficult to understand, and that in some cases no information was provided.

*“Support from the healthcare team is poor because they do not understand whether I have the right dosage of the medications or not and also, they do not give me enough information about my medications” (PT4, male, 52 years old).*

In summary, certain HCPs believe that sound cooperation between HCPs would enhance patient care. Furthermore, patients identify that poor teamwork between HCPs results in their confusion on the information obtained from HCPs concerning their treatment. The majority of HCPs report that collaboration among team members is necessary to improve the level of effective care for diabetic patients, benefitting patients by facilitating information sharing among HCPs.

#### ***Communicating with patients while at home and using new technology***

HCPs report that they need to utilise innovative technology for educating and delivering information to their patients at all times, particularly when HCPs only meet their patients for a few minutes and patients may not recall all of the HCP’s instructions. Therefore, making use of communication technologies such as SMS, WhatsApp or Twitter to disseminate information would improve diabetes self-management.

*“I suggest using SMS or WhatsApp or Twitter to give information to patients, and this would improve diabetes self-management” (HCP4).*

HCPs believe that it is crucial to utilise such innovative technologies to enhance patient understanding of diabetes and diabetic self-management within their home environment. HCPs also reported their willingness to utilise such new technologies in their waiting rooms, with the aim of encouraging patients to acquire greater knowledge regarding diabetes self-management. HCPs outlined how they might restructure their waiting rooms in order to implement such technology, enabling the education of patients during their waiting times, making this an active period of education and engagement.

*“There should be waiting rooms that have data shown on screens to raise awareness of diabetes while patients are waiting, so they can watch it” (HCP10).*



Other HCPs believe that they should utilise technology to educate patients constantly, beyond their waiting time at the clinic. They believe that utilising visual aids, SMS, or WhatsApp, which may increase patient awareness concerning their diabetes management. This should be achievable with the contemporary widespread use of mobile phones and internet technologies. Using these technologies will assist patients in gaining knowledge of their condition and encourage lifestyle changes in diabetic patients outside of the clinic and the waiting room.

#### **5.4. Similarities and differences in the results**

Both the quantitative and qualitative results show that diabetic patients have made changes in their diets since their diagnosis (Table 27). However, the quantitative results do not identify the challenges patients faced in their efforts to follow the recommended diets, as were revealed in the qualitative results. The qualitative results show that patients face cultural barriers, stigma, and challenges at home. The social culture of eating exposes patients to unhealthy food on a regular basis, as patients were expected to attend a large number of social events with the presupposition of eating unhealthy food. Patients also structured to overcome the expectations of their gender roles, where men found it difficult utilise the kitchen to prepare food, and women reported facing negative responses from their husbands when they ate healthy food. Further challenges at home included food not being served at regular times, and a lack of food appropriate for diabetic management, and both of these issues were related to a lack of family support.

It is clear from this analysis that there are similarities and differences between the quantitative and qualitative results. To some extent, this should be expected due to the different epistemological approaches of quantitative and qualitative data gathering, and the ways in which these methods collect different types of information and engage with participants in different ways. However, the differences captured in these findings should be seen as a strength of this study, as they add greater depth and nuance to the findings that would be difficult to achieve using a single method alone. For example, the poor adherence to diet in the quantitative results was explained by the qualitative finding that patients with T2DM faced challenges adhering to the recommended diet. The triangulated results can then be combined for interpretation.

Table 27: Summary of quantitative and qualitative results

<b>Self-care activity</b>	<b>Quantitative results (method 1)</b>	<b>Cf.</b>	<b>Qualitative results (method 2)</b>
Adhering to required diet	More than half of patients were not able to follow their recommended diet on any of the preceding seven days. Only a small percentage were able to follow the diet on all of the preceding seven days.	=	Most patients did not follow diet plans, and barriers to following healthy diets were related to cultural issues.
Exercise	More than half of the patients did not exercise on any of the preceding seven days. Just 29.9% of patients exercised on three or more days. More females than males did not exercise.	≐	The most common form of exercise was walking. Female patients faced challenges as they had no suitable place to walk. Patients who had difficulties walking could not exercise.
Testing blood sugar	Many patients did not test their blood sugar on any of the preceding seven days. The percentage of patients who tested their blood sugar on three or more days in that time was only 14.7%. More women than men tested their blood sugar.	≐	Patients did not monitor their blood sugar level regularly, but they monitored blood sugar to take corrective actions such as taking or not taking meals, taking the right doses of medicine, and exercising.
Foot care	Half of the patients did not check or care for their feet on any of the preceding seven days. Only 40.2% of patients checked and cared for their feet on three or more days.	≠	Many patients had a positive attitude towards foot care, and reported examining their feet daily. This was due to fear of amputation, but also al-wuḍū; participants needed to wash their feet five times per day for prayer.
Taking medication	Adhering to medication on all seven days was high but there were cases of non-adherence. More women than men adhered to medication. More than half of the patients did not take insulin on any day in the previous seven days.	≠	Patients were taking insulin, tablets, and traditional medicine such as berry leaves, sauda seeds, and garlic, which were preferred over modern medicine by some patients. Some patients preferred insulin over pills.
Support from family	Most of the participants (64.7%) did not follow the diet management throughout the month.	=	Food was not served regularly and was not appropriate for diabetes patients, related to a lack of family support.

Support from friends	16.2% of the participants performed physical activity on all 7 days of the last week.	≠	Male patients reported receiving support from their friends and were encouraged to perform physical exercise. Female patients did not report receiving support from their friends.
Support from healthcare providers	The results show that 84% of respondents took the medications as prescribed on all 7 days of the last week.	=	HCPs prescribed medication and educated patients on self-care.

The same (=); similar (≈); different (≠).

## 5.5. Conclusion

The integration of findings from both the qualitative and quantitative components of this study give credence to the importance of using a mixed methods approach in this study. Conducting a concurrent triangulation design enabled a comprehensive exploration of the experience of self-care activities among Saudi patients with T2DM and social support in Saudi Arabia. The five themes presented are based on the qualitative findings, while the quantitative findings provide further explanation and context for these themes. The five themes emerged inductively from the qualitative data, and the quantitative data reflects only some aspects of the derived themes. The practice of diabetes self-care activities, culture and religion, and social support are qualitative themes that are supported by quantitative findings, while the themes of stigma and healthcare environment are qualitative themes only.

The qualitative and quantitative findings show a poor adherence to diabetes self-care activities among Saudi patients with T2DM. The qualitative findings indicate that adherence to medication was an easier task to perform among the other self-care activities as reported by the patients. These findings were supported by the quantitative results, which showed adherence to taking medication was the highest scoring of the self-care activities. The qualitative findings also indicated that culture, social support, and stigma were factors that influenced self-care practices. In addition, the quantitative results show that there are significant differences in self-care activities between age groups measured on a continuous level. Both qualitative and quantitative findings indicate certain differences between males and females in the performance of their diabetes self-care activities. Further, the results showed that the education

level of patients with T2DM was affecting adherence to self-care, and this result was supported by both qualitative and quantitative findings.

The qualitative findings explain the challenges faced by HCPs in diabetes patient care, while the quantitative results indicate that the majority of participants had been advised to adhere to diabetes self-care activities by their HCPs. The qualitative findings show that the challenges faced by patients include a lack of family support, inability to adhere to the required diet, exercise intensity, and medication. These challenges undermined either a single self-care activity or several self-care activities. Lack of family support was identified as the main challenge facing patients at home. This lack of support from family and friends was found to have a negative impact on the patients in this study.

### **The key findings of this chapter**

- The results show that there were significant differences between males and females in all aspects of the questionnaire. This is due to Saudi Arabia's sociocultural makeup.
- Patient adherence to medication was the highest scoring among diabetes self-care activities, while the lowest scoring activities were adherence to a recommended diet and exercise regime. Patients with T2DM faced difficulties in following diets and exercise routines because of a lack of community awareness about healthy diets and the benefits of physical activities, as well as the approach to lifestyle and wellbeing in Saudi Arabian culture.
  - The culinary culture in Saudi Arabia presents a challenge to diabetes management because appropriate food for diabetic patients is not prepared either at home or at social events.
  - There are significant gender differences in managing self-care behaviours among T2DM patients in Saudi Arabia.
  - The segregation of males and females in public areas, which is stipulated by Saudi culture, has a negative effect on patient adherence to self-care activities. For example, females are not allowed to exercise in public.
  - Saudi culture also requires people to attend a large number of social events, which presents a challenge for patients with T2DM in terms of managing their diabetes and adhering to self-care activities.

- Lack of awareness of T2DM in Saudi society results in the public stigmatisation of diabetic patients, which in turn affects their adherence to medication as they seek to hide their disease from friends and family.
- Participants recognised that taking medication was a key aspect of managing their diabetes.
- Dietary counselling is mostly provided by HCPs on a continuous basis.
- Families, spouses and friends play an important role in T2DM patients' adherence to diabetes self-care activities.
- Lack of time and resources were further challenges facing HCPs in the care and education of patients.
- Lack of communication and cooperation between HCPs presents a challenge which affects patient care.

The following chapter will discuss these results.

## CHAPTER SIX: DISCUSSION

### 6.1. Introduction

This chapter discusses the research findings as they relate to each of the research questions, drawing on both the quantitative and qualitative components, and examining these results in relation to the current literature. The key findings are integrated in order to examine the impact of demographic factors, the role of social support, and the role of healthcare professionals in improving adherence with self-care activities among Saudi patients with T2DM. Each of these areas is addressed in turn in order to meet the aims of the study and to attempt to improve understanding of factors affecting self-care management among Saudi people with T2DM. The impacts of culture, religion, gender, social support and stigma are also examined. Through integrating these findings with a systematic review of the literature, the ways in which the thesis extends existing knowledge and theories in relation to self-care and social support of people with T2DM in Saudi Arabia are also outlined.

From both the study findings and the wider literature, it is evident that T2DM patients demonstrate very low levels of self-care activity; however, the findings show that social support is an important source of encouragement for patients with T2DM in terms of them adhering to self-care. The robust explanatory evidence provided by this study indicates that several factors affecting self-care activities including culture and religion, stigma, gender, social support, and healthcare environment impact on self-care among Saudi patients with T2DM. As result, self-efficacy theory and social support theory provide a useful framework to assess and understand self-care and social support among Saudi patients with T2DM; the findings were also consistent with the basic ideas and concepts of self-efficacy theory and social support theory. Key themes emerged from both the qualitative and quantitative data. However, as the five main themes emerged inductively from the qualitative data and the researcher could not predict these at the point of survey design, the quantitative data reflects only some aspects of these themes. Where possible, quantitative data is thus presented to give further context and explanation to qualitative findings. If the researcher had conducted the qualitative interviews first, the survey could have been designed to cover all areas of the

themes; however, as these were done at the same time, quantitative data is not available to support all of the themes discussed.

## **6.2. Patients with T2DM: adherence to self-care activities**

The findings of this study indicate that the general level of diabetes self-care activities among participants with T2DM is low. This supports the findings of other studies conducted not only in Saudi Arabia but also in India, which found poor levels of self-care activities among patients with DM (Abu Sabbah et al., 2014; Rajasekharan et al., 2015). The current study suggests that people with T2DM adhere most rigorously to taking medication and foot care; these self-care activities attracted much greater commitment than controlling diet, blood sugar testing, and exercise.

This study found that patients faced challenges that limited the effectiveness of their efforts to adhere to the recommended diet. Cultural and religious traditions were found to pose particular difficulties, as these encourage the consumption of foods with high fat and carbohydrate content. Diet regimes were also affected by attending social activities or events and by the giving and receiving of hospitality. Most families in Saudi Arabia also cook one type of food for all family members, which makes it difficult for people with T2DM to follow the dietary advice given by HCPs, because the single meal may not be a suitable food for their diabetes.

In the current study, individuals with T2DM were seen to practise various desirable diabetes self-care activities, but this was usually to an inadequate level based on the responses to the SDSCA questionnaires. Certain foods are granted essential special cultural importance in many cultures, such as in China (Chun & Chesla, 2004), and, similarly, this study disclosed that communal eating of traditional Saudi food was central to participants' social and cultural lives. HCPs must therefore be aware of the importance of culturally appropriate diets for their patients and must thus provide culturally appropriate dietary advice.

When comparing diet adherence, the current study found that more women than men had not adhered to their required diet for at least one day in the previous week. This matches findings in the context of Nepal (Bhandari & Kim, 2016). One explanation for this is that, in Saudi Arabia, women are generally responsible for cooking traditional food for all the family to eat; as a result, they themselves do not eat healthy food. The results of this study also showed that male patients were able to eat healthy diets because their wives supported them and cooked

healthy food for them, while females reported that their husbands and children did not support them in eating healthy food.

The current study found that the lowest rates of adherence were seen for physical exercise. Studies conducted in Saudi Arabia by Sharaf, Midhet, and Al-Mohaimed (2012) and Abu Sabbah and Al-Shehri (2014) found similar results regarding limited adherence to physical activity. This may be due to a lack of places for exercise and a lack of suitable environments in Saudi Arabia for activities such as walking. The hot weather is a further potential factor contributing to low physical exercise rates among the population in Saudi Arabia. An explanation discussed by some participants in the interviews was that physical inactivity is extremely prevalent in the majority of the Saudi population. Another explanation discussed by some participants was that low adherence to exercise may be due to most patients using cars for transport. This current study found that the level of physical exercise was also affected by personal, cultural and environmental factors, and that simple awareness of the benefits of doing regular physical exercise was insufficient to produce change. This is consistent with another study conducted in Saudi Arabia, which found lack of social support and resources to be the main barriers to adherence to a physical exercise programme, particularly for females (AlQuaiz & Tayel, 2009).

The present study found significant differences between males and females in terms of participating in physical activities; more males than females reported doing exercise. Other studies have produced similar findings in Saudi Arabia (Alkahtani & Awad, 2016) and other Arabic-speaking countries (El Ansari, Khalil, Crone & Stock, 2014). This may be due to the fact that males in Saudi Arabia can walk and exercise in public, while females cannot exercise in public for cultural reasons. As such, females in the current study felt that the responsibility for managing their diabetes and adhering to the dietary advice of HCPs was theirs alone. This study found that Saudi women could not exercise due to a lack of appropriate places for them to do so. In contrast, in Saudi Arabia, it is acceptable for men to exercise in public (Ali, Baynouna & Bernsen, 2010).

This study found that adherence to the correct regime for testing blood sugar was low and that over a third of participants did not test their blood sugar at all. Similar studies suggest that blood sugar testing levels are generally low among diabetes patients, despite this being an essential part of diabetes control (Hanko et al., 2007; Abue Sabbah & Al-Shehri, 2014). This



present study found that participants were aware of the importance of testing their blood sugar level to manage their diabetes, and participants tested their blood sugar at times when they had eaten too much or were not sure if they had taken the correct medication dose. An explanation discussed by some participants in the interviews was difficulties in using the glucometer at home; many patients cited technical difficulties in testing their blood sugar levels, especially those aged 50 and above. Consequently, these participants reported testing their blood only when they felt that their blood sugar might be high.

These findings suggest that HCPs must educate patients about the importance of maintaining appropriate blood sugar levels in order to manage their diabetes and prevent DM complications. Interestingly, this study found that poor blood testing levels occurred in both genders. An explanation discussed by some participants in the interviews was that HCPs do not give recommendations and guidelines to some patients. Overall, more women than men did not test their blood sugar, perhaps because most females in Saudi Arabia are housewives and have a lot of household responsibilities, which may cause them to forget to test their blood sugar levels or to have insufficient time for such blood testing. Women were only slightly less likely than men to test their blood sugar levels, though this is broadly consistent with a study conducted in Ghana by Mogre et al. (2017), which found that males were more likely to adhere to blood sugar testing regimens than females. These findings differ from two previous studies from Saudi Arabia by Khan and Khan (2000) and Sabbah and Al-Shehri (2014), both of which found that women performed these tests more frequently than men.

In the survey, taking medication was the most commonly practised form of self-care reported among participants, which clearly reflects a high level of dependence on medication. This result was reaffirmed by the interviews, which showed that the taking of medication among people with T2DM was prioritised over other diabetes self-care activities, as it is an easy task, and patients face fewer challenges taking medication. This finding was consistent with the findings of other studies, which found high levels of adherence to medication (Albright, Parchman, & Burge, 2001; Tewahido & Berhane, 2017). A similar study carried out by Abu Sabbah and Al-Shehri (2014) in Saudi Arabia also found that patients' commitment to adherence to medication was the highest among self-care activities.

One explanation discussed by some participants in the interviews was that taking medication was a simple way to reduce blood sugar levels compared with changing diet, performing

exercise, and blood testing. Another explanation discussed by some participants in the interviews was that patients with T2DM worry about diabetes complications, and taking their medication is an easier way of avoiding these complications than diet or exercise. Some of the main reasons for missing medication were school holidays and attending social events, as most people in Saudi Arabia travel to meet family members in school holidays and they do not eat at regular times; thus, their medications are also taken irregularly or not at all.

This study found that there were significant differences between males and females in terms of taking medication: more female patients reported taking their medication than males. One explanation discussed by some participants in the interviews was that males, being out of the home more frequently, forget to take their medications more often, while the majority of females are housewives, which makes it easier for them to take their medications throughout the day. A similar study carried out in Saudi Arabia also found that female patients demonstrated higher adherence to medication than males (Albargawiab, Snethena, Gannasc, & Kelbera, 2016), and a study in Nigeria similarly found that females had higher adherence to treatment protocols (Uchenna, Ijeoma, Pauline, & Sylvester, 2010).

The present study found that most participants (69.3%) reported washing their feet daily, which supports Rajasekharan et al. (2015), which found that 64.8% of participants washed their feet daily. Similarly, Kahsay and Berhe (2013) found that more than two-thirds (67%) of their participants adhered to recommended diabetic foot care practices. The rates from the current study were, however, higher than those of a study done in Nigeria by Desalu et al. (2011), which found that only 46% of the participants washed their feet daily.

The reason for this frequency of washing the feet is likely to be that all participants in the current study needed to wash their feet five times per day as preparation for Islamic prayer; however, this form of washing differs from medical foot care, as the latter involves a more thorough examination of the feet, as well as skin care and a daily change of socks (Muhammad-Lutfi, Zaraihah, & Anuar-Ramdhan, 2014). Diabetes foot care is important to help avoid foot problems or complications such as infection, ischaemia (absence of blood flow to the foot), and peripheral neuropathy (damage to nerves), which are the main causes of foot ulcers (Boulton et al., 2008; Pendsey, 2010; Singh, Pai, & Yuhhui, 2013).

This present study found that the diabetes complication that participants worried about most was limb amputation, and this motivated them to examine their feet daily. Nevertheless, the

main factor impelling washing appeared to be religious beliefs and involved a different kind of foot care. The results revealed significant differences between males and females in terms of foot care, with females doing more than males. This is consistent with other studies that have found that females report greater levels of foot self-care than males (Rossaneis, Haddad, Mathias, & Marcon, 2016).

Generally, the self-care activities of diabetic participants within the preceding seven days were severely limited, with almost half ignoring their regimens. This finding, which reflects low adherence to self-care activities, is very alarming, and implies that most patients with T2DM in this study are likely to develop DM complications. More generally, this poor adherence to self-care activities requires immediate action by HCPs, because it is clear that patients with T2DM are dependent on medication to control their diabetes. The current study showed that age was not significantly related to any diabetes self-care activities. Similar findings from Kurnia, Amatayakul, and Karuncharernpanit (2015) also found no significant differences between age groups with respect to all dimensions of managing diabetes. All diabetes self-care activities were influenced by gender in the current study, which found that male patients with T2DM were more adherent to diet plans, exercise regimes, and testing blood sugar levels, while female patients with T2DM had higher adherence to medication and foot care. The current study showed no differences from marital status in dimensions of self-care except diet and physical activity. There were, however, differences by employment levels in terms of medication compliance, foot care, exercise, and diet. The current study also showed that income had a significant impact on diet, exercise, foot care, and medication, as well as finding differences between different education levels with respect to self-care activities such as diet, exercise, and testing blood sugar. This is similar to a study conducted in the Brazilian context, which found that level of education impacted adherence to self-care activities (Macedo et al., 2017).

It was found that many participants with T2DM are not following any recommendations from their HCPs, indicating a gap between what they know they should do to manage their diabetes and what they are actually doing. These findings, which reveal poor adherence to self-care activities among Saudi patients with T2DM, may be due to Arabic culture making it difficult for Saudi diabetes patients to practise self-care activities where traditional food with high fat and carbohydrate content is served at home and the social process of gathering involves high consumption of rice and meat (Laher, 2012). The findings of this research also highlighted that

the majority of Saudi patients did not adhere to physical exercise due to the impact of culture. According to Al-Nozha et al. (2007), the majority of the Saudi population are physically inactive. Their survey, which covered 17,395 Saudis, showed that 98% of Saudi female participants and 93% of Saudi male participants were physically inactive.

The participants in the current research suggested that counselling about diabetes self-care among people with T2DM could succeed in increasing the practice of self-care activities among Saudi individuals with T2DM. For example, in terms of physical exercise, each patient should be advised of physical activities suited to their health condition and circumstances. There is also a need for targeted counselling on medication adherence, diet, self-monitoring of blood sugar levels, and foot care among patients with T2DM. The results of the present study showed that, in Saudi Arabia, those who are female, widowed, with low levels of education, unemployed, or with low levels of income are less likely to practise specific self-care activities. Poor adherence to medications was associated with males, employed persons, and high incomes, while poor adherence to foot care was associated with males, high levels of education, high incomes, and being employed. Poor adherence to reducing fat in the diet was associated with old age and unemployment.

These findings are consistent with self-efficacy theory and Cohen's social support theory in that patients with T2DM in Saudi Arabia must have a strong understanding of diabetes self-care activities and needs to practise the correct tasks in order to manage their diabetes and prevent complications. Patients also need support from their family and friends to motivate them to adhere to self-care activities in their daily lives. Support from healthcare professionals is also important, particularly in relation to education and information. This support from HCPs helps patients to understand the importance of practising self-care activities to better control their glycaemic levels, and Saudi patients with T2DM need social support from their family, friends and HCPs because self-care activities are difficult tasks that patients may find it difficult to conduct regularly.

### **6.3. The relationship between social support and adherence to self-care activities**

The interviews found that support from family, friends, and HCP for patients with T2DM plays an important role in the management of T2DM. This support was assessed with regard to patients' adherence to self-care activities.

## **Support from family**

This study found that support from family, friends, spouses, and HCPs was an important source of encouragement for patients with T2DM, helping them to adhere to their treatment and manage their diabetes. It is clear that effective management of T2DM requires the implementation of diabetes self-care activities in the daily lives of patients, and the support patients receive helps with them continuing such self-care activities. Lifestyle changes are the main focuses of the care and treatment of T2DM, and these require the person to be motivated and aware of the significance of such changes (Santos & Marcon, 2014).

The present study found that social support from family members plays a significant role in self-care among patients with T2DM. This is consistent with the findings of an American study conducted by Reyes, Tripp-Reimer, Parker, Muller, and Laroche (2017), which found that family members assisted patients with T2DM in staying on track with practising diabetes self-care activities. In particular, in the interviews for the present study, a number of participants stressed the importance of family member support in terms of adhering to a strict diet. A possible explanation for this was that patients with T2DM eat food prepared by their families, and thus, these families can offer great support in terms of offering suitable food. In this way, self-care and social support in patients with T2DM appear to overlap in practice. Patients must understand the importance of adherence to diet in terms of managing to control their glycaemic levels, while family support is significant in terms of preparing healthy food that is suitable for people with diabetes. This support from the family in many instances enables and motivates patients to practise self-care activities.

This study found that psychological support from family members encouraged patients to better manage their diabetes. Psychological support is important because DM is a chronic condition and to manage it, patients must change their daily habits, which can be stressful. Another possible explanation is that worry about diabetes complications means that individuals with T2DM need emotional support from their family to help control the disease and prevent such complications. Therefore, family emotional support helps patients practise diabetes self-care activities and cope with the demands of the disease. This is similar to findings from a study done in Botswana which found that lack of emotional support from partners and friends contributed to non-adherence to diet plans and physical exercise (Ganiyu, Mabuza, Maletle, Govender, & Ogunbanjo, 2013).

This research found that social support played an important role in enabling diabetes self-care among Saudi patients with T2DM, but it was also noted that patients who have other family members with the same medical condition received more support from their family because these family members had experience and knowledge of DM management. The findings of this study also show the negative effects that lack of family support has on patients' adherence to self-care activities. Significantly, many patients with T2DM improved when they were admitted to hospital because they were receiving care from HCPs. In contrast, a study done in Malaysia found that participants who received care from their family members during illness had higher levels of adherence to diabetes self-care than those who received care from friends or nursing staff (Ishak, Yusoff, Rahman, & Kadir, 2017).

The current research found that participants reported that a lack of support from family and friends made them feel isolated. The most probable explanation for family and friends not playing an active role or apparently not showing care towards patients is a lack of awareness about the disease, meaning they serve food that is not suitable for diabetics, which results in patients becoming isolated. This is similar to findings from a study conducted in Japan, which found that for participants who stayed with their family at home, the level of self-care was higher than for those who were taken care of at an institution, due to lack of social support in the latter circumstance (Matsuzawa, Sakurai, Kuranaga, Endo, & Yokono, 2010). It is important to clarify, however, that family members need awareness of diabetes management, and participants in this research faced challenges with practising healthy behaviour when their families lacked awareness of diabetes management. This might partly clarify why many participants in the present study mentioned family support as a major factor that enables and motivates patients with T2DM to practise self-care activities in their daily lives. Healthcare providers in Saudi Arabia should thus encourage individuals with T2DM and their families to engage with education about diabetes management and self-care activities. This is particularly important as patients and their families are more responsible for patients' health than the healthcare service.

### **Support from friends**

A number of participants reported that their friends provided them with great support, which encouraged those patients to manage their diabetes. Similarly, social support from friends motivated participants to practise diabetes self-care activities such as controlling their blood

sugar levels, exercising, and eating healthy food. This is similar to findings from another study, which found that diabetic patients support each other in order to manage their diabetes (Huh & Ackerman, 2012). This study suggests that HCPs need to share patient care with family members and educate patients' families about DM management so that they can support patients. In particular, in Saudi Arabia, where people live with their families and participate in many social events that can negatively affect individuals with T2DM, family support would help many patients to control their diabetes. Social support from family and friends had a strong impact on improvement of diabetes self-care activities among participants in this study.

### **Support from healthcare professionals**

This current study found that participants reported different forms of HCP support, such as prescribed medications and blood tests. The majority of the participants reported that the main support from their HCPs was prescribed medications and assessment of blood sugar levels. A possible explanation for this is patients' beliefs that diabetes medications are the main method of controlling their diabetes, and blood sugar tests offer an easy way of showing the patients the current status of their diabetes. As a result, the patients describe prescribed medications and conducting blood tests as the main types of support they receive from their HCPs. Similarly, several other studies have found that HCP support for patients with T2DM mainly takes the form of prescribing proper treatment, requesting laboratory investigations, and providing the health education and information necessary to manage their diabetes (Summerbell et al., 2008; Goetz et al., 2012; Engström et al., 2016; Alsairafi et al., 2016).

Another type of support from HCPs identified in this study was information and education related to the management of diabetes. One possible explanation for this result is that HCPs teach patients with DM about their treatment and how to perform blood tests at home. HCPs also help patients to understand their illness. The current study indicated that the main roles of HCPs were prescribing medication, assessment of blood sugar, and education. This education mainly concerned treatment, performing diabetic self-activities, and teaching patients about low and high blood sugar levels, as well as identifying DM complications. It was found that educating, giving information, and motivating patients to perform continuous diabetes self-care activities were the support that patients acknowledged receiving from HCPs.

This study found that gender differences between patients and HCPs offered a barrier to delivery of care due to gender segregation based on cultural and religious factors. Schieber et al. (2014) similarly indicated that discordance in gender increased disagreement between female patients and male doctors regarding advice given on weight loss. This gender difference was highlighted by HCPs and female patients. Due to the culture in Saudi Arabia, the segregation of genders has affects the relationships between patients and their HCPs. Religious and cultural roles make communication between different genders unacceptable in certain circumstances, and thus many patients, especially females, have difficulty communicating with their HCPs if they are of a different gender. This study also found that female HCPs struggling to treat and give health education to male patients. Usually Muslim women choose to be examined by female doctors or nurses, and similarly, males also prefer to be examined by a doctor or nurse of the same gender.

Though Islam prohibits general physical contact between the genders, there are some exceptions, including when there are no available care providers of the same sex (Underwood, Shaikha, & Bakr, 1999; Aasim & Amal, 2011). Nevertheless, patients prefer to be examined by HCPs of the same gender, due to cultural factors, and as mentioned previously in the literature review, separation of genders in Saudi Arabia means that patients have difficulty accepting being examined by, or even communicating with, HCPs of a different gender.

Other patients reported in this study that they used diabetes medications alongside traditional medicine. HCPs need to educate patients about taking their diabetes medication to manage their diabetes and thus avoid any diabetes complications. While, as discussed above, there was a high level of adherence to taking medications among the participants, the interviews showed that taking medication was influenced by many myths and misconceptions, which may affect patients' control of their diabetes.

#### **6.4. Factors affecting self-care activities**

The interview findings identified four major factors influencing self-care activities for people with T2DM in Saudi Arabia: cultural and religious, gender, stigma, and workplace-related factors.



## **Cultural and religious**

The findings of this study show that the problem of non-adherence to diet plans among patients with T2DM in Saudi Arabia is affected by the patients' culture. Many barriers to following healthy diets were related to cultural issues, and other studies have similarly found that dietary habits are influenced by religion and cultural beliefs (Serour, Alqhenaei, Al-Saqabi, Mustafa, & Ben-Nakhi, 2007). Dietary habits in Saudi Arabia, and in Arabic-speaking countries in general, are particularly affected by culture and religion.

People in Saudi Arabia generally live with big families and attend many social events. In their homes, and at such social events, traditional foods are generally served, which can lead to difficulties with adherence to diet plans. In addition, Islamic values support hospitality and generosity, and thus people wish to serve large amounts of food and encourage guests to eat copiously (Khoury, 2001; Ali et al., 2010). This contrasts with the Islamic ruling that a person should only eat what they need, and not eat too much, but Saudi Arabian cultural influences have affected dietary habits. The Qur'an states "Eat and drink, but be not excessive. Indeed, He likes not those who commit excess" [Qur'an 7:31]; Islam further prohibits excessive eating based on the words of the Prophet Muhammad (Peace Be Upon Him) who said: "No man fills a vessel worse than his stomach. A few mouthfuls that would suffice to keep his back upright are enough for a man. But if he must eat more, then he should fill one third (of his stomach) with food, one third with drink and leave one third for easy breathing" (Tahir-ul-Qadri, 2005, p. 13).

In the Saudi context, there is a strong possibility that cultural and traditional food practices make it difficult for diabetes patients to adhere to diet. Another possible explanation for patients facing challenges in eating food that is not suitable for their condition at home may be lack of awareness the appropriate food to cook. The current study found that participants simply eat what is cooked for them at home and do not make any food choices. The study indicated that individuals with DM were eating food chosen by their families that contained unhealthy ingredients not suitable for their condition (Ranasinghe, Ishara, Piger, & Katulanda, 2015). It is clear that raising family awareness is therefore necessary regarding healthy diet, and that HCPs need to consider the patient's family during health education.

This study also found that women were struggling to cook healthy food where they were cooking for their family, as it was difficult and more expensive for them to cook different food

for themselves. Other studies have similarly found that females were not able to cook healthy food for themselves where they were cooking for other people, and that they thus simply ate what they cooked for others (Hunt, Pugh & Valenzuela, 1998; Samuel-Hodge et al., 2000). Another finding from this study was that eating outside the home at restaurants affects individuals with T2DM's attempts to eat healthy food. In recent years, most families in Saudi Arabia have begun to meet outside the home at restaurants due to the prevalence of malls in which there are many restaurants serving fast food. Over the last few decades, the prevalence of DM has risen in Saudi Arabia due to increased calorie intake, driven in part by eating fast food and eating outside the home more frequently (Al-Nuaim, 2014). The findings from the current study showed that people with T2DM in Saudi Arabia are struggling to change their behaviours with regard to following dietary recommendations, and while adherence to medication was a relatively easy task for the participants, adherence to diet was the most difficult task due to the nature of their culture. Participants were aware of the importance of adhering to a healthy diet in order to manage their diabetes, and the Islamic faith encourages Muslims to take care of themselves and value their health (Yosef, 2008). However, it remains difficult to change people's behaviour, and the importance of culture, particularly in relation to food in Saudi Arabia, must be noted.

This study found that religious belief and culture also did affect patients' adherence to diabetes medication, however. The results indicated that patients were using alternative therapies to manage their diabetes, such as herbal medicine and cupping, which were recommended by their religion, as they believed that pills or drugs had more side effects as they are made of chemicals. This study highlights the myths and misconceptions related to diabetes medication among patients with T2DM regarding their belief that traditional medicine is better than diabetes medication for treating their conditions. These myths and misconceptions about managing diabetes affect diabetes self-management, which may result in DM complications (Horne & Weinman, 1999). A study carried out in Saudi Arabia found a high prevalence of traditional medicine use by diabetic patients in Saudi Arabia (Al-Saeedi, Elzubier, Bahnassi, & Al-Dawood, 2003), and in Saudi Arabia it remains common to use herbal medications to manage diabetes (AlMurtadha, Abdalla, Elfaki, & Alfraj, 2015).

In this study, respondents indicated that they too used traditional medicine for treatment to avoid the side effects of diabetic medications. The use of traditional medicine was based on their sociocultural and religious beliefs. Some patients with T2DM had also been told by

traditional healers that traditional herbs were safer than the medication prescribed by their doctors. Jin, Sklar, Oh, and Li (2008) found that patients feared complications and side effects of medication because these could cause physical discomfort.

The current study also found that the holy month of Ramadan, where adherents fast for the whole month, affects the management of diabetes among patients with T2DM due to them fasting all day, not taking diabetes medication, and eating a large amount of food at night. Due to these irregular eating habits, people with diabetes may change their medication regimens without consulting their HCPs (Hui et al., 2010; Mygind, Kristiansen, Wittrup, & Nørgaard, 2013). Ramadan is a holy month for Muslims, and they fast between sunrise and sunset. Islam gives permission for avoidance of fasting for those who cannot fast due to health concerns, but due to their belief in the rewards from Allah for fasting, most people actively want to fast.

HCPs must better therefore understand and address religious and cultural concerns for their patients when they are planning diet regimens and education programmes. This finding showed that patients with T2DM are struggling to eat healthy food, both at home and at any social event they may be attending. A possible explanation for this may be the lack of awareness in the community about food that is suitable for diabetic patients. This is similar to findings in the Iranian context, where a study indicated that social barriers such as lack of public awareness about diabetes, lack of family support, and unsupportive macro-environments were negatively affecting diabetes self-care among people with T2DM (Shakibazadeh et al., 2011).

## **Gender**

The responses indicated gender differences in patient views of spousal support. The male participants acknowledged that their wives supported them in managing their diabetes; the men particularly noted that their wives supported them in relation to their diet, taking medication, and exercise. However, female participants often received no support at home. This is similar to findings from Iran and Canada which showed that men report receiving support from their family, while women do not (Shakibazadeh et al., 2011; Wong, Gucciardi, & Grace, 2005). This trend may be compounded in Saudi Arabia by the cultural expectation that women stay at home and act as caregivers for the family. Gender roles are greatly influenced by society and culture (Okoro, Barksdale, & Fisher, 2017), yet in general, females usually place the needs of others ahead of their own needs and provide support for all their family members and friends (Tamres, Janicki, & Helgeson, 2002; Taylor, 2007; Park & Kim, 2012). This is significant, as

individuals with T2DM need support from their spouses to help them manage their diabetes. HCPs therefore need to consider gender differences, in particular the fact that females do not receive any support from their husbands. HCPs should thus provide care and support for them and address this issue with patients and their families during health education.

## **Stigma**

The current participants indicated that they had been stigmatised directly and that they perceived that the stigma related to T2DM was also experienced by and received from family and friends. Similarly, an Australian study found that patients with T2DM experienced and perceived stigmatisation related to their diabetes (Browne, Ventura, Mosely, & Speight, 2013). This study also indicated that female participants felt additional stigmatisation about their diabetes as their immediate families were hiding their illness from other family members so that other daughters in the family would be able to marry. Another finding in this present study was that young females were struggling to marry due to their illness, which affected the management of their diabetes; some male participants even reported that they would not allow their children to get married to a person with DM. A possible explanation for this is that lack of awareness in the community about DM and a cultural stigma around chronic illnesses such as diabetes, which leads families not to offer their sons to females with chronic conditions. A study carried out in South Asia also found that families there feared the community finding out about illness in one of their family members as such illness would threaten the marriage options of younger female family members in the South Asian community (Goenka, Dobson, Patel, & O'Hare, 2004). This current study similarly showed that the stigma surrounding diabetes affects female patients; being diabetic affects their married lives and some females were struggling to get married due to their diabetes, while other patients' marriages had broken down because of their diabetes and they had been divorced.

The present study highlights that participants have experiences with stigmatisation related to their illness that affects management of their diabetes. Most of the stigma comes from family members, relatives, or friends. Some participants mentioned that they are criticised when they take medication in front of other people. Consistent with previous studies, experiencing diabetes-related stigma had psychological and behavioural consequences (Shiu, Kwan, & Wong, 2003; Wellard, Rennie, & King, 2008; Browne et al., 2013). Patients described an unwillingness to disclose their T2DM to others, which may have dangerous consequences in

the event of a medical emergency (Shiu et al., 2003; Wellard et al., 2008; Browne et al., 2013). The stigma may also affect patients' diabetes self-care activities, as some patients highlighted that they avoid taking their medication in front of others (Jeragh-Alhaddad et al., 2015). Social stigma related to the diagnosis of DM seemed to most heavily influence patients' adherence to their medications. Jeragh-Alhaddad et al. (2015) indicated that some participants stated that they would never take their pills in front of others for fear of being stigmatised for having the illness. A possible explanation for this is that diabetes has no cure, and the complications are serious and dangerous; thus, people feel sorry for diabetic patients. However, there may be cultural misunderstanding of the nature of DM as a disease. Another explanation is that T2DM is related to genetics and public do not differentiate between T1DM and T2DM. As one of the main causes of T2DM is lifestyle, the study found that patients prefer to remain at home and not meet anyone due to comments made about their DM, which cause them to feel stigmatised when their appearance and their disease are criticised. Surprisingly, this present study also found that patients felt that diabetes disabled them as their children took over their roles at home or cared excessively for them. This over caring from a caregiver may make patients feel as though someone is always observing them. The stigma surrounding T2DM due to lack of public awareness affects patients' diabetes management, suggesting that increased community knowledge about DM is essential.

This present study highlighted that female participants in particular hide their diabetes from family members and friends due to feeling ashamed and embarrassed about their condition. Similarly, another study found that females with GDM felt ashamed and embarrassed to have GDM, and were therefore worried about their families' reactions (Wazqar & Evans, 2012). Some studies also show that people with DM hide their disease from both family and friends (Scollan-Koliopoulos, 2004; Tessaro, Smith, and Rye, 2005; Wazqar & Evans, 2012). One study found that patients with DM were hiding their disease from people in order to appear normal (Celik, Kelleci & Satman, 2005). One explanation for this is a lack of family awareness, in particular from husbands, which causes female patients to worry and be scared about being sick for cultural reasons. They may also wish to avoid any family problems that may cause their husband to marry another woman and/or divorce them. This study found that female patients experienced family problems due to being diabetic, and females with DM may bear the brunt of certain social practices due to worries that their husband will marry another female in better health (Ahmad, Hussein, Kheir, & Ahmad, 2001). As discussed in the literature

review, a man can marry four females as allowed by Islam, but women cannot marry more than one man. If the wife has a chronic disease, this may thus trigger polygamy. As a result, one study found that females with diabetes were hiding their diseases from their husbands for a long time (Ahmad et al., 2001). HCPs need to educate patients and their families about DM to increase their knowledge and promote good outcomes in diabetes management. The present study also found that gender differences between HCPs and patients played an important role in the delivery and receipt of care.

Diabetes-related stigma is one of the most pertinent findings in this present study, particularly from an Islamic perspective, and it influences and shapes all features of the life of Saudi people. For Muslims, everything is explained in terms of God's will, including illness. Diabetes-related social stigma thus appears to have impacted on T2DM patients' ability to manage their condition. However, the religion of Islam supports human wellbeing in both soul and body, so HCPs can raise religious and health awareness in a positive non-stigmatising way for family and community during the delivery of educational programmes.

### **Workplace-related factors**

The interview findings identified five major workplace-related factors: lack of time, patient denial, patients missing appointments, unmanageable workload, and lack of training and resources.

*Lack of time;* in this study, both patients and HCPs reported lack of time as a major factor affecting delivery of care and health education. The most probable explanation is that diabetic clinic patients only have a few minutes with HCPs due to the fact that there are other patients waiting. Another finding from this study is that patients reported that this lack of time led to HCPs not listening to them, as it may mean HCPs are busy finishing paperwork on a file, prescribing medication, or checking blood test results. A barrier commonly cited by HCPs was similarly a lack of time to develop support for diabetic patients in order to understand their concerns and to adopt individually tailored methods (Stuckey et al., 2015). Each patient requires adequate time with their HCPs in order to learn how to manage their diabetes, discuss their condition with their HCPs, and develop a good relationships with them. The current study results suggests that each patient needs to have more time with their HCP; in particular, patients should meet with their HCPs two to three times per year, which complies with the policy of two centres from which the data were collected. This current study found that, due to lack of

time, HCPs are not currently able to educate their patients in an appropriate way. A possible explanation for this is that each patient has different needs and approaches to being educated, and the time spent on health education is also dependent on the topic. Therefore, where HCPs do not have adequate time for their patients, this affects the quality of education and may also affect patients' understanding of such education and HCPs' proper understanding of patient conditions. The findings from this study also suggest that inadequate time spent with HCPs may also be connected to a lack of trust in HCPs by patients.

*Patient denial;* this study found that patients deny their illness and the dangers of diabetes, and that this denial of the disease leads to patients overlooking or minimising the seriousness of DM. The findings also reveal the shock or fear of diabetes that patients feel, and the difficulties this causes in implementing the necessary lifestyle changes. Some participants appeared to be in denial for several reasons. This agrees with another study that concluded that, in patients with T2DM, denial of disease increases over time during the first five years of the development of diabetes, and that this is connected with poor metabolic control (Garay-Sevilla et al., 1999).

This study found that patient denial also affected acceptance of treatment and health education, and patients' denial of their disease was the biggest challenge faced by HCPs. The current results also suggest that health education can support patients in understanding the nature of DM, as well as demonstrating the need for psychological support for patients during diagnosis.

The current study found that patients with T2DM require psychological support during diagnosis, alongside health education to assist in them understanding the condition and how to manage it. This study suggests that additional psychological support received by patients during diagnosis could help such patients to accept and cope with their illness.

*Patients missing appointments;* this study found that those patients who missed their appointments frequently faced a high risk of developing diabetes complications. Similarly, another study found that missing scheduled medical appointments was related to higher HbA1c levels, an indicator of mortality, as well as poor adherence to oral medication (Karter et al., 2004). The current study also found that patients missing their appointments had a negative impact on the management of their diabetes. Several reasons emerged for the patient missing their appointment, including lack of money, particularly where patients did not have the money for transportation to come to their appointment if the patient's house is located a long way from the diabetic clinic. Another possible explanation is that, as most participants in this study were

female, this may be due to cultural factors. Saudi women are not able to go out by themselves to attend appointments, and previous Saudi studies have found that participants reported that lack of transport and forgetfulness were the main reasons for missing their diabetes clinical appointments (Khan et al., 2012). As discussed in the literature review, in Saudi Arabia there is no public transportation, and patients must use a car or taxi to come to the diabetic clinic.

Another reason for patients missing their appointments was missing patient files, which mean the patient is not able to attend their appointment and must make another appointment. One participant in this study reported that they felt frustrated when they came to their appointment on time and waited for a long time, but as their file was missing due to the medical record department failing to bring their file to the diabetic clinic, they needed to make another appointment. The patient file has all the information required to help HCPs assess the patient's condition, and as a result, some HCPs depend on the patient's file in order to give appropriate care. While the diabetic clinic uses a computer database, nevertheless, patient files are also used.

The study found consistent indications that reminder systems improve patients' appointment attendance rates (McLean et al., 2016). The current study found that another reason for patients missing their appointments was the lack of such a reminder system, which facilitated patients forgetting their appointments. One possible explanation for these results may be the long duration between appointments (three or six months). A reminder system in the diabetic clinic would be very helpful for diabetic patients to enable them to remember to attend their appointments. The current study found that patient failure to attend clinic appointments resulted from poor access to services, which also affected patients' management of their diabetes.

*Unmanageable workload;* this study found that heavy workload affected patient care. The HCP participants reported that they had a lot of work to do in the diabetic clinic that was only indirectly related to patient care, and this was described by some HCPs as a barrier to patient care. Similarly, several studies found that a heavy nursing workload seems likely to be connected with suboptimal patient care and may lead to reduced patient satisfaction (Keijsers, Schaufeli, LeBlanc, Zwerts, & Miranda, 1995; Anderson & Maloney, 1998; Aiken, Clarke, Sloane, Sochalski, & Silber, 2002).

One possible explanation is that HCPs are responsible for clinic arrangements, calling patients, requesting supplies, and creating patient censuses. As noted in the literature review, high



workloads and staff shortages are strongly related to decreased quality of patient care. Another explanation is that there may be a shortage of staff. It was reported by HCPs that one member of staff in the diabetic clinic may see 30 to 40 patients per day, and it is difficult to educate patients in an effective way with such large numbers. The current study showed that crowded, busy clinics and shortages of staff had a negative impact on patient care and the patients' relationships with HCPs. These crowded diabetes clinics also cannot support or activate diabetes self-care activities among people with T2DM.

*Lack of training and resources;* HCP participants reported that they required training to support them in improving their patient-education skills. Continuous training on advances in diabetes management for HCPs is necessary so that they can deliver optimal care for their patients (Stuckey et al., 2015). As discussed in the literature review, a lack of continuous training programmes for diabetes education providers is one of the many barriers to good patient care. This study found that lack of training for HCPs affected patients; some patients felt bored by the use of the same information and teaching methods, and as a result they stopped attending the diabetic educator clinic. HCPs do desire to update their information and gain new skills that will assist them in delivering health education and giving care, especially in the face of new fast-changing information in the medical field, which necessitates continuous training of HCPs. The current study showed that a lack of resources also has an impact on patient education, and other studies have reported that a lack of educational facilities is involved in the failure of patient education (Abazari, Vanaki, Mohammadi, & Amini, 2012). The probable explanation for this result is that patient education requires both facilities and educational materials suitable to differing ages and needs. The current study indicates that HCPs do not have continuous training to improve their skills in patient care or education to support their patients in managing their illnesses. Another finding was that there is a lack of resources supporting HCPs in terms of patient education. Continuous training of HCPs is thus needed in order for them to update their knowledge, which can help improve patients' management of diabetes. Additionally, resources need to be made available for patient education to support HCPs in teaching patients how to manage their diabetes and practise diabetes self-care activities in their daily lives.

## **Changes needed in patient management**

The current study found that several changes were needed to assist in effectively managing diabetic patients. These changes include collaboration among doctors, dieticians, and diabetic educators and communicating with patients at home and by using new technology.

*Collaboration among doctors, dieticians, and diabetic educators;* the current study found a lack of teamwork within the diabetes healthcare teams. HCPs reported that they were working with patients alone, which affects patient care. The study found that HCPs reported that lack of collaboration within the diabetic healthcare teams and the limited teamwork available prevented diabetes care from being carried out in an organised manner (Stuckey et al., 2015). As noted in the literature review, inadequate collaboration within diabetes healthcare teams can negatively affect the level of patient care. One possible explanation for this may be that the team members have different roles within the team, and cooperation is necessary among HCPs for the benefit of patients. For example, diabetic educators need to know about the medication patients are taking and the reason for any changes in dosage, as this information will help with patient education. Patients in the current study reported confusion between their doctor's instructions and the diabetic educator's information regarding their medication. One possible explanation for this is lack of communication between HCPs, with the doctor being focused on prescribing the medication that the patient needs, while the diabetic educator is focused on education that helps the patient take their medication. Better communication between HCPs would ensure that their information would be similar and complementary, and as a result, patients would not feel so confused. This lack of teamwork among HCPs affects patients' diabetes self-care activities. This study also found that patients trusted the doctor's information rather than that of other HCPs. This result may be related to culture, as the Arabic-speaking community gives doctors more prestige than other HCPs. These findings show that cooperation between HCPs is required to deliver optimal care to patients, which could result in patients better managing their diabetes.

*Communicating with patients at home and using new technology;* Patients with T2DM require continuous connections with their HCPs in order to manage their diabetes. The key finding that emerged is the importance of communicating with patients at home, to help motivate them towards continuous diabetes self-care. This is especially relevant as HCPs only meet patients for a few minutes in the clinics. One participant in this study reported that using new technology

to communicate with patients would help support patients at home to practise diabetes self-care activities. Similarly, a previous study indicated that patients with DM who used secure messaging more often to communicate with HCPs had better blood sugar control (Harris, Haneuse, Martin, & Ralston, 2009). Secure messaging helps allow better glycaemic control by satisfying patients' otherwise unmet needs for care (Harris et al., 2009). As discussed in the literature review, using new technology to communicate with patients outside of the clinical environment may help to improve overall patient-provider communication relevant to diabetes care. Secure messaging can also be used by HCPs to recommend medication changes between in-person visits, thus enhancing treatment regimens more quickly (Harris et al., 2009). Another finding from this study is the possibility of activation of patients' education in the waiting room. Usually, patients are seated in the waiting room while waiting for their appointment to see the doctor, offering the possibility to provide a screen or poster that educates patients about managing their diabetes.

To enhance diabetes care in Saudi Arabia requires a better understanding of key cultural determinants, social support, stigma, gender differences between HCPs and patients, and the gender roles of patients. In today's society, it is inadequate to simply suggest that diabetes self-care activities do not meet the modern way of life in Saudi Arabia. Rather, these issues must be addressed.

The findings of this study indicate that support from family, friends, spouses and HCPs are an important source of encouragement for patients with T2DM, helping them to adhere to their treatment and manage their diabetes. This is consistent with literature on T2DM in Saudi Arabia, which suggests that religion and a collectivist culture encourage people to take care of one another (Al-Balad, 2014). Social support theory is clearly applicable to the Saudi Arabian context, and HCPs can maximize the benefits by embracing the support offered to patients from family, friends and spouses, as this can help patients to self-care and more effectively manage their diabetes. It is important, therefore, that diabetes care services include family members where possible, as patients and families represent a single unit in Saudi Arabia.

It should be acknowledged, however, that tensions do exist between religion and culture. Religious practices are potentially well placed to support healthy living through eating in moderation; avoiding alcohol, tobacco and all psychoactive substances; frequent exercise; regular prayer; and fasting (El-Kadi, 1993). The relatively low levels of adherence to exercise

and diet in this study appear to be due to culture. This is consistent with the literature, which highlights how Saudi culture is associated with eating large meals that are high in calories. Furthermore, women are often discouraged from exercising outdoors (Ali, Baynouna and Bernsen, 2010; Al-Nuaim, 2014). However, religion is a helpful resource for HCPs in diabetes patient care, and can promote self-efficacy by motivating patients to effectively follow a personal care plan to control blood sugar and manage their condition. In this way, individuals carrying out self-care practices can promote effective self-management of T2DM (Al-Khawaldeh et al., 2012).

Another area of tension between religion and culture concerns gender roles. The findings of this study reveal that the majority of women do not receive any support from their families or spouse. Whilst religious Islamic texts espouse spiritual equality between men and women, Arabic culture perceives men to be more powerful. Strategies are needed to address this imbalance.

In summary, an important aim of this study was to investigate the extent to which healthcare professionals and social support act as determinants of self-care among adults diagnosed with T2DM in Riyadh, Saudi Arabia. The importance of concepts such as self-care and social support has been highlighted, and the findings can help us to refine our understanding of key theories in a Saudi Arabian context. In general terms, a collectivist culture is a good fit with social support; however, there are areas where placing an emphasis on religion rather than culture would be more effective (for example, in terms of exercise, diet and gender roles).

## **6.5. Conclusion**

This chapter integrated the findings and discussed them in relation to the findings of other studies in order to examine the impact of demographic factors and the role of social support in improving adherence to self-care activities among Saudi patients with T2DM. Patients generally had several measures in place to help them manage their diabetes, each of which supported varying levels of successful adherence. Among these measures, taking medication had the highest level of adherence. For successful diabetes management, however, healthcare providers must emphasise the importance of following a regimen that includes all required self-care activities. This is particularly important, as the findings overall uncovered poor compliance with diabetes self-care activities among patients with T2DM in Riyadh, Saudi Arabia.

The present study found that factors affecting self-care are related to culture, religion, gender, social support, and stigma. The findings showed the importance of social support from family, friends, spouses, and HCPs. The main reasons for poor practice of diabetes self-care activities among participants in this study were lack of social support, lack of community awareness about diabetes self-care activities, lack of facilities in the patients' environment such as a lack of places to exercise, and issues with sourcing healthy food suitable for people with T2DM at social events, work, and in the home.

There is a definite need for improvement in terms of health education and training for patients with T2DM. The findings indicate a lack of training and skills among HCPs, which affects diabetes patient care, indicating a further need for improvements in the health system overall, and in HCP training in particular. HCPs must focus on including patients' families in their education sessions so that they can provide support for individuals with T2DM to help them continuously practise diabetes self-care activities. HCPs should also increase their levels of team collaboration in order to provide appropriate care for patients with T2DM. Healthcare in Saudi Arabia overall must recognise and integrate culture, religion, and stigma in its educational functions.

Saudi Arabian culture is underpinned by the extended family, with close-knit extended families and stronger social relations characterising interpersonal relationships. Grandmothers and grandfathers benefit from living with their children and grandchildren, with younger generations being taught to value and respect their forebears' wisdom and experience. Therefore, the concept of social support in Saudi Arabia may relate to culture, which is likely to vary from established practices in Western culture that tend to focus on individualism and the nuclear family. In the Saudi Arabian community, support provided by family motivates those with chronic diseases such as diabetes towards high self-efficacy in managing their condition. There are also other facets to social support, such as education, love, inspiration, and care for patients with T2DM, which enable them to practise self-care activities on a day-to-day basis. As a result, self-efficacy theory and social support can underpin healthcare policy and practice in Saudi Arabia particularly in terms of understanding aspects of Saudi patients' self-care that require support from family, friends, spouses, and healthcare professionals. The findings of the current study suggest that factors such as culture and religion, stigma, gender, and lack of social support act as barriers to adherence to diabetes self-care activities among Saudi patients with T2DM.

### **The key findings in this chapter:**

- Social environmental factors form major barriers to effective diabetes management. Lack of awareness about DM management and lack of facilities in patients' environments, such as places for exercise, also affect diabetes management.
- Patients have a good understanding of the importance of adherence to diet in terms of controlling their blood sugar levels; however, patients still have difficulty following diet plans, and most patients with T2DM eat what their families eat or what is served at the social events that they attend. Thus, family support plays an important role in patients' adherence to diet plans.
- The economic level of patients with T2DM affects their ability to register at a gym to exercise; HCPs must therefore strive to understand the economic status of their patients so that they can advise them how to manage their DM without economic hardship.
- There is a lack of knowledge among participants relating to the essential nature of monitoring blood sugar in terms of both how to use a glucometer at home and the purpose or aim of checking blood sugar levels regularly at home. HCPs must actively teach patients according to their needs and emphasise the importance of maintaining stable blood sugar levels.
- Social support from family members plays an important role in assisting individuals with T2DM in controlling their diabetes. Social support from families is greater among those families who have another member with DM. Similar results were seen in terms of support from friends; patients with T2DM received more support from their friends who also had diabetes. As a corollary, this study found that a lack of social support from family and friends affected patients' ability to manage their diabetes.
- Many patients denied their illnesses, indicating that patients with T2DM require psychological support during diagnosis and health education to understand what is happening to them and how to manage it. This study suggests that early psychological support should be given to patients during diagnosis to help them to accept and cope with their illness.
- Lack of time and unmanageable workloads affect HCP performance. A clear job description that delivers good care to patients is required for all HCPs, and the number of staff should be sufficient to provide high quality care and reduce clinic crowding, allowing HCPs enough time to talk with their patients properly.

- HCPs face several challenges in terms of providing patient care, some related to work environment conditions and others related to their skills. HCPs require more training in diabetes patient care, and additional resources to help them educate patients using different approaches. This would positively affect patient education and impact diabetes management.
- The lack of continuous training for HCPs affects their patient care, while the lack of educational facilities makes it difficult to educate a variety of patients. Healthcare organisations must improve generally and make policies that support continuous education and training for diabetes healthcare teams to help them with diabetic patient management.
- Generally, participants displayed poor adherence to diabetes self-care activities. This is likely due to poor education about diabetes self-care activities. HCPs need more training and resources to support patient education and must also focus on individual education and educating patients according to their needs. HCPs must also be aware of the role gender differences play in patient education in Saudi Arabia.
- Where the main barriers to diabetes self-care activities are cultural, HCPs should work together with the community to educate people about diabetes, including how to manage and prevent it.

The following chapter will present the conclusion of this thesis, and comment on its contribution to knowledge, including its strengths and limitations. Several of the recommendations listed above will also be further clarified to underpin the future development of service delivery.

## **CHAPTER SEVEN: CONCLUSIONS AND RECOMMENDATIONS**

### **7.1. Introduction**

This final chapter sets out the conclusions and recommendations arising from this study. The chapter begins with a discussion of the contribution to knowledge, followed by the limitations of this study. Following this, recommendations are offered for policy and practice, and a dissemination plan and suggestions for future research are also set out. Finally, the researcher offers a reflective commentary.

### **7.2. Contribution to knowledge**

The study generated the following contributions to knowledge:

- The best of my knowledge, this is the first study to focus on of the role of HCPs and social support in diabetes self-care activities in Saudi Arabia. This study is not only the first to examine the relationship between these issues in Saudi Arabia, but it has also generated and analysed a significant amount of qualitative and quantitative data on this topic. As such, it provides an in-depth understanding of the support diabetic patients receive to encourage the implementation of diabetes self-care activities and manage their condition.
- The study generates unique findings and a deeper understanding of how diabetes self-care activities are performed among Saudi patients with T2DM. The study identified the self-care and social support status of patients in Saudi Arabia and shows that religion, culture, stigma, gender and social support are all key factors that influence self-care among patients with T2DM in Saudi Arabia. More specifically, this study found that cultural factors, such as the gender roles of participants, are deeply related to T2DM management. This contributes to the growing body of literature in other Arabic-speaking countries such as Kuwait (Alragum, 2008) and Lebanon (Sukkarieh, 2011), as well as Saudi Arabia itself (Aljohani, 2011), and there is still some uniqueness to Saudi culture compared to other Arab countries. However, the present study is the first to identify that cultural factors, such as gender differences between HCPs and patients, are affecting patient diabetes self-management education.
- This study is the first to identify the role family members, friends and the community and their attitudes towards diabetes, as well as stigmas held by HCPs towards people



with T2DM in Saudi Arabia. The study identified that psychological support for patients with T2DM from family members and HCPs is important and encouraged them to better manage their diabetes. These are significant findings as they contribute to the understanding of T2DM in Saudi Arabia and have the potential to help inform changes to the way diabetes management is approached in the Saudi Ministry of Health and the wider healthcare system, with a view to improving the self-care activities among people with diabetes in Saudi Arabia.

The use of mixed methods strengthened this study by providing clear and comprehensive data to support the understanding of the qualitative findings (Best, 2012). The mixed methods approach is common in healthcare research and it is used to evidence as well as to discover complex problems in healthcare systems (Doyle, Brady & Byrne, 2009). This study used the concurrent triangulation design, and this design allowed the application of both qualitative and quantitative approaches to produce independent findings, allowing the results from both methods to be combined for interpretation. This assisted the researcher in shaping the priorities of findings, factors affecting the practice of diabetes self-care activities (such as culture and stigma), and how to manage them. Triangulation has aided the researcher's contribution to knowledge, and produced an improved, holistic and detailed evaluation of self-management strategies for diabetics. Also, the mixed methods approach produces more data than a single method alone, and allows the researcher to examine a number of factors in one study (Daymon & Holloway, 2010).

By applying the critique of conceptual frameworks, self-efficacy theory and social support theory, and by using the empirical evidence to investigate their relevance to a diabetes population in Saudi Arabia, this study introduced a valuable approach to assessing diabetes patient care. This enables the decision makers in the MOH and HCPs to identify and manage factors that could affect diabetic patient care, in order that they can improve the quality of their caregiving standards. This framework (self-efficacy theory and Cohen's social support theory) supports the findings of the present study. More specifically, efficacy theory highlights those individuals with high awareness of carrying out a certain behaviour (such as diabetes self-care activities), along with the existence of a supportive environment (such as HCPs, family, spouse and friends' support) as factors that impact the desired outcome (such as practising diabetes self-care activities and managing T2DM). The findings of this study are consistent with those of Bandura (1997) in that people tend to avoid activities that they believe exceed their abilities,

and there is a positive relationship between self-efficacy and self-care activities. As such, it is clear that HCPs in Saudi Arabia need to understand how to educate and support their patients in order to for them to achieve a high level of self-efficacy when practising self-care activities.

The aim of this study is to advance self-management research in Saudi Arabia and provide the evidence that can subsequently be translated into improved healthcare policies and procedures. To the best of my knowledge, this is the first study produced on the topic by a healthcare professional, and it is hoped that nurses and other HCPs will contribute their own findings to the literature on the self-management of diabetes. In this way, the present study builds a foundation of evidence-based procedures and policies that will make self-management of diabetes a reality in Saudi Arabia. In order for health outcomes for T2DM patients to improve in Saudi Arabia, both patients and their families need to be committed to following the self-management plans produced by healthcare professionals. It is hoped that by disseminating these research findings, healthcare providers, managers, and MOH policy and decision makers, will refocus on the benefits of diabetes management, and recognise the need to provide healthcare professionals and social support for diabetics who wish to follow a programme of self-care in the Saudi Arabian healthcare system.

### **7.3. Limitations**

This study has certain limitations that should be acknowledged. First, the sample consisted of patients with T2DM attending diabetic centres in public hospitals in Riyadh, and so the result may not be applicable to a primary healthcare setting, nor may it be generalisable to all Saudi patients with T2DM, because there were 388 survey respondents and 20 patients for interviews. Secondly, the sample of HCPs only included diabetic educators, diabetic nurses and staff nurses, and other HCPs were not included. Therefore, including all diabetic healthcare teams would have provided other perceptions on the role and support of HCPs in improving diabetes self-care activities among Saudi patients with T2DM. Nevertheless, as noted above, this study was conducted in Riyadh, the capital of Saudi Arabia and the largest city with the highest population density. In addition, this study contributes to knowledge of self-care activities for people with T2DM in Saudi Arabia.

#### **7.4. Recommendations for Policy**

In order to improve both the quality of care and overall health outcomes for people with T2DM in Saudi Arabia, the following recommendations are offered:

- The Ministry of Health should revise the education strategy for diabetic patients and develop health education campaigns that focus on the patient's family as well as the individual with T2DM. This can be achieved by health education presentations for the families of patients in order to improve their awareness of DM management. These presentations could be given in the hospital, or by means of information packs given to the patients to share with their families, or digitally by means of apps/web resources.
- The Ministry of Health should assess the needs of the healthcare professionals regularly. This can be achieved by investing in a new strategy to regularly assess the work performance of diabetic healthcare teams, with a focus on continuing professional development and providing training courses where needed.
- The Ministry of Health should work in conjunction with religious authorities and reach a greater audience by spreading the message of health awareness through places of worship, i.e. mosques. This can be achieved by providing training courses for religious authorities regarding DM and involving them in educating the public about DM by working together with HCPs.

#### **7.5. Recommendations for Practice**

This study provides a number of recommendations on how to present, popularise and monitor diabetes self-management practice in Saudi Arabia.

- HCPs need to provide guidance and a treatment plan uniquely suited to each individual patient. Because inadequate self-care activities mainly stem from external factors, such as weak family support and cultural prejudices, women appear to be more exposed to these factors than men, and healthcare professionals need to concentrate on confronting these prejudices in the community, and the cultural and social issues that hamper self-management activities. Furthermore, there is a need for the practice of further education that highlights the cultural and religious stigmas that affect diabetes self-care activities among T2DM patients in Saudi Arabia. This would help HCPs tailor an education for each patient according to their needs and societal role.

- The dissemination of leaflets that give information to patients and which can be shared and read with their family need to be widely circulated. Health education information that is delivered through TV channels and social media is also required. Cultural factors (e.g. gender roles of the participants related to T2DM management) have the greatest impact on patient self-care activity. This might include the impact of receiving care from a HCP of a different gender, or the varying levels of support from spouses and family members. These can have either positive or negative effects on diabetes self-care activity depending on each patient's cultural framework. The findings also indicate that family support, spousal support, and HCP support were very important in successfully encouraging patients to engage in diabetes self-care activities, and that female patients may not always be receiving such support. It is thus recommended that patients with T2DM and their family members should receive adequate information about diabetes and self-care activities from HCPs in the early stages of diagnosis.
- Support from family and spouses helps individuals with T2DM to perform diabetes self-care activities and manage their diabetes, because they feel that someone cares about them and that they are being looked after. Support from family and spouses is a requirement of people with T2DM in order for them to continuously practise diabetes self-care activities and motivate them to develop good lifestyle habits. In practice, public health education is required to achieve this.
- This study's findings can inform the care of Type 2 diabetes patients by healthcare professionals in Saudi Arabia, and provide them with the information they need on the current status of self-care, and how this can be expanded upon. The contents of this study provides healthcare professionals with feedback on how they are dealing with Type 2 diabetes patients, and gives them information on self-care which they can pass on and share with patients. A copy of this study will be given to the MOH, and both diabetic centres in Riyadh. Also, the researcher will present lectures and lead a workshop on the findings of this study to HCPs. These presentations will be described in the following section on dissemination.

## **7.6. Dissemination Plan**

I have disseminated the preliminary results of this study through several presentations (see Appendix 19). This research has investigated the extent to which the role of healthcare professionals and social support act as determinants of self-care among adults diagnosed with

T2DM in Riyadh, Saudi Arabia. The study has sought to increase the awareness of patients, their families and their community about the importance of adherence to diabetes self-care activities for diabetes management. It has also sought to identify the need for continuous training, updated resources and the appropriate healthcare environment to help HCPs deliver quality care and support the activation of diabetes self-care among patients with T2DM. The results will be disseminated in the following ways:

- An electronic copy of this thesis will be available on the University of Salford institutional repository, which means that it will be available through Google Scholar and other search engines.
- A copy of the results will be sent to the MOH in Saudi Arabia in order to consider and raise awareness of the importance of continuous training for the diabetes healthcare team, and the involvement the patient family members in patient health education. Following this, the researcher will request to meet the directors of the MOH, being the General Director of Health Affairs in the cities of Saudi Arabia, in order to hold a seminar on the results of this study, and to consider how the research results can support HCPs in the development of an action plan for patients with chronic conditions such as DM. In addition, the researcher will conduct a presentation and workshop regarding the findings for HCPs in the hospitals where my research was conducted. After this, a summary of these results will be published in a Saudi Arabian newspaper (such as Al Riyadh and Al Jazirah) in Arabic to increase awareness of this study among the Saudi healthcare teams and local communities.
- The publication of the results of this study in a national (*Journal of Health Specialties*) and international journals (*Nurse Prescribing*). The researcher has already co-authored two journal articles on related topics (see Appendix 18) and so is aware of the amount of work and time that goes into journal publication. The findings will be presented at national conferences (such as Science, Health and Medicine Conferences) and international conferences (such as Diabetes UK Professional Conference).

### **7.7. Suggestions for future research**

Future research needs to examine the relationship between social support and diabetes self-care activities among Saudi adults with T2DM by using a mixed methods approach. More national studies are needed to assess family support and diabetes self-care activities among Saudi adults

with T2DM. Such research may well be carried out to discover the implications of the impact of culture and stigma in diabetes self-care management, where the participants include patients and their families, and such research would assist HCPs in understanding the challenges facing patients in managing their diabetes at home and in the community.

### **7.8. Reflexivity**

It is important to consider reflexivity before concluding the present study. Patton (1990) describes reflexivity as a process in which researchers conduct explicit self-awareness. Furthermore, Finlay (2002:532) defines it as thoughtful, conscious self-awareness and the continual assessment of subjective responses, inter-subjective dynamics, and the actual research procedure. Pyett (2003) adds that it is an assessment of individual roles in building meaning.

I arrived in Manchester in September 2014, eager to begin my doctoral studies in a new country as an international student from Saudi Arabia. I chose to travel to the UK for my degree to broaden my academic and personal horizons. Studying abroad in the western world in a different language was not easy, because English is not my first language, and so the process of writing my thesis was challenging. Therefore, I attended English academic classes and seminars and also obtained the help of a proofreader and received feedback and comments from my supervisor in order to produce a well-written thesis.

I felt very welcome among the university staff and in the city. It has given me access to a new culture and a new life – it is very multicultural, yet totally integrated. The University also has very good industrial connections and international links, and so I was able to understand a different way of thinking and understanding. Adaptation to the weather and social environment in Manchester was a significant change in my life. Living with my husband in Manchester provided much motivation and support during the process of the PhD study.

In Saudi Arabia, I have a very successful professional career. I fulfilled the role of a Hospital Nursing Director for ten years, and my work was concerned with coordinating, planning and directing the overall clinical nursing practices in the hospital. My research experience was quantitative studies, which is the most common method of research conducted in my workplace in Saudi Arabia. In this PhD study, I initially set out to use quantitative research methods, but after one year, at my Internal Assessment, the examiners recommended that I change to mixed

methods. Following this discussion, I appreciated the need for a change to mixed methods research in order to see other perspectives and obtain richer data. This was not anticipated when I planned the study. I realised it would require time and effort, and therefore I attended a lot of methods courses and seminars, (including qualitative, quantitative and mixed methods) and I also read a lot of methods literature and analysed other mixed methods studies. This process helped me to understand the nature, practice and application of mixed methods research, and also improved my analytical thinking and research interpretation skills.

Structuring my research within an overarching theoretical framework was a challenge, as I needed to make sure that this theoretical framework would be able to accurately interpret the study's findings. To achieve this, I reviewed my research question and the objective of my study. I was thrilled when, with the help of my supervisors, we found the theories that were best-suited to my research area, as this was a lengthy process. The chosen theory guides the type of study questions that are asked and the type of answers that are to be expected. I decided that this study would adopt two conceptual models which would form the framework for this study, where the first was based on conceptualisation of self-efficacy theory and the second on the social support theory of Cohen (1988).

I sought ethical approval from both the University of Salford and the Ministry of Health in Saudi Arabia, and I believe this was crucial in ensuring that the mixed methods approach research adhered to a moral and ethical framework. This minimised any power imbalances by ensuring transparency between the researcher and the participants. It is also my belief that, when participants are informed of their right to withdraw from participation, this motivates researchers to conduct studies more ethically, since they face the possibility of losing data if participants choose to withdraw from the study.

I began data collection when I arrived in Riyadh in January 2016. I found it difficult to recruit HCP participants because the majority were busy and had a lot of patients to see to. However, this was achieved by carrying out interviews with them in their offices. The outset of the interview process with HCPs was difficult due to interruptions from staff or patients, and ultimately, HCPs agreed to carry out the interviews during their breaks or free time. During data collection I was required to go to Hospital A for two days and to Hospital B for three days.

While conducting this study's data collection in Riyadh (after I had completed the fieldwork and was working on transcription), I became unwell, suffering from pneumonia, and was

admitted to hospital for one night. It was difficult to concentrate on the research under these circumstances. However, with the support of my husband and family, I was able to do it. This episode reminded me of the importance of our health.

When considering my insider/outsider role, on the one hand, I may be considered an ‘outsider’ because I do not work as a doctor or a diabetes educator and am also not a diabetes patient in any of the clinical settings in Riyadh where the research was conducted. However, as an outsider I had the advantage of becoming an observer and I did not take for granted the environment of the research setting. On the other hand, becoming an ‘insider’ gave me an advantage, as I was able to gain information based on my background as a nurse; I was able to enter hospitals and communicate with both patients and HCPs, even though I knew little or nothing about patient care at these centres. As a researcher, both ‘insider’ and ‘outsider’ roles seem to have significance in process of conducting an interview for this study. For this reason, it is important for the researcher to uphold reflexivity throughout the research process. Thus, although I am an outsider in the context of diabetes care, I can also be considered an insider within the nursing profession, and both of these experiences were highly beneficial. It demonstrated the significance of successfully communicating with ‘gate keepers’ and in obtaining their co-operation during the data collection process. This experience has given me a greater understanding of the significance of obtaining insight from those working in the healthcare profession and those suffering from diabetes, in order to enhance the quality of care and service delivery. Using the mixed methods research approach, which regards research methods as a continuum, I discovered that my insider/outsider research position resembled this, since I frequently shifted between the insider/outsider research roles. Another advantage of being an ‘insider’ researcher is that I have a good understanding Saudi culture, which meant that I knew how to ask questions and gather information from the participants in a culturally appropriate way.

I conducted this study independently, and my supervisors, colleagues and postgraduate research students were closely involved. I conversed with them about the research process and listened carefully to their feedback at all stages of the study. This enabled me to create a clear audit trail of decisions throughout the research process. It was challenging for me to carry out the qualitative interviews, due to the fact that some participants (particularly males) did not wish to talk to me. Their hesitance may have resulted from a number of factors, including the unique social, religious and cultural determinants within the Saudi community which



segregates men and women. This made it challenging for me to investigate various topics during the interview (again, particularly with male participants) and when exploring responses associated with sexual questions. Some interviews were discontinued because the respondents were embarrassed or ashamed to discuss the topic. Furthermore, being a female researcher, it was difficult to interview unknown male respondents in a conservative environment. I would often keep the door of the interview room open when interviewing men if they preferred me to do so, and if it better suited the conservative culture.

Throughout the qualitative analysis, coding could occasionally be elusive. Nonetheless, by re-reading the transcript, listening to the interviews multiple times, and discussing all such aspects with supervisors, I was able to code the data. It was recommended to me by my research supervisors that I engage with reflexivity. These supervisors had frequently engaged in discussion with me regarding quantitative and qualitative data analysis. All such supervisors have a contextual background that differs from that of the researcher, thus making their help and support throughout quantitative and qualitative data analysis highly beneficial, since they were able to identify problems and pose questions. This is of paramount importance in the reflexivity process. Lastly, carrying out this mixed methods research was a great learning curve for me. I was able to experience the methodology in practice and identify the possible challenges and issues that may be encountered, and in doing so, learned how to manage them.

Finally, conducting a mixed methods study was a positive experience for me. I acquired new knowledge and methodological skills. In my future studies I will continue to carry out mixed methods research (triangulation) because the literature shows that it has two advantages. The first of these is that it improves the researcher's understanding of the research phenomena being studied, and the second is that this method enhances the cross-validation example, where one method can be supported by the other method. I conducted this mixed-methods study and witnessed the benefits of this approach in the positive outcome of my research study. I can now anticipate difficulties and areas where problems need to be managed. When I return to Saudi Arabia, and to my job as a hospital nursing director, I will share my experience from this study and discuss it with the Ministry of Health, my colleagues and other researchers.

## **7.9. Conclusion**

This study has investigated the extent to which the role of healthcare professionals and social support act as determinants in self-care among adults diagnosed with T2DM in Riyadh, Saudi Arabia. It is based on a survey of 388 patients with T2DM and 32 interviews (20 patients with T2DM and 12 HCPs) in two hospitals in Saudi Arabia. The key findings are integrated in order to examine the impact of demographic factors, the role of social support, and the role of healthcare professionals in improving adherence to self-care activities among Saudi patients with T2DM. The study's findings show a poor adherence to diabetes self-care activities among Saudi patients with T2DM. This study indicates that a range of factors impact on self-care among Saudi patients with T2DM, including culture and religion, stigma, gender, social support and healthcare environment. This study will benefit the people of Saudi Arabia as it provides new knowledge on diabetes management, and important information regarding T2DM for both the community and healthcare professionals. A key outcome of this research is that there is still much work to be done for diabetes patient care in Saudi Arabia. There has been a massive increase in the incidence of T2DM in Saudi Arabia, and this presents a clear need for public health education, including the families of patients. There is also a need for further studies in this research area, and this study marks a significant contribution to the foundation of future research in this area. Due to the scale of the diabetes diagnoses in Saudi Arabia, this is not a task that be completed in the short-term, but rather requires the combined efforts of researchers, the Ministry of Health, HCPs, and T2DM patients themselves.

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# Appendices

## Appendix 1: Search Key Terms

Boolean Operators	Keywords
	Non-insulin dependent diabetes
	Type 2 Diabetes Mellitus
	Self-care activities
	Self-management
	Self-care behaviour
	Self-care adherence
	Healthcare professional support
	Families' support
	Friends' support
	Spouse support
	Social support
	Diabetic educator
	Healthcare team
	Diabetic care team
	Physician
	Diabetic nurse

## Appendix 2: Steps for the Search Strategy

Key words	Sources Searched	Result (I: Initial R: Related)	Related	Selected	Final result
Non-insulin dependent diabetes, Type 2 diabetes, Type 2 diabetes in Saudi Arabia, Self-care, Self-management, Self-care behaviour, Self-care adherence, Healthcare professional support, Families' support, Friends' support, Peer support, Social support, Diabetic educator, Healthcare team, Diabetic care team, Physician, Diabetic nurse	CINAHL	<i>Initial: 6,799</i> <i>Related: 111</i>	261	13	33
	MEDLINE	<i>I: 79,546</i> <i>Related: 20</i>		11	
	British Nursing Index	<i>Initial: 9,406</i> <i>Related: 30</i>		2	
	PubMed	<i>Initial: 6,995</i> <i>Related: 10</i>		3	
	Google Scholar	<i>Initial: 13,900</i> <i>Related: 90</i>		4	

**Appendix 3: Summary of quantitative studies**

Author/Data/ Setting	Study Overview	Setting/Sampling/ Ethics	Study design/ Data Collection and analysis	Key Findings	Limitations	Ethics approval
Badedi, Solan, Darraj, Sabai, Mahfouz, Alamodi, and Alsabaani (2016)  SA	To assess factors associated with glycaemic control among Saudi patients with Type 2 diabetes mellitus (T2DM).	At primary health care centre in Jazan city, KSA.  Sampling = 288 Saudi patients with T2DM.	A cross-sectional approach.	Lower HbA1c levels among patients who received family support or had a close relationship with their physician. Also, patients with knowledge of diabetes or those with greater confidence in their ability to manage self-care behaviours had a lower HbA1c. In contrast, risk factors such as depression or stress were significantly correlated with poorer glycaemic control.	No specific limitations found.	Unknown
Gao, Wang, Zheng, Haardörfer, Kegler, Zhu, and Fu (2013)  China	To explore the relationships between self-efficacy, social support and patient-provider communication (PPC), and their effects on self-care behaviours and glycaemic control among Chinese patients with T2DM in a whole model.	One primary care centre.  Sampling 222 Chinese adults with T2DM.	Data was collected by survey, a physical examination and fasting blood glucose tests.  Data was analysed by SPSS.	High self-efficacy, better patient-provider communication and high level of social support were related to performance of diabetes self-care behaviour, which is associated with glycaemic control.	Participants were of one age group, most of them elderly and experiencing complications.	Yes

<p>Gomes-Villas Boas, Foss, Freitas and Pace (2012)</p> <p>Brazil</p>	<p>To analyse the relation between social support, non-medication treatment such as diet, physical exercise adherence, medication treatment adherence and clinical-metabolic control of T2DM patients under outpatient follow-up.</p>	<p>A tertiary outpatient clinic in Ribeirão Preto, SP, Brazil.</p> <p>Sampling = 162 patients with T2DM.</p>	<p>Cross-sectional and quantitative study.</p> <p>Three instruments were used for data collection: Inventário da Rede de Suporte Social (IRSS), the translated version of The Social Support Network Inventory, adapted and validated (<math>\alpha=0.95</math>) for the Brazilian culture.</p> <p>Data analysis used SPSS version 11.5.</p>	<p>There were no links between social support and clinical and metabolic control variables. Social support can be useful to achieve treatment adherence.</p>	<p>Only assesses social support with treatment adherence without other self-care activities.</p>	<p>Yes</p>
<p>Harvey, Sherman, Spears, Ford and Green (2017)</p> <p>USA</p>	<p>To examine how perceived social support impacted self-care management behaviour among female African-American and Caribbean populations.</p>	<p>At health and human service facilities in the USVI and Connecticut.</p> <p>Sampling = 42 African American</p>	<p>A descriptive, cross-sectional design.</p> <p>Data collection used survey self-report.</p>	<p>Caribbean women residing in the United States were more likely to follow a general diet and to engage in physical activity, whereas African-American women were more likely to follow a specific diabetes diet and to monitor their glucose. Caribbean women living</p>	<p>Due to the cross-sectional design, this study lacks the ability to show causality.</p>	<p>Yes</p>



		and Caribbean women diagnosed with T2DM.	Data analysis used descriptive statistics.	in the United States Virgin Islands were more likely to follow the recommended foot care procedure.		
Huang, Hung, Stocker and Lin (2013)  Taiwan	To compare the levels of self-care behaviour, social support and quality of life among type 2 diabetes mellitus patients who underwent three regimens: taking medicine, taking medicine while dieting and taking medicine while dieting with exercise.	A medical centre in Southern Taiwan.  Sampling = 127 patients with T2DM.	A descriptive, cross-sectional survey.  Data collected by conducting face-to-face interviews (participants were literate).  Data analysis used SPSS V 17.0	Patients with a combined regimen of taking medicine while dieting with regular exercise had the highest score in the levels of social support, self-care behaviour and quality of life.	No specific limitations found.	Yes
Komar-Samardzija, Braun, Keithley, and Quinn (2012)  USA	To examine the relationships between physical activity frequency and caloric expenditure in African-American women with type 2 diabetes and self-efficacy, family/friend social support.	A diabetes centre within a mid-sized hospital located in Northwest Indiana.  Sampling = 50 African-American females with T2DM.	Descriptive, cross-sectional, and correlational.  Data collection used self-report instruments.  Data analysis SPSS 11.5	The higher levels of exercise self-efficacy, family social support for exercise, and a reduction in physical environmental barriers may serve to increase physical activity levels in this population.	The sample was a convenience sample recruited from one diabetes centre, which limits the generalisability of the	Yes

					study findings. Also, the sample consisted of females only.	
Mayberry and Osborn (2014) USA	To assess the relationships between supportive and obstructive family behaviours and patients' diabetes self-care activities and HbA1C, and potential interaction effects and differences by demographic characteristics.	A Federally Qualified Health Center in Nashville, USA.  Sampling = 192 adults with T2DM.	A cross-sectional study.  Data collection used survey.  Data analysis: statistical.	Supportive family behaviours were associated with adherence to different self-care behaviours, whereas obstructive family behaviours were associated with lower adherence to self-care behaviours. Non-Whites reported more supportive and obstructive behaviours than Whites, but race did not affect the relationships between family behaviours and self-care or HbA1C.	Sample 70% female	Yes
McEwen, Pasvogel, Gallegos and Barrera (2010) USA	To pilot test the efficacy of culturally tailored diabetes self-management social support intervention for Mexican-American adults with Type 2 diabetes (T2DM) living in the U.S.-Mexico border region and to test the feasibility of recruiting and training	Community in the Arizona-Sonora, Mexico border region.  Sampling= 21 Mexican-American adults with T2DM.	A single-group pre-test and post-test design.  Data collection: self-report questionnaires to assess behavioural outcomes.	A culturally-tailored diabetes self-management social support intervention for patients with T2DM improved behavioural outcomes linked to T2DM self-care activities, sedentary behaviours, distress with T2DM regimen, and diabetes knowledge. This intervention positively	Small sample size and design	Yes

	promotoras to participate in intervention delivery.		Data analysis SPSS v 14.	affected diabetes self-management behaviours.		
Odume, Ofoegbu, Aniwada and Okechukwu (2015)  Nigeria	Assessment of the relationship between family characteristics and glycaemic control.	The National Hospital, Abuja.  Sampling = 145 adult patients with T2DM.	A descriptive and cross-sectional study.  Data were collected using a questionnaire.  Data analysis used SPSS v 17.0.	There was a significant relationship between family function and social support and glycaemic control.	No specific limitations found.	Yes
Schiøtz, Bøgelund, Almdal, Jensen and Willaing (2012)  Denmark	To examine associations between social network and patient activation, psychosocial problems, self-management behaviours and HbA1c levels.	Two settings: the Steno Diabetes Center, a specialist diabetes clinic in the Copenhagen area in Denmark, and a web panel consisting of a representative sample of the Danish population.  Sampling = 2572 patients with T2DM.	A cross-sectional survey research design. Data collection: Survey (online questionnaire).  Data: Statistical analysis.	Social support was associated with more positive scores for activation of care and health-promoting self-management behaviours such as frequent exercising and frequent foot examinations, while a poor functional social network, measured as perceived lack of help in the event of severe illness, was associated with low patient activation, greater emotional distress, negative assessment of care, fewer health-promoting eating habits and less frequent foot examinations.	Used cross-sectional design, which inhibits us from determining causal relationships.	Unknown

Shayeghiana, Aguilar-Vafaiea, Besharatb, Amiri, Parvin, Gillani, and Hassanabadi (2015)  Iran	To explore the role of coping styles and social support in the relationship between self-care activities and glycated haemoglobin in patients with type 2 diabetes.	The Endocrine Clinic at Labbafinejad Hospital (in the city of Tehran, Islamic Republic of Iran).  Sampling = 100 patients with T2DM.	Survey questionnaires (self-report questionnaire). Data analysis: Descriptive.	There are significant relationships between glycated haemoglobin and self-care activities, coping styles and social support. Also, the results showed social support had a moderating role on the relationship between self-care activities and glycated haemoglobin.	Sample constituted a convenience sample from the general population, limiting generalisability.	Yes
Smalls, Gregory, Zoller and Egede (2015)  USA	To examine the direct and indirect effects of neighbourhood factors and self-care on glycaemic control in adults with T2DM.	At an academic medical centre and Veterans Affairs Medical Centre in the southeastern United States.  Sampling = 615 with T2DM.	Data collection used questionnaire.  Data analysis: Confirmatory factor analysis was used to create latent variables for neighbourhood factors and diabetes self-care behaviour. Structural equation modelling was used to test direct and indirect effects between	Self-care behaviours and neighbourhood aesthetics have direct effects on glycaemic control, social support and access to health foods had a direct effect on self-care, and social support had an indirect effect on glycaemic control via self-care.	There may be a lack of generalisability due to heterogeneity of participants from recruitment sites.	Yes

			neighbourhood factors and glycaemic control as assessed by HbA1c levels.			
Song, Song, Han, Park, Nam and Kim (2012)  USA	To characterise the primary sources of social support and the extent of unmet needs for support in order to define the gap between social support needs and the receipt of social support in a sample of Korean-Americans with T2DM. Also, to examine the effect of unmet needs for support on their self-care activities.	The Baltimore-Washington area, USA.  Sampling = 83 Korean-Americans with T2DM.	A community-based self help intervention programme with a randomised controlled Design.  Data analysis used Descriptive statistics.	Primary source of social support differed by gender (Men: spouse; Women: non-spouse). Unmet needs of social support associated with inadequate self-care activities.	Small and homogeneous sample; generalisability; assessed perceptions of Social support (vs. received social support).	Yes
Stephens, Franks, Rook, Iida, Hemphill, and Salem (2013)  USA	To investigate daily dietary adherence and diabetes-specific distress among older adults with T2DM as a function of spouses' diet-related support and diet-related control (persuasion and pressure), and whether these daily processes differ among couples who do and do not appraise	Participants homes in USA.  Sampling = The sample comprised 129 couples (258 individuals), in which one partner was diagnosed with T2DM.	Data collection: partner completed end-of-day diaries using electronic diary methods.  Data analysis using descriptive analysis.	<b>Key Findings:</b>  Spouses' diet-related support was associated with increases in patients' adherence whereas diet-related persuasion and pressure were associated with reduction in adherence.	No specific limitations found	Unknown

	responsibility for managing T2DM as shared.					
Sukkarieh-Haraty and Howard (2014)  Lebanon	Studied the relationship between diabetes self-care, psychological adjustment, social support and glycaemic control in the Lebanese population with type 2 diabetes mellitus.	At two clinics, both in the greater Beirut area.  Sampling = 140 people with T2DM.	Descriptive correlational design.  Data collection Self-report questionnaires.  Data analysis used SPSS.	Social support was positively connected with A1C levels, thus inferring that as samples show uncontrolled levels of A1C, they received extra social support from their social network.	SDSCA-Ar that was newly translated into Arabic by the researcher.	Yes
Sürücü, Besen and Erbil (2017)  Turkey	To investigate empowerment, social support, and diabetes-related characteristics as predictors of self-care behaviours and glycaemic control in individuals with T2DM in Turkey.	At a university hospital or a training and research hospital and who were hospitalised in the endocrine service in the southeast of Turkey.  Sampling = 220 people with T2DM.	Descriptive cross-sectional and relational research designs. Data collection used questionnaires that were completed independently by the patients. Data analysis used Power software Version 3.1.	Patients who felt empowered exhibited increased glycaemic control levels and improved their diabetes self-care behaviours. Also, it was found that social support improved the diabetes self-care behaviours of individuals with diabetes but was not connected to glycaemic control.	Sample was from lower level of income in Turkey. So, a diabetes-specific scale was not used.	Yes

Watanabe, Kurose, Kitatani, Yabe and Hishizawa (2010) Japan	To investigate the role of family support in glycaemic control by nutritional self-care behavior of Japanese patients with type 2 diabetes.	At Kansai Electric Power Hospital.  Sampling = 112 people with T2DM.	A cross-sectional study.  Data collection Survey  Data analysis Statistical analysis.	There was a significant relationship between HbA1c levels and family nutritional support. Patients with family nutritional support showed significantly lower HbA1c than patients without family support.	This study only studied diet self-care behaviours and family support.	Yes
Watkins, Quinn, Ruggiero, Quinn and Choi (2013) USA	To investigate the relationship between spiritual and religious beliefs and practices, social support, and diabetes self-care activities in African-Americans with T2DM.	At 2 federally qualified health centers in a Midwestern city.  Sampling = 132 patients with T2DM.	A cross-sectional study.  Data collection: Participants completed a computer-delivered baseline assessment, including the self-report measures, prior to randomisation to intervention groups for the controlled trial.  Data analysis used SPSS 16.0 and SAS 9.2.	There were significant relationships between spiritual and religious beliefs and practices and general diet. Also, additional significant relationships were found for social support with general diet, specific diet, and foot care. Sex was a significant predictor for specific diet, and income was a significant predictor for blood glucose testing	This study did not consider religious affiliations and associations and the impact they have on health behaviours.	Yes

**Appendix 4: Summary of qualitative studies**

Author/Date/Setting	Study Overview	Setting/Sampling /Ethics	Data Collection and analysis	Key Findings	Limitations	Ethics approval
<p>Crotty, Henderson, Ward, Fuller, Rogers, Kralik, and Gregory (2015)</p> <p>Australia</p>	<p>Maps the support provided by formal (paid and professional carers) and informal networks to people with mental illness and type 2 diabetes, comparing the experiences of people with a spouse to those without one.</p>	<p>A community nursing service for those with mental health problems who receive professional support to self-manage T2DM.</p> <p>Sampling: 29 people with a diagnosed mental illness and T2DM.</p>	<p>Semi-structured interviews and participants completed an egocentric social network map that involved mapping the people and services that support them in managing their health.</p> <p>Data analysis: The interviews were analysed using the principles of grounded theory.</p> <p>Analysing network data: network visualisation;</p>	<p>Small social networks with few friendship ties were identified by participants. People with a spouse had support in performing self-management in daily care, while people without a spouse were more reliant on professional and paid caregivers for daily care.</p> <p>People without a spouse often developed friendships with formal caregivers and also demonstrated greater reliance upon weak social ties for emotional support and social connection.</p>	<p>Small sample size</p>	<p>Yes</p>



			descriptive analysis of network properties; and development of longitudinal and inferential models.			
Goetz, Szecsenyi, Campbell, Rosemann, Rueter, Raum, and Miksch (2012)  Germany	To explore the views of general practitioners, practice nurses and people with T2DM, as well as their experiences and perspectives of the importance of social support in caring for people with T2DM and their role in providing social support.	Stuttgart (Germany) Interviews with general practitioners (n=10) and focus groups with practice nurses (n=10) and people with T2DM (n=9).	Focus groups for practice nurses and patients with T2DM took place in the practice of one participating GP. The focus groups were divided into groups. All together, four focus groups met at any one time, while each GP was interviewed once in his or her own practice.  Data analysis:	The outcome showed that social support is important, and helpful for people with T2DM in order to improve their diabetes control and have an impact on their well-being. General practitioners recognised a lack of public information about facilities, such as sports or self-help groups. Practice nurses emphasised that they required more training, for example in dietary counselling.	The sample was from a single region of Germany and only included GPs that were participants in one quality circle, which may have resulted in selection bias of superior motivation within the study sample.	Yes

			The 10 interviews and four focus groups were recorded digitally, fully transcribed and analysed separately with ATLAS.ti software.			
Janice, Sue, and Heather (2010)  New Zealand	To better understand the day-to-day lived experiences of those adults with type 2 diabetes, in particular their historical and current ability to self-manage this condition.	Whanganui, New Zealand  Sampling = 9 people with T2DM: four New Zealand Europeans, four Maori and one Samoan (5 female and 4 male).	Semi-structured interviews, interwoven with an iterative analytic process.  Themes generated by the analysis checked and rechecked.	Support to self-manage was harnessed more readily from spiritual beliefs, family and friends rather than from HCPs.	Small sample size	Yes
Jeragh-Alhaddad, Waheedi, Barber, Brock and Brock (2015)	To explore barriers to medication adherence among Kuwaiti adults with T2DM.	A sample of Kuwaiti patients with T2DM were recruited from different general	Semi-structured interviews.	Personal, sociocultural, religious, healthcare provider, and healthcare system related	Sample only included Kuwaitis with type 2 diabetes.	Yes

Kuwait		practices and hospitals of Kuwait.  Sampling = 20 Kuwaiti patients with T2DM.	Data collection used face-to-face interviews.  Data analysed using thematic analysis.	factors may impede medication adherence among Kuwaitis with type 2 diabetes.		
Kaltman, Talisman, Serrano, Cabassa, Magee, Pulgar-Vidal, and Cohen (2015)  USA	To engage a local primary care clinic community that serves a Latino immigrant population to obtain their input regarding the design and implementation elements for an integrated behavioural intervention that will simultaneously target T2DM and depression self-management in this high-risk patient population.	A primary care clinic that serves low-income, uninsured Latino immigrants at 2 sites in the greater Washington, DC, metropolitan area.  Sampling: 14 patients with T2DM and depression and 7 of their family members as well as key informants were identified by 9 Primary Care Provider Perspectives.	Key Informant Interviews, individual semi-structured and 3 focus groups were conducted.  Data was thematically analysed	The need for support and acceptability of individualised behavioural interventions that target T2DM and depression simultaneously.	The participants were mostly immigrants from Central America and Mexico and their families: sample size was small, so cannot be considered representative of the larger population of Latinos with T2DM as well as of depression.	Yes

<p>Knutsen, Foss, Todorova, Roukova, Kennedy, Portillo, and Lionis (2015)</p> <p>Europe (Bulgaria, Greece, Norway, Spain and the United Kingdom)</p>	<p>To explore the coalescences between food and diet among people with T2DM and the relevance of social networks to the way people are supported in their management of T2DM.</p>	<p>At healthcare centres in up to three rural and urban regions in each country.</p> <p>Sampling = 125 people with T2DM (25 patients from each country).</p>	<p>Semi-structured interviews.</p> <p>Data thematically analysed.</p>	<p>The influence of self-management and food, including support, knowledge, and relationships within families; attention and openness in social situations; and the premises and norms of society.</p>	<p>No specific limitations found</p>	<p>Yes</p>
<p>Laranjo, Neves, Costa, Ribeiro, Couto, and Sá (2015)</p> <p>Portugal</p>	<p>To assess the facilitators, barriers and expectations in the self-management of type 2 DM, as perceived by patients.</p>	<p>At the Portuguese Diabetes Association outpatient clinic in Portugal.</p> <p>Sampling = 16 people with T2DM.</p>	<p>A qualitative descriptive approach was taken using focus groups as the data collection method.</p> <p>Data collection: three focus groups (n = 6, n = 6 and n = 4) and an independent observer.</p>	<p>Information and knowledge translation, as well as family and social ties, were regarded as facilitators in some situations and as barriers in others.</p>	<p>Small sample size</p>	<p>Yes</p>

			Data analysis: thematically analysed			
Mathew, Gucciardi, De Melo and Barata (2012)  Canada	To better understand differences in diabetes self-management, specifically needs, barriers and challenges among men and women living with T2DM.	Diabetes Education Centres, Ontario, Canada.  Sampling = 35 participants with T2DM (men =17 and women =18).	Five focus groups: one mixed sex group, two with only men and two with only women to allow for sex-specific discussions and telephone interviews.  Data analysis: thematic analysis	The outcome highlighted the differences in the needs and challenges of diabetes self- management among males and females, which may inform gender-sensitive diabetes care, counselling and support.	The sample was pulled from a large, urban, culturally diverse region, so the findings of this study may not be representative of other more culturally homogeneous populations with T2DM in Canadian cities.	Yes
Oftedal, Karlsen and Bru (2010)  Norway	To describe how adults with type 2 diabetes perceive different attributes of support provided by healthcare practitioners and how various attributes can	South-western Norway.  Sampling = 19 people with T2DM.	A descriptive/expl orative qualitative design and focus groups were	Healthcare practitioners may strengthen the self-management motivation among adults with type 2 diabetes by enhancing expectations of being able to perform the necessary diabetes care, and through the provision of	Majority of participants had acceptable levels of glycaemic control, as measured by HbA1c.	Yes

	influence people's motivation to self-manage their disease.		used to collect data.  Data analysis used qualitative content analysis.	empathetic, individualised, practical and ongoing group-based support.		
Puziah, Hamidah and Azian (2016)  Malaysia	To explore the process undertaken by people with type-2 diabetes engaging in and adapting self-management behaviour from the nursing perspective.	Public Community Health Centre, Diabetes Counselling Unit and the Primary Care Team at one of the tertiary hospitals in Malaysia.  Sample: 30 people with T2DM.	Data collected using a focus group, semi-structured interviews, longitudinal observations, and a personal and reflective diary.	Patients' empowerment during education process, which begins with patients acquiring information.  The majority of participants expressed concerns about their doubts regarding information and knowledge they received from healthcare professionals, which they described as being too technical for them to understand.	No specific limitations found.	Yes

**Appendix 5: Summary of mixed methods studies**

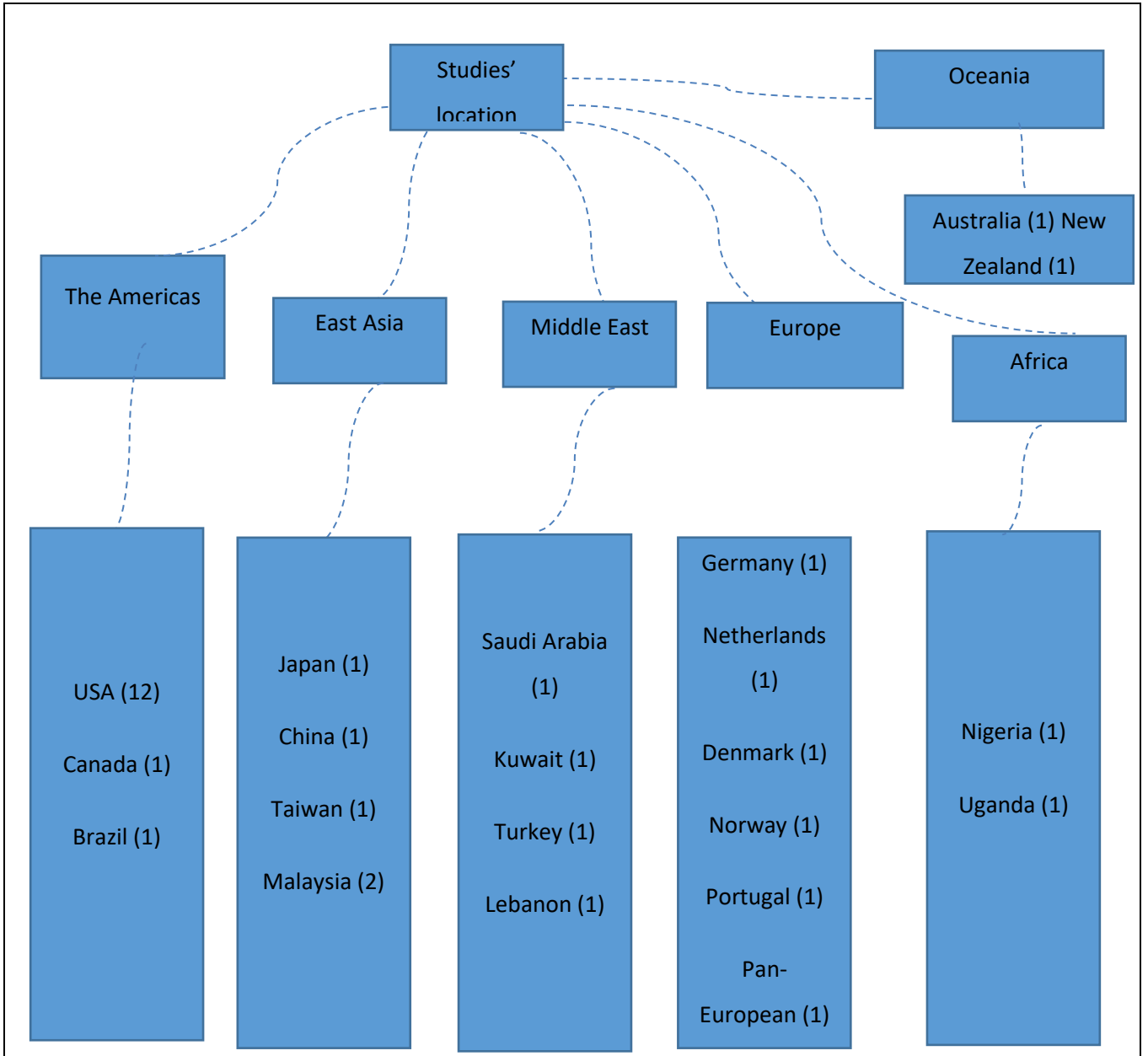
Author/Date/Setting	Study Overview	Setting /Sampling/ Ethics	Data Collection and analysis	Key Findings	Limitations	Ethics approval
Baumann, Frederick, Betty, Josphine, and Agatha (2015)  Uganda	To test a short-term peer support programme to improve the following; diabetes self-care behaviours, glycaemic control, social support and emotional well-being, linkages to healthcare providers, and to assess the sustainability of the intervention 18 months later.	Clinic in Mityana, a rural community in Uganda.  Sample = Patients age over 18 years. 16 Peer Champions and 25 Peer Partners.	Pre-post questionnaires and intervention training programme.  Data was analysed using the SPSS software (descriptive).  Qualitative data were entered into an electronic database and the content was analysed for themes.	The outcome showed improvement in glycosylated haemoglobin, diastolic blood pressure and eating behaviours. A peer support intervention programme improved diabetes care.	The measurement of the intervention programme is limited because there was no control group.	Yes
Chlebowy, Hood and LaJoie (2010)  USA	To identify facilitators and barriers to self-management of T2DM among African American adults.	A mid-sized city in the southeastern United States	Data was collected by a survey and 7 focus groups.	Barriers to self-management behaviours include: Internal factors such as fears connected with glucose monitoring, perceived lack of personal control over diabetes,	No specific limitations found	Yes

		Sample = 38 people with T2DM.	Data was analysed using SPSS software (descriptive).  Qualitative data used Atlas.Ti, version 6 software	lack of self-control over dietary habits and memory failure, while external factors such as social support from family/peers and HCPs positively influenced adherence behaviours by providing cues to action, direct assistance, reinforcement, and knowledge.		
Mayberry and Osborn (2012)  USA	To explore the relationships between participants' perceptions of family members' diabetes self-care knowledge, family members' diabetes-specific supportive and non-supportive behaviours, and participants' medication adherence and glycaemic control (A1C).	Sampling = Adults with T2DM: 45 participants for focus groups and 61 participants for survey.	Focus group and survey.  Data analysis used statistical tests that were performed using STATA version 11.	Participant reports of family members' non-supportive behaviours were associated with being less adherent to one's diabetes medication regimen. Participants emphasised the importance of instrumental help for diabetes self-care behaviours and reported that non-supportive family behaviours sabotaged their efforts to perform these behaviours.	Sample was recruited from a single site, so the findings cannot be generalised	Yes
Venkatesh and Weatherspoon (2013)  USA	To determine social support and healthcare provider support in diabetes self-management of Indians with T2DM in the United States.	The sample were recruited from Michigan, USA.	Qualitative in-depth interviews were guided by a semi structured questionnaire.	The importance of patient support offered by healthcare providers and social networks in potentially influencing diabetes self-management.	A proportion of the acceptable (AC) (HbA1c<7%) group was physicians or individuals who worked in research laboratories; hence, there	Unknown



		Sample: 30 people with T2DM.	Nvivo 8 software was used for data analysis.	Poor compliance with lifestyle changes such as diet, weight control, and physical activity. Thus, a need for healthcare provider communication and support.	is room for potential bias, which could have impacted the generalizability of the findings. Because about one third of the AC group constituted physicians or researchers, we recognize that this is not typical of the general lay population.	
Vissenberg, Nierkens, Valkengoed, Nijpels, Uitewaal, Middelkoop, and Stronks (2017)  Netherlands	To explore the effect of the social network based intervention Powerful Together with Diabetes on diabetes self-management among socioeconomically deprived patients.	Sampling= 131 patients with T2DM.	A quasi-experimental study and semi-structured qualitative interviews.  Quantitative data analysis (survey) used SPSS 19.0.	An intensive support group and simultaneous involvement of significant others might improve diabetes self-management behaviours among socioeconomically deprived patients.	Sample: Not able to assign the participants randomly to the intervention or control group.	Yes

**Appendix 6: Studies location used for the literature review**



## Appendix 7: Ethical approval from Salford University



Research, Innovation and Academic  
Engagement Ethical Approval Panel

Research Centres Support Team

T +44(0)161 295 2280

[www.salford.ac.uk/](http://www.salford.ac.uk/)

11 January 2016

Dear Sabah,

**RE: ETHICS APPLICATION HSCR 15-126 – The role of health care professional and social support systems as determinants of self-care among adults diagnosed with type 2 diabetes mellitus (T2DM) in Riyadh, Saudi Arabia.**

Based on the information you provided, I am pleased to inform you that application HSCR15-126 has been approved.


If there are any changes to the project and/ or its methodology, please inform the Panel as soon as possible by contacting [Health-ResearchEthics@salford.ac.uk](mailto:Health-ResearchEthics@salford.ac.uk)

Yours sincerely,



Sue McAndrew  
Chair of the Research Ethics Panel

## Appendix8: Ethical approval from the MOH in Saudi Arabia

<p>الإدارة العامة للبحوث والدراسات الرقم: 601556 التاريخ: 1437-02-28 هـ / 2016-12-10 مرئقات: 27 التاريخ: المشروع:</p>		<p>المملكة العربية السعودية وزارة الصحة الإدارة العامة للبحوث والدراسات</p>
<p>بحث الطالبة / صباح الصومالي</p>	<p>سعادة / مدير مستشفى الإيمان بالرياض</p>	
<p>المحترم</p>	<p>السلام عليكم ورحمة الله وبركاته، ، ، ،</p>	
<p>إشارة إلى موضوع الطالبة / صباح إسماعيل الصومالي، مبتعثة من وزارة الصحة لدراسة درجة الدكتوراة في تخصص " الرعاية الصحية والإجتماعية" بكلية التمريض، القبالة والعلوم الإجتماعية جامعة "سالفورد" بالمملكة المتحدة، رقم الهوية الوطنية (١٠٦١١٢٩٦٣٩) والرقم الأكاديمي (٠٠٣١٤٩١٤) وعنوان الرسالة:</p>	<p>" دور دعم الأنظمة المهنية والإجتماعية كمحددات للرعاية الذاتية بين البالغين المصابين بالنوع الثاني من مرض السكري في الرياض"</p>	
<p>نحنيطكم علماً بأن الطالبة قد إستوفت كافة المستندات المطلوبة وتمت مراجعتها من قبل الإدارة العامة للبحوث والدراسات بوزارة الصحة ولجنة الأخلاقيات بمدينة الملك فهد الطبية (مرفق صورة)، وتمت الموافقة على تسهيل مهمة إجراء هذا البحث، وحيث أن المذكورة عاليه ستفد جزء من دراستها في مستشفى الإيمان بالرياض.</p>	<p>وعليه، نأمل من سعادتكم التفضل بالإطلاع والإيعاز لمن يلزم بتسهيل مهمتها لجمع البيانات اللازمة بما يضمن أن لا يكون هناك أي تأثير على خدمة المراجعين خلال قيامها بمهام بحثها، مع العلم بأن وزارة الصحة تضمن حقوقها في نتائج هذا البحث من خلال إتفاقية المشاركة في البيانات والتي تم توقيعها بين الباحثة والإدارة العامة للبحوث والدراسات.</p>	
<p>وتفضلوا بقبول أطيب التحيات ، ، ،</p>	<p>مرفق ملخص المقترح البحثي، ، ، ، ،</p>	
<p>مساعد مدير عام الإدارة العامة للبحوث والدراسات</p>	<p>ص. عذاري فيصل العتيبي</p>	<p>د. رأفت بن ٢٠١٦/٠٢/٢٧</p>
<p>هاتف: ٠١١٤٧٣٥٠٣٨</p>	<p>فكس: ٠١١٤٧٣٥٠٣٩</p>	<p>ص.ب الرياض: ٢٧٧٥</p>
	<p>e-mail: research@moh.gov.sa</p>	<p>الرمز البريدي: ١١١٧٦</p>



المحترم / سعادة / مدير مستشفى الملك سلمان بن عبدالعزيز بالرياض

السلام عليكم ورحمة الله وبركاته،،،،

إشارة إلى موضوع الطالبة / صباح إسماعيل الصومالي، مبعثة من وزارة الصحة لدراسة درجة الدكتوراة في تخصص " الرعاية الصحية والاجتماعية" بكلية التمريض، القبالة والعلوم الاجتماعية جامعة "سالفورد" بالمملكة المتحدة، رقم الهوية الوطنية (١٠٦١١٢٩٦٣٩) والرقم الأكاديمي (٠٠٣١٤٩١٤) وعنوان الرسالة: " دور دعم الأنظمة المهنية والاجتماعية كمحددات للرعاية الذاتية بين البالغين المصابين بالنوع الثاني من مرض السكري في الرياض"

نحيطكم علماً بأن الطالبة قد استوفت كافة المستندات المطلوبة وتمت مراجعتها من قبل الإدارة العامة للبحوث والدراسات بوزارة الصحة ولجنة الأخلاقيات بمدينة الملك فهد الطبية (مرفق صورة)، وتمت الموافقة على تسهيل مهمة إجراء هذا البحث، وحيث أن المذكورة عاليه ستفد جزء من دراستها في مستشفى الملك سلمان بن عبدالعزيز بالرياض. وعليه، نأمل من سعادتكم التفضل بالإطلاع والإيعاز لمن يلزم بتسهيل مهمتها لجمع البيانات اللازمة بما يضمن أن لا يكون هناك أي تأثير على خدمة المراجعين خلال قيامها بمهام بحثها، مع العلم بأن وزارة الصحة تضمن حقوقها في نتائج هذا البحث من خلال إتفاقية المشاركة في البيانات والتي تم توقيعها بين الباحثة والإدارة العامة للبحوث والدراسات.

وتفضلوا بقبول أطيب التحيات ،،،،

مرفق ملخص المقترح البحثي،،،،

مساعد مدير عام الإدارة العامة للبحوث والدراسات

ص. عذاري كيطيل العتيبي

**Appendix 9: Participant Study Information Sheet for people with type 2 diabetes  
Code:**



**Participant Information Sheet**

**Research Study Title:**

**The role of health care professional and social support systems as determinants of self-care among adults diagnosed with type 2 diabetes mellitus (T2DM) in Riyadh, Saudi Arabia.**

I am Sabah Alsomali currently completing a research study for my PhD in School of Nursing, Midwifery and Social Work at the University of Salford. I would like to invite you to be part of this research study. Before you decide it is important that you understand the purpose of the research study and your role as a participant. Please take time to read the following information carefully. Ask questions if anything you read is not clear or would like more information. Take time to decide whether or not to take part. Finally, It is your decision whether or not to be part of the research study and you may withdraw at any time.

**What is the purpose of the research project?**

The aim of this study is to investigate the extent to which health care professional support and social networks act as determinants of self-care among adults diagnosed with T2DM in Riyadh, Saudi Arabia.

**Why have I been invited?**

The main reason for including you in this research study is because you are an individual with type 2 diabetes mellitus.

**Do I have to take part?**

To participate in this research study it is your choice. This Participant's information sheet will provide details to help you make this decision and you can contact the researcher if you have any question about this research study. If you agree to take part of the study, you will be asked to sign a consent form. You are free to withdraw at any point while taking part in the study.

**What will happen to me if I take part?**

You can participate in this research in two ways:

- You will be asked to complete questionnaires, it will take approximately 10 to 15 minutes to complete. The aims from these questionnaires are to measure five self-care activity: diet, physical activities, glucose testing, diabetic medication and foot care.
- If you wish to participate in an interview, You will be involved in an interview in order provide a deeper understanding of the nature of support given to people with type 2 diabetes in order to enable them to adhere to the prescribed diabetes self-care regimen while in the latter context it is envisaged to assess how people with type 2 diabetes perceive the efficacy of the support they receive from health care professionals as well as families and friends. The interview it will take approximately 1 to 2 hours and will be scheduled at a date that is convenient to you.

**What are the possible disadvantages and risks of taking part?**

There are no personal risks associated with participation in the study and being involved in this research will not cause any harm to you and your family and there are no medical risks involved in taking part in this study.

**What benefit if I participate in the research?**

Participation in this study is completely voluntary.

**What if there is a problem?**

If you have concerns about any aspect of the study, please contact the first supervisor Dr xxx, (The email and the phone number of the supervisor will be added later on) in the first instance. However, if you remain dissatisfied please contact the University of Salford School of Nursing, Midwifery, Social Work and Social Sciences Research Innovation and Enterprise Manager.

Anisha Kurien, Research Centres Manager, G.08 Joule House Acton Square,  
University of Salford M5 4WT. A.kurien@salford.ac.uk Tel: 0161 295 5276

**Will my taking part in the study be kept confidential?**

All information which is collected about you during the course of the research will be kept strictly confidential. A coding system will be used so that you will never be identified in any way. No names will appear in the study. Your identity and personal contact details will be known only to the researcher and the research supervisors at the University of Salford. The researcher will not use your name or any information that could reveal their identity in this or any future research study, publication, conference presentation or teaching session. Storage and destruction of data will conform to the Data Protection Act (1998).

**What will happen if I don't carry on with the study?**

You have the right to withdraw from the study at any point without prejudice and this will not affect your medical care in any way. If you withdraw from the study all the information and data collected from you will be destroyed and your name removed from all the study files.

**What will happen to the results of the research study?**

The results of the study will be written in my PhD thesis; parts of the study may be presented at conferences and also may be published in nursing journal without identifying any of the participants. You have the right to ask for the results if needed and the choice of seeing the completed statistical analysis.

**Who is organising or sponsoring the research?**

The university of Salford and Ministry of Health in Saudi Arabia.

If there are any further questions regarding this study, you can contact me (by phone or email) or my supervisors (by email) as follows. If you prefer, we can arrange to discuss this invitation, face to face, at a mutually convenient place and time.

Contact for further information:

Sabah Alsomali

College of Health & Social Care

University of Salford

Mary Seacole Building

M1.33

United Kingdom

Email: s.i.m.Alsomali@edu.salford.ac.uk

Uk contact : [REDACTED]

Saudi Arabia contact: [REDACTED]

This research study is supervised by:

Dr Danny D Meetoo

Lecturer-Multi-Professional Post Graduate Studies

School of Nursing, Midwifery, Social Work & Social Sciences

University of Salford

Mary Seacole Building, Frederick Road

Salford M1.63

Email: D.Meetoo@salford.ac.uk

Tel: +44 (0)161 295 6478

*Thank you for taking the time to read this information*



## Arabic version for Participant Study Information Sheet for people with type2

### استمارة المعلومات للمشاركين في الدراسة diabetes

#### علما ان موضوع الرسالة:

دور دعم الانظمة المهنية و الاجتماعية كمحددات للرعاية الذاتية بين البالغين المصابين بالنوع الثاني من مرض السكري في الرياض, السعودية

انا صباح الصومالي طالبة دكتوراه في جامعة سالفورد في المملكة المتحدة. أود أن أدعوكم إلى المشاركة في هذه الدراسة البحثية. وقبل أن تتخذوا القرار بشأن هذه المشاركة إنه من المهم أن تدركون الغرض من هذه الدراسة البحثية وفهم دوركم بصفتم مشاركين فيها. نرجو أن تتيحوا لأنفسكم وقتاً لقراءة المعلومات التالية بعناية. تفضلوا بطرح أية أسئلة قد تكون لديكم أو إذا كان أي شيء تفرؤونه فيها غير واضح لكم أو أنكم ترغبون في تلقي مزيد من المعلومات عن هذا البحث. كما نرجو أن تتيحوا لأنفسكم وقتاً للقرار فيما لو كنتم تودون المشاركة في هذه الدراسة البحثية. في نهاية الأمر، إنه قراركم فيما لو كنتم تريدون المشاركة في هذه الدراسة البحثية أو أنكم قد تنسحبون من المشاركة فيها في أي وقت تشاؤون.

#### ما الهدف من الدراسة ؟

تهدف الدراسة الى استكشاف مدى تأثير الدعم الذي يقوم به الفريق الصحي و المجتمع بصفتها عوامل محددة في تدعيم الرعاية الذاتية بين الأشخاص البالغين الذين سبق تشخيصهم بالإصابة بمرض السكري من النوع الثاني في الرياض، المملكة العربية السعودية.

#### لماذا تمت دعوتي إلى المشاركة في هذه الدراسة ؟

لقد تم دعوتك بالمشاركة لانك مصاب بالمرض السكري النوع الثاني .

#### هل تتوجب علي المشاركة في هذا الدراسة؟

لا . قرار المشاركة في الدراسة يعود إليك وحدك و لك كامل الحرية للانسحاب من الدراسة في اي وقت دون التبرير لذلك. أرجو ان تعلم ان عدم مشاركتك أو انسحابك من الدراسة في اي وقت لن يؤثر على الخدمات الصحية المقدمة لك حاليا أو في المستقبل. وأن ورقة معلومات المشارك هذه التي بين أيديك سوف تزودك بالتفاصيل لمساعدتك على اتخاذ هذا القرار وبإمكانك الاتصال بالباحثة إذا كانت لديك أي أسئلة حول هذه الدراسة. في حالت موافقتك على المشاركة في هذه الدراسة سوف يتم الطلب منك التوقيع على استمارة موافقة ولديك الحرية في الانسحاب من المشاركة في أي وقت.

#### ما الذي سيطلب مني فعله لو قررت المشاركة في الدراسة؟

إذا وافقت على المشاركة في الدراسة , بإمكانك المشاركة في هذا الدراسة بطريقتين وهما كما يلي:  
أولا : سوف يتطلب منك تعبئة استبيانات وهذا سيستغرق منك وقتاً يتراوح بين عشرة إلى خمسة عشرة دقيقة لإكمالها. والهدف من هذه الاستبيانات هو لقياس خمس نشاطات تتعلق بالرعاية الذاتية وهي: أتباع الحمية الغذائية و ممارسة الرياضة و العناية بالقدمين و استخدام العلاج طبقاً للارشادات الطبية و الفحص المستمر لمستوى السكر في الدم.  
ثانياً : سوف يتم دعوتك لمقابلة في حالت رغبتك بالمشاركة. و هدف من ذلك لتوفير فهماً أعمق عن طبيعة الدعم المقدم إلى الأشخاص المصابين بمرض السكري من النوع الثاني .لن تزيد المقابلة عن ساعة أو ساعتين و يتم تسجيلها و كتابتها ثم تحليلها.

#### ما هي لمخاطر المحتملة لهذه المشاركة؟

ليست هناك اي مخاطر شخصية أو أخطار طبية مرتبطة بمشاركتك في هذه الدراسة

#### ما هي الفائدة التي ألتقاها إذا شاركت في هذا البحث؟

المشاركة في هذه الدراسة هي مشاركة طوعية تماماً.

#### ما ذا يحصل إذا كانت هناك مشكلة؟

إذا كان لديك شكوى تخص الدراسة في أي وقت , فأرجوا منك الاتصال بالمشرف علي الدراسة مباشرة وهو الدكتور ميتو (على عنوانه الإلكتروني: D. Meeto@salford.ac.uk و رقم هاتفه 161 295 6478 (0) 44+) . وفي حالت رغبتك بالاستمرار باشكوي فنرجو الاتصال بمديرة المشاريع بالجامعة سالفورد الخاصة بالكلية التمريض.

أنيشا كوريان، مديرة مركز البحوث، جي 08 جول هاوس، آكتون سكوير، جامعة سالفورد أم5 4دبليو تي.  
العنوان الإلكتروني: A. kurien@salford@ac.uk و رقم الهاتف: 161 295 5276 (0) 44+

### هل يتم الحفاظ على سرية مشاركتي في هذا البحث؟

جميع المعلومات المستقاة سوف تعامل بكامل السرية. سوف يتم حفظ جميع المعلومات في موقع جامعة سالفورد حيث لن يتمكن من الوصول إليه سوى الباحثة أو مشرفها . سوف يتم مسح اسمك أو هويتك من النتائج في التقارير المكتوبة أو المنشورة .

### ما سيحصل إذا لم أستم في المشاركة في هذه الدراسة؟

قرار المشاركة في الدراسة يعود إليك وحدك و لك كامل الحرية للانسحاب من الدراسة في اي وقت دون التبرير لذلك. أرجو ان تعلم ان عدم مشاركتك أو انسحابك من الدراسة في اي وقت لن يؤثر على الخدمات الصحية المقدمة لك حالياً أو في المستقبل. في حالت انسحابك من الدراسة فإن كافة المعلومات والبيانات التي تم جمعها منك سوف يتم اتلافها ومسح اسمك من كافة ملفات هذه الدراسة.

### ما سيحصل لنتائج هذه الدراسة البحثية؟

سوف أقوم باستخدام النتائج في كتابة التقرير النهائي لرسالة الدكتوراه. و لكن لن أقوم بكشف هويتك أو اسمك في اي من التقارير المكتوبة، إذا كنت ترغب في الحصول على نتائج الدراسة , فليس عليك سوى اخباري بذلك و سأقوم بإرسال ملخص النتائج فوراً الإنتهاء منها.

### من الذي يقوم بتنظيم أو كفالة هذا البحث؟

يقوم بتنظيمه الدراسة كل من جامعة سالفورد في المملكة المتحدة و وزارة الصحة في المملكة العربية السعودية. إذا كانت لديكم أية أسئلة في المستقبل بما يتعلق بهذه الدراسة البحثية فبإمكانكم الاتصال بنا على رقم الهاتف (644 6077) أو بواسطة البريد الإلكتروني على العنوان [s.i.m.Alsomali@edu.salford.ac.uk](mailto:s.i.m.Alsomali@edu.salford.ac.uk) أو الإتصال بالمشرفين على هذا البحث (بواسطة البريد الإلكتروني) كما يلي. وإذا كنتم تفضلون فيإمكاننا أن نرتب مناقشة الدعوة للمشاركة في الدراسة وجهاً لوجه في مكان ووقت ملائم لكلا الطرفين.

## **Appendix 10: Participant Study Information Sheet for Health care Professional Code:**



### **Participant Information Sheet**

#### **Research Study Title:**

The role of health care professional and social support systems as determinants of self-care among adults diagnosed with type 2 diabetes mellitus (T2DM) in Riyadh, Saudi Arabia.

I am Sabah ALSomali currently completing a research study for my PhD in School of Nursing, Midwifery and Social Work at the University of Salford. I would like to invite you to be part of this research study. Before you decide it is important that you understand the purpose of the research study and your role as a participant. Please take time to read the following information carefully. Ask questions if anything you read is not clear or would like more information. Take time to decide whether or not to take part. Finally, It is your decision whether or not to be part of the research study and you may withdraw at any time.

#### **What is the purpose of the research project?**

The aim of this study is to investigate the extent to which health care professional support and social networks act as determinants of self-care among adults diagnosed with T2DM in Riyadh, Saudi Arabia.

#### **Why have I been invited?**

The main reason for including you in this research study is because you are staff members in the diabetes health care team and you have experienced the work with people with type 2 diabetes mellitus.

#### **Do I have to take part?**

To participate in this research study it is your choice. This Participant's information sheet will provide details to help you make this decision and you can contact the researcher if you have any question about this research study. If you agree to take part of the study, you will be asked to sign a consent form. You are free to withdraw at any point while taking part in the study.

**What will happen to me if I take part?**

You will be asked to participate in an interview. You will be involved in an interview in order to provide a deeper understanding of the nature of support given to people with type 2 diabetes in order to enable them to adhere to the prescribed diabetes self-care regimen while in the latter context it is envisaged to assess how people with type 2 diabetes perceive the efficacy of the support they receive from health care professionals as well as families and friends. The interview will take approximately 1 to 2 hours and will be scheduled at a date that is convenient to you.

**What are the possible disadvantages and risks of taking part?**

There are no personal risks associated with participation in the study.

**What benefit if I participate in the research?**

Participation in this study is completely voluntary.

**What if there is a problem?**

If you have concerns about any aspect of the study, please contact the first supervisor Dr xxx, (The email and the phone number of the supervisor will be added later on) in the first instance. However, if you remain dissatisfied please contact the University of Salford School of Nursing, Midwifery, Social Work and Social Sciences Research Innovation and Enterprise Manager.

Anisha Kurien, Research Centres Manager, G.08 Joule House Acton Square,  
University of Salford M5 4WT. A.kurien@salford.ac.uk Tel: 0161 295 5276

**Will my taking part in the study be kept confidential?**

All information which is collected about you during the course of the research will be kept strictly confidential. A coding system will be used so that you will never be identified in any way. No names will appear in the study. Your identity and personal contact details will be known only to the researcher and the research supervisors at the University of Salford. The researcher will not use your name or any information that could reveal their identity in this or any future research study, publication, conference presentation or teaching session. Storage and destruction of data will conform to the Data Protection Act (1998).

**What will happen if I don't carry on with the study?**

You have the right to withdraw from the study at any point without prejudice and this will not affect your employment in any way. If you withdraw from the study all the information and data collected from you will be destroyed and your name removed from all the study files.

### **What will happen to the results of the research study?**

The results of the study will be written in my PhD thesis; parts of the study may be presented at conferences and also may be published in nursing journal without identifying any of the participants. You have the right to ask for the results if needed and the choice of seeing the completed statistical analysis.

### **Who is organising or sponsoring the research?**

The university of salford and Ministry of Health in Saudi Arabia.

If there are any further questions regarding this study, you can contact me (by phone or email) or my supervisors (by email) as follows. If you prefer, we can arrange to discuss this invitation, face to face, at a mutually convenient place and time.

Contact for further information:

Sabah Alsomali

College of Health & Social Care

University of Salford

Mary Seacole Building

M1.33

United Kingdom

Email: s.i.m.Alsomali@edu.salford.ac.uk

Uk contact : [REDACTED]

Saudi Arabia contact: [REDACTED]

This research study is supervised by:

Dr Danny D Meetoo

Lecturer-Multi-Professional Post Graduate Studies

School of Nursing, Midwifery, Social Work & Social Sciences

University of Salford

Mary Seacole Building, Frederick Road

Salford M1.63

Email: D.Meetoo@salford.ac.uk

Tel: +44 (0)161 295 6478

<b>Thank you for taking the time to read this information</b>
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## Arabic version for Participant Study Information Sheet for Health care Professional

### استمارة المعلومات للمشاركين في الدراسة

#### علما ان موضوع الرسالة:

دور دعم الانظمة المهنية و الاجتماعية كمحددات للرعاية الذاتية بين البالغين المصابين بالنوع الثاني من مرض السكري في الرياض، السعودية

انا صباح الصومالي طالبة دكتوراه في جامعة سالفورد في المملكة المتحدة. أود أن أدعوكم إلى المشاركة في هذه الدراسة البحثية. وقبل أن تتخذوا القرار بشأن هذه المشاركة إنه من المهم أن تدركون الغرض من هذه الدراسة البحثية وفهم دوركم بصفتكم مشاركين فيها. نرجو أن تتبحوا لأنفسكم وقتاً لقراءة المعلومات التالية بعناية. تفضلوا بطرح أية أسئلة قد تكون لديكم أو إذا كان أي شيء تفرؤونه فيها غير واضح لكم أو أنكم ترغبون في تلقي مزيد من المعلومات عن هذا البحث. كما نرجو أن تتبحوا لأنفسكم وقتاً للقرار فيما لو كنتم تودون المشاركة في هذه الدراسة البحثية. في نهاية الأمر، إنه قراركم فيما لو كنتم تريدون المشاركة في هذه الدراسة البحثية أو أنكم قد تتسحبون من المشاركة فيها في أي وقت تشاؤون.

#### ما الهدف من الدراسة ؟

تهدف الدراسة الى استكشاف مدى تأثير الدعم الذي يقوم به الفريق الصحي و المجتمع بصفتها عوامل محددة في تدعيم الرعاية الذاتية بين الأشخاص البالغين الذين سبق تشخيصهم بالإصابة بمرض السكري من النوع الثاني في الرياض، المملكة العربية السعودية.

#### لماذا تمت دعوتي إلى المشاركة في هذه الدراسة ؟

لقد تم دعوتك بالمشاركة لانك في الفريق الصحية الذي يقدم رعاية طبية للمرضى المصابين بالمرض السكري النوع الثاني .

#### هل تتوجب علي المشاركة في هذا الدراسة؟

لا . قرار المشاركة في الدراسة يعود إليك وحدك و لك كامل الحرية للانسحاب من الدراسة في اي وقت دون التبرير لذلك. أرجو ان تعلم ان عدم مشاركتك أو انسحابك من الدراسة في اي وقت لن يؤثر على الخدمات الصحية المقدمة لك حالياً أو في المستقبل. وأن ورقة معلومات المشارك هذه التي بين أيديك سوف تزودك بالتفاصيل لمساعدتك على اتخاذ هذا القرار وبإمكانك الاتصال بالباحثة إذا كانت لديك أي أسئلة حول هذه الدراسة. في حالت موافقتك على المشاركة في هذه الدراسة سوف يتم الطلب منك التوقيع على استمارة موافقة ولديك الحرية في الانسحاب من المشاركة في أي وقت.

#### ما الذي سيطلب مني فعله لو قررت المشاركة في الدراسة؟

إذا وافقت على المشاركة في الدراسة , بإمكانك المشاركة في هذا الدراسة بطريقتين وهما كما يلي:  
أولاً : سوف يتطلب منك تعبئة استبيانات وهذا سيستغرق منك وقتاً يتراوح بين عشرة إلى خمسة عشرة دقيقة لإكمالها. والهدف من هذه الاستبيانات هو لقياس خمس نشاطات تتعلق بالرعاية الذاتية وهي: اتباع الحمية الغذائية و ممارسة الرياضة و العناية بالقدمين و استخدام العلاج طبقاً للارشادات الطبية و الفحص المستمر لمستوى السكر في الدم.  
ثانياً : سوف يتم دعوتك لمقابلة في حالت رغبتك بالمشاركة. و هدف من ذلك لتوفير فهماً أعمق عن طبيعة الدعم المقدم إلى الأشخاص المصابين بمرض السكري من النوع الثاني .لن تزيد المقابلة عن ساعة أو ساعتين و يتم تسجيلها و كتابتها ثم تحليلها.

#### ما هي الفوائد والمخاطر المحتملة لهذه المشاركة؟

ليست هناك اي مخاطر شخصية أو أخطار طبية مرتبطة بمشاركتك في هذه الدراسة

#### ما هي الفائدة التي ألتقاها إذا شاركت في هذا البحث؟

المشاركة في هذه الدراسة هي مشاركة طوعية تماماً.

#### ما يحصل إذا كانت هناك مشكلة؟

إذا كان لديك شكوى تخص الدراسة في أي وقت , فأرجوا منك الاتصال بالمشرف علي الدراسة مباشرة وهو الدكتور ميتو (على عنوانه الإلكتروني: D. Meeto@salford.ac.uk و رقم هاتفه 161 295 6478 (0) 44+). وفي حالت رغبتك بالاستمرار باشكوي فنرجو الاتصال بمديرة المشاريع بالجامعة سالفورد الخاصة بالكلية التمريض.

أنيشا كوريان، مديرة مركز البحوث، جي 08 جول هاوس، آكتون سكوير، جامعة سالفورد أم5 4دبليو تي.

العنوان الإلكتروني: A. kurien@salford@ac.uk و رقم الهاتف: 161 295 5276 (0) 44+

#### هل يتم الحفاظ على سرية مشاركتي في هذا البحث؟

جميع المعلومات المستقاة سوف تعامل بكامل السرية. سوف يتم حفظ جميع المعلومات في موقع جامعة سالفورد حيث لن

يتمكن من الوصول إليه سوى الباحثة أو مشرفها . سوف يتم مسح اسمك أو هويتك من النتائج في التقارير المكتوبة أو المنشورة .

**ما سيحصل إذا لم أستمّر في المشاركة في هذه الدراسة؟**

قرار المشاركة في الدراسة يعود إليك وحدك و لك كامل الحرية للانسحاب من الدراسة في اي وقت دون التبرير لذلك. أرجو ان تعلم ان عدم مشاركتك أو انسحابك من الدراسة في اي وقت لن يؤثر على الخدمات الصحية المقدمة لك حالياً أو في المستقبل. في حالت انسحابك من الدراسة فإن كافة المعلومات والبيانات التي تم جمعها منك سوف يتم اتلافها ومسح اسمك من كافة ملفات هذه الدراسة.

**ما سيحصل لنتائج هذه الدراسة البحثية؟**

سوف أقوم بإستخدام النتائج في كتابة التقرير النهائي لرسالة الدكتوراه. و لكن لن أقوم بكشف هويتك أو اسمك في اي من التقارير المكتوبة، إذا كنت ترغب في الحصول على نتائج الدراسة , فليس عليك سوى اخباري بذلك و سأقوم بإرسال ملخص النتائج فور الانتهاء منها.

**من الذي يقوم بتنظيم أو كفالة هذا البحث؟**

يقوم بتنظيمه الدراسة كل من جامعة سالفورد في المملكة المتحدة و وزارة الصحة في المملكة العربية السعودية. إذا كانت لديكم أية أسئلة في المستقبل بما يتعلق بهذه الدراسة البحثية فيإمكانكم الاتصال بنا على رقم الهاتف (644 6077) أو بواسطة البريد الإلكتروني على العنوان s.i.m.Alsomali@edu.salford.ac.uk أو الإتصال بالمشرفين على هذا البحث (بواسطة البريد الإلكتروني) كما يلي. وإذا كنتم تفضلون فيإمكاننا أن نرتب مناقشة الدعوة للمشاركة في الدراسة وجهاً لوجه في مكان ووقت ملائم لكلا الطرفين.

**Appendix 11: QUESTIONNAIRE OF DIABETES SELF CARE ACTIVITIES**

**Thank you for taking the time to complete this questionnaire. The questionnaire is divided into two parts. Questions 1 to 6 are about you. Questions 7 to 33 ask you about your diabetes self-care activities. For those questions relating to the past seven days, if you were ill during the past seven days, please think back to the last seven days when you were not ill. Please answer the questions as honestly and accurately as you can by placing a tick (✓) in the relevant box. Your answers will be strictly confidential.**

**ABOUT YOU**

**Question 1: Your gender**

1	2
Male	Female

**Question 2: Your age**

1	2	3	4	5	6
18-29	30-39	40-49	50-59	60-69	70 and above

**Question 3: Your Marital Status**

1	2	3	4
Single	Married	Divorced	Widow

**Question 4: Your educational level**

1	2	3	4	5	6
Primary	Intermediate	Secondary	Technical Degree	Bachelor	Higher Degree: MSc, PhD



**Question 5: Your employment**

1                      2                      3                      4                      5

Employed full time	Employed part time	Unemployed	Unable to work due to health problem	Retired

**Question 6: Your monthly income: Saudi Arabia, Riyal (SAR).**

1                      2                      3                      4                      5

Less than 4000 SAR	4000-8000 SAR	9000-13000 SAR	14000-18000 SAR	19000 SAR or above

**ABOUT YOUR DIET****Question 7: How many of the last seven days have you followed your diabetes diet as recommended by the diabetes care team?**

1            2            3            4            5            6            7            8

0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days

**Question 8: On average, over the past month, how many days per week have you followed your eating plan?**

1            2            3            4            5            6            7            8

0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days

**Question 9: On how many of the last seven days did you eat foods such as fresh fruits, fresh vegetables, whole grain bread, dried beans and bran?**

1            2            3            4            5            6            7            8

0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days





**Question 18: On how many of the last seven days did you test your blood sugar?**

1          2          3          4          5          6          7          8

0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days

**Question 19: On how many of the last seven days did you test your blood sugar as recommended by your diabetes care team?**

1          2          3          4          5          6          7          8

0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days

**ABOUT YOUR FOOT CARE**

**Question 20: Has your diabetes care team discussed with you about the importance of looking after your feet?**

1                                  2                                  3

Yes	No	I can't remember

**Question 21: On average, how often do you see your chiropodist (podiatrist)?**

- 1. Once every two weeks
- 2. Once every month
- 3. Once every three months
- 4. Once every six months
- 5. Once every twelve months
- 6. When I think it is necessary

**Question 22: In between seeing my chiropodist (podiatrist) I wash my feet with warm water and use a recommended mild soap. I then dry between my toes. I apply a skin cream. I do this**

1.	Every day	<input type="checkbox"/>
2.	Every other day of the week	<input type="checkbox"/>
3.	At least twice a week	<input type="checkbox"/>
4.	At least once a week	<input type="checkbox"/>
5.	When I think it is necessary	<input type="checkbox"/>

**Question 23: On how many of the last seven days did you check and take care of your feet?**

1            2            3            4            5            6            7            8

0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**Question 24: On how many of the last seven days did you inspect the inside of your shoes?**

1            2            3            4            5            6            7            8

0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

**Question 25: My diabetes is being controlled with**

1.	Tablet	<input type="checkbox"/>
2.	Insulin	<input type="checkbox"/>
3.	Tablet and insulin	<input type="checkbox"/>





## Arabic version for SDSCA questionnaires

### استبيان عن نشاطات الرعاية الذاتية لمرض السكري

الرجاء عدم الكتابة في هذا العمود	<p>أشركم على اعطاء الوقت لإكمال هذا الاستبيان. ينقسم الاستبيان إلى قسمين. الأسئلة من 1-6 المعلومات الشخصية. الأسئلة من 7-33 الواردة ادناه هي عن الانشطة المتعلقة بعنايتك الشخصية لمرض السكري خلال السبعة الايام الماضية ، إذا كنت مريضاً خلال الأيام السبعة الماضية، يرجى اعادة التفكير الى السبعة الايام الاخيرة التي لم تكن فيها مريض. الرجاء الإجابة على الأسئلة بأمانة ودقة بقدر ما تستطيع بوضع علامة (√) في المربع المناسب. سوف يتم الحفاظ على إجاباتك بسرية تامة.</p>																		
	<p>المعلومات الشخصية</p> <p>السؤال 1. الجنس:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="width: 50%; text-align: center;">2</td> <td style="width: 50%; text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">أنثى</td> <td style="text-align: center;">ذكر</td> </tr> <tr> <td style="height: 20px;"></td> <td style="height: 20px;"></td> </tr> </table>	2	1	أنثى	ذكر														
2	1																		
أنثى	ذكر																		
	<p>السؤال 2. العمر:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="width: 16.6%; text-align: center;">6</td> <td style="width: 16.6%; text-align: center;">5</td> <td style="width: 16.6%; text-align: center;">4</td> <td style="width: 16.6%; text-align: center;">3</td> <td style="width: 16.6%; text-align: center;">2</td> <td style="width: 16.6%; text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">70 سنة فما فوق</td> <td style="text-align: center;">69-60</td> <td style="text-align: center;">59-50</td> <td style="text-align: center;">49-40</td> <td style="text-align: center;">39-30</td> <td style="text-align: center;">29-18</td> </tr> <tr> <td style="height: 20px;"></td> <td style="height: 20px;"></td> <td style="height: 20px;"></td> <td style="height: 20px;"></td> <td style="height: 20px;"></td> <td style="height: 20px;"></td> </tr> </table>	6	5	4	3	2	1	70 سنة فما فوق	69-60	59-50	49-40	39-30	29-18						
6	5	4	3	2	1														
70 سنة فما فوق	69-60	59-50	49-40	39-30	29-18														
	<p>السؤال 3: الحالة الاجتماعية</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="width: 25%; text-align: center;">4</td> <td style="width: 25%; text-align: center;">3</td> <td style="width: 25%; text-align: center;">2</td> <td style="width: 25%; text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">أرمل/ أرملة</td> <td style="text-align: center;">مطلق/ مطلقة</td> <td style="text-align: center;">متزوج/ متزوجة</td> <td style="text-align: center;">عازب/ عازبة</td> </tr> <tr> <td style="height: 20px;"></td> <td style="height: 20px;"></td> <td style="height: 20px;"></td> <td style="height: 20px;"></td> </tr> </table>	4	3	2	1	أرمل/ أرملة	مطلق/ مطلقة	متزوج/ متزوجة	عازب/ عازبة										
4	3	2	1																
أرمل/ أرملة	مطلق/ مطلقة	متزوج/ متزوجة	عازب/ عازبة																



السؤال 4. المستوى التعليمي:

6	5	4	3	2	1
درجة علمية أعلى، الماجستير الدكتوراه	بكالوريوس	درجة تقنية (فنية)	الثانوية	المتوسطة	ابتدائية

السؤال 5: عملك

5	4	3	2	1
متقاعد	غير قادر على العمل بسبب مشكلة صحية	لا أعمل	أعمل بدوام جزئي	أعمل بدوام كامل

السؤال 6. الدخل الشهري:

5	4	3	2	1
19000 ريال سعودي أو أعلى	14000-18000 ريال سعودي	9000-13000 ريال سعودي	4000-8000 ريال سعودي	أقل من 4000 ريال سعودي

حول الحمية الغذائية الخاصة بك

السؤال 7: كم عدد الأيام من بين الأيام السبعة الماضية كنت تتبع الحمية الغذائية الخاصة بمرض السكري على النحو الذي أوصى بها الفريق الصحي؟

8	7	6	5	4	3	2	1
7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	ولا يوم

	<p>السؤال 8: على مدى الشهر الماضي، ومعدل كم يوم في الأسبوع اتبعت نظاما غذائيا الخاصاً لك؟</p>							
	8	7	6	5	4	3	2	1
	7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	ولا يوم
	<p>السؤال 9: كم يوم من الأيام السبعة الماضية تناولت الأطعمة مثل الفواكه الطازجة والخضار الطازجة والخبز والحبوب الكاملة، والفاصوليا المجففة والنخالة؟</p>							
	8	7	6	5	4	3	2	1
	7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	ولا يوم
	<p>السؤال 10: كم يوم من الأيام السبعة الماضية تناولت الحلويات مثل الكيك والمشروبات الغازية والبسكويت والمربى والشوكولاتة وعصائر الفاكهة؟</p>							
	8	7	6	5	4	3	2	1
	7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	ولا يوم
	<p>السؤال 11: كم يوم من الأيام السبعة الماضية تناولت الأطعمة مثل اللحوم الحمراء ومنتجات الألبان؟</p>							
	8	7	6	5	4	3	2	1
	7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	ولا يوم
الرياضة	ممارسة							
	<p>السؤال 12: هل اقترح عليك الفريق الصحي لرعاية مرضى السكري أن تمارس التمارين الرياضية لفترة محددة من الزمن؟</p>							
3	2		1					
لا أستطيع أن أتذكر	لا		نعم					

<p><b>السؤال 13: كم يوم من الأيام السبعة الماضية مارست نشاط رياضي اوصى بها الفريق الصحي الخاص بك؟</b></p>							
8	7	6	5	4	3	2	1
7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	و لا يوم
<p><b>السؤال 14: كم يوم من الأيام السبعة الماضية مارست نشاط رياضي لمدة 30 دقيقة على الأقل (مجموع الدقائق من النشاط المتواصل , بما فيه المشي)؟</b></p>							
8	7	6	5	4	3	2	1
7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	و لا يوم

<p><b>السؤال 15: كم يوم من الأيام السبعة الماضية مارست تمرينا رياضيا (مثل السباحة، والمشي)، غير الذي تفعله في المنزل أو كجزء من عملك؟</b></p>							
8	7	6	5	4	3	2	1
7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	و لا يوم
<p><b>السؤال 16: هل أوصى فريق الصحي لرعاية مرضى السكري الخاص بك بأن تقوم بفحص نسبة السكر في الدم؟</b></p>							
3	2	1					
لا أستطيع أن أتذكر	لا	نعم					
<p><b>السؤال 17: كم عدد المرات التي اوصى بها الفريق الصحي لرعاية مرضى السكري أن تقوم بفحص نسبة السكر في الدم؟</b></p>							

<input type="checkbox"/>	1. كل يوم
<input type="checkbox"/>	2. مرتان في الأسبوع
<input type="checkbox"/>	3. بين يوم وآخر
<input type="checkbox"/>	4. لم يتم اعطاء أي توجيهات

السؤال 18: كم يوم من الأيام السبعة الماضية قمت بفحص نسبة السكر في الدم؟

8	7	6	5	4	3	2	1
7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	و لا يوم

السؤال 19: كم يوم من الأيام السبعة الماضية قمت بفحص نسبة السكر في الدم على النحو الموصى به من قبل فريق الصحي لرعاية مرضى السكري الخاص بك؟

8	7	6	5	4	3	2	1
7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	و لا يوم

السؤال 20: هل ناقش فريق الصحي لرعاية مرضى السكري معك حول أهمية الاعتناء بقدميك؟

3	2	1
لا أستطيع أن أتذكر	لا	نعم

السؤال 21: معدل كم مرة تقابل اخصائي الأقدام الخاص بك (معالج الأرجل)؟

- |                          |                         |
|--------------------------|-------------------------|
| <input type="checkbox"/> | 1. مرة في كل أسبوعين    |
| <input type="checkbox"/> | 2. مرة في كل شهر        |
| <input type="checkbox"/> | 3. مرة في كل ثلاثة أشهر |
| <input type="checkbox"/> | 4. مرة في كل ستة أشهر   |

	<p>5. مرة في كل انثى عشر شهراً <input type="checkbox"/></p> <p>6. عندما أجده ضرورياً <input type="checkbox"/></p>																								
<p><b>السؤال 22:</b> في ما بين زيارات اخصائي الأقدام الخاص بي (معالج الأرجل) أغسل قدمي بالماء الدافئ واستخدام الصابون الموصى بها ثم اجفف ما بين أصابع قدمي و أضع كريم الجلد. أفعل هذا</p>																									
	<p>1. كل يوم <input type="checkbox"/></p> <p>2. بين كل يوم وآخر <input type="checkbox"/></p> <p>3. على الأقل مرتان في الأسبوع <input type="checkbox"/></p> <p>4. على الأقل مرة في الأسبوع <input type="checkbox"/></p> <p>5. عندما أجده ضرورياً <input type="checkbox"/></p>																								
<p><b>السؤال 23:</b> كم يوم من الأيام السبعة الماضية قمت بفحص قدميك والعناية بهما؟</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td> </tr> <tr> <td>7 أيام</td><td>6 أيام</td><td>5 أيام</td><td>4 أيام</td><td>3 أيام</td><td>2 يوم</td><td>1 يوم</td><td>و لا يوم</td> </tr> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td> </tr> </table>		8	7	6	5	4	3	2	1	7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	و لا يوم								
8	7	6	5	4	3	2	1																		
7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	و لا يوم																		
<p><b>السؤال 24:</b> كم يوم من الأيام السبعة الماضية تفقدت ما بداخل حذائك؟</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td> </tr> <tr> <td>7 أيام</td><td>6 أيام</td><td>5 أيام</td><td>4 أيام</td><td>3 أيام</td><td>2 يوم</td><td>1 يوم</td><td>و لا يوم</td> </tr> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td> </tr> </table>		8	7	6	5	4	3	2	1	7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	و لا يوم								
8	7	6	5	4	3	2	1																		
7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	و لا يوم																		
<p><b>السؤال 25:</b> يتم التحكم في مرض السكري لدي بواسطة</p> <p>1. تناول الحبوب <input type="checkbox"/></p> <p>2. الانسولين <input type="checkbox"/></p> <p>3. تناول الحبوب والانسولين <input type="checkbox"/></p>																									

السؤال 26: كم يوم من الأيام السبعة الماضية تناولت الدواء الخاص بالسكري الموصى به لك على النحو الذي حدده الطبيب المعالج؟

8	7	6	5	4	3	2	1
7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	و لا يوم

السؤال 27: كم يوم من الأيام السبعة الماضية أخذت حقن الأنسولين الموصى بها لك؟

8	7	6	5	4	3	2	1
7 أيام	6 أيام	5 أيام	4 أيام	3 أيام	2 يوم	1 يوم	و لا يوم

السؤال 28: هل ناقش فريق الرعاية الصحية الخاص بمرض السكري معك حول الحاجة للحد من كمية الدهون في النظام الغذائي الخاص بك؟

2	1
لا	نعم

السؤال 29: هل تقوم في الوقت الحاضر بتقليل كمية الدهون في النظام الغذائي الخاص بك؟

2	1
لا	نعم

السؤال 30: كم من الوقت مضى عليك الآن وأنت تقوم بتقليل كمية الدهون في النظام الغذائي الخاص بك؟

1. منذ أقل من شهر واحد
2. 1-3 أشهر
3. 4-6 أشهر
4. 7-12 شهراً
-

5. أكثر من 12 شهراً <input type="checkbox"/>	6. لم أقوم بتقليل كمية الدهون									
<b>السؤال 31: هل تعتقد أنه من الضروري تقليل كمية الدهون في النظام الغذائي الخاص بك؟</b>										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;">3</td> <td style="width: 33%; text-align: center;">2</td> <td style="width: 33%; text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">لا أعرف</td> <td style="text-align: center;">لا</td> <td style="text-align: center;">نعم</td> </tr> <tr> <td style="height: 20px;"></td> <td></td> <td></td> </tr> </table>	3	2	1	لا أعرف	لا	نعم				
3	2	1								
لا أعرف	لا	نعم								
<b>السؤال 32: هل أعطيت في الأونة الأخيرة بعض التفكير حول التغييرات التي يمكن أن تقوم بها لتقليل كمية الدهون في النظام الغذائي الخاص بك ؟</b>										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">2</td> <td style="width: 50%; text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">لا</td> <td style="text-align: center;">نعم</td> </tr> <tr> <td style="height: 20px;"></td> <td></td> </tr> </table>	2	1	لا	نعم						
2	1									
لا	نعم									
<b>السؤال 33: هل انت واثق من أنك سوف تقلل من كمية الدهون في النظام الغذائي الخاص بك؟</b>										
<input type="checkbox"/>	1. لست واثقاً على الإطلاق									
<input type="checkbox"/>	2. واثق بشكل متوسط									
<input type="checkbox"/>	3. واثق إلى درجة ما									
<input type="checkbox"/>	4. واثق جداً									
<b>نهاية الاستبيان</b>										
أشركم على إعطاء الكثير من وقتكم لإكمال هذا الاستبيان										

**Appendix 12: Approval to use these SDSCA questionnaires was secured from the author.**

Dear Sabah,

Thank you for your payment of \$25 for permission to use the Summary of Diabetes Self Care Activities (SDSCA) in your study. Now that we have received your payment, you have our permission to use the English version of the Summary of Diabetes Self-Care Activities Questionnaire in your research project and we will be able to provide answers to any questions you may have. We have attached the 2000 Diabetes Care article with the SDSCA psychometric information. At the end of the article, there is an appendix with the English version of the questionnaire, and the scoring information. We have also attached a user-friendly copy of the English version of the SDSCA instrument.

Please be sure to check our website first for answers to the most frequently asked questions: <http://www.ori.org/sdsc>

We wish you every success with your research,  
Deborah

Deborah  
Senior  
Oregon  
1776  
Eugene, Oregon 97403  
<http://www.ori.org/>

J.  
Research  
Research  
Millrace

Toobert,

PhD  
Scientist  
Institute  
Drive

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## Arabic version for Study Participant Consent Form

### استمارة موافقة المشارك في الدراسة البحثية

دور دعم الانظمة المهنية و الاجتماعية كمحددات للرعاية الذاتية بين البالغين المصابين بالنوع الثاني من مرض السكري في الرياض, السعودية

أرجوا قراءة جميع العبارات التالية و إذا كنت موافقا أرجو توقيع الاستمارة بجانب(اسم المشارك)

اسم الباحثة (الباحثين): صباح الصومالي

نعم لا

- أؤكد بأنني قد قرأت وفهمت ما ورد في ورقة معلومات الدراسة البحثية الوارد عنوانها أعلاه (النسخة 2، 15/12/09) وقد أتيت لي الفرصة في طرح الأسئلة بشأنها.
- كما أدرك بأن مشاركتي في هذه الدراسة البحثية هي مشاركة طوعية ولديّ الحرية في الانسحاب منها في أي وقت وبدون أن يتوجب عليّ إعطاء أي سبب لذلك وبدون أن يكون هناك أي تأثير لذلك على حقوقي القانونية.
- أدرك بأنه يتم الحفاظ على اسمي واشتراكي في هذه الدراسة البحثية بسرية.
- أدرك بأن أية معلومات شخصية حولي مثل عنوان البريد الإلكتروني الخاص بي وعنوان الاتصال لا تتم المشاركة بها خارج نطاق فريق هذه الدراسة البحثية وسوف لا تستخدم إلا لأغراض هذا البحث.
- وأفهم بأن المعلومات التي أزودها سوف يتم إستخدامها بدون كشف هوية المشارك.
- أوافق على المشاركة في مقابلة يتم تسجيلها صوتياً على الشريط.
- أوافق على المشاركة في الدراسة الواردة عنوانها أعلاه.

التوقيع

التاريخ

اسم المشارك

اسم الباحثة

التاريخ

(صباح الصومالي)  
التوقيع

**Appendix 14**  
**Interview Guide**

**Appendix 6: Interview Guide, Interview questions for people with type 2 diabetes.**

**Thank you for taking part in this interview. The interview itself consists of 19 questions. I would like to start by asking the first question, which is:**

**Question 1**

In your opinion, what does it mean when we say that someone is healthy?

**Question 2**

Do you feel you have led a healthy life?

**Question 3**

What was it that made you go to see the doctor?

<p><b>Explore:</b></p> <p>Symptoms of diabetes</p> <p>Symptoms      unrelated      to</p>
---

**Question 4**

What do you think has caused your diabetes?

**Question 5**

5 a) How did you feel/react when you were first told that you had diabetes?

5 b) If someone were to ask you, how would you describe the experience of living with a diagnosis of diabetes?

**Explore**

Way of life

Sexuality

Food

**Question 6**

How would you describe your knowledge of diabetes?

**Question 7**

What kind of treatment are you presently receiving from your doctor in order to control your diabetes?

**Explore**

Insulin

Tablets

Diet

**Question 8**

In your opinion, what do you think are the worries or troubles, if any, that people with diabetes have?

**Explore**

Hypoglycaemia

Hyperglycaemia

Circulation

Nervous system

### Question 9

Having diabetes means that the person is expected to adhere to a wide range of responsibilities in order to control the condition. In your opinion, what do you think these responsibilities are?

#### Explore

Insulin

Blood glucose testing

Urine testing

Diet

### Question 10

There are times and for various good reasons a person is not always able to adhere to treatment. This does not mean that the person is lacking self-control. Can you give me some examples of instances when?

5 a) You found it hard to adhere to your treatment

5b) When you have not adhered to your treatment

### Question 11

From time to time a person with diabetes does experience side effects due to diabetes and through not adhering to ongoing treatment. Personally, have you experienced any side effects or complications from having diabetes or through not adhering to the prescribed treatment?

### Question 12

Generally speaking, a person tends to cope better with diabetes if there is continuous support for that person. In your case, what would you say has been the best source of ongoing support in helping you to cope with your diabetes?

#### Explore

Doctor

Diabetes care team

Diabetes information booklets

Family members

### Question 13

When thinking about support, how would you describe the support you receive from?

1. Diabetes care team
2. Family members
3. Friends and relatives

### Question 14

To what extent does the support you receive match your expectations and how effective has this support been?

**Question 15**

Every medical condition carries a certain degree of risk. In so far as your own diabetes is concerned, what would you say are your own worries about having diabetes?

**Question 16**

It is hoped that living with diabetes will not prevent the person from leading a normal and trouble free life. At a personal level, how do you view the future in so far as living with diabetes is concerned?

**Question 17**

In your opinion, in what ways does having a diagnosis of diabetes impact on the life of the individual?

<p><b>Explore</b></p> <p>Marriage/divorce</p> <p>Having children</p> <p>Social isolation</p>
--

**Question 18**

How often do you attend the diabetes clinic? In your opinion, why do you think it is important to attend the diabetes clinic?

### Question 19

Finally, what aspect/aspects of your treatment do you find the easiest to adhere to and the most difficult to adhere to?

**End of interview. Thank you very much for taking part in this interview.**

### Arabic version for Interview Guide, Interview questions for people with type 2 diabetes

أسئلة المقابلة الشخصية مع المرضى المصابون بمرض السكري من النوع الثاني. شكراً لك على المشاركة في هذه المقابلة. تتكون المقابلة ذاتها من 19 سؤالاً. وأود أن أبدأ بطرح السؤال الأول، وهو كالتالي:

#### السؤال 1

في رأيك، ماذا نعني عندما نقول أن شخصاً ما هو شخص يتمتع بصحة جيدة؟

#### السؤال 2

هل تشعر أنك تعيش حياة صحية؟

#### السؤال 3

ما الذي يجعلك تذهب لرؤية الطبيب؟

استكشف:

أعراض مرض السكري

أعراض لا علاقة لها بمرض السكري



#### السؤال 4

برأيك ما الذي تسبب بإصابتك بمرض السكري؟

#### السؤال 5

5 أ) كيف كان شعورك/ ردة فعلك عندما قيل لك أول مرة إن لديك مرض السكري؟  
5 ب) إذا كان شخص يسألك، كيف تصف تجربة العيش مع تشخيصك بالإصابة بمرض السكري؟

#### استكشف:

طريقة الحياة

الحالة الجنسية

الطعام

المسائل الاجتماعية

#### السؤال 6

كيف تصف معرفتك بمرض السكري؟

السؤال 7

أي نوع من العلاج تتلقاه في الوقت الحاضر من طبيبك لكي تتمكن من السيطرة على مرض السكري لديك؟

#### استكشف:

الأنسولين

تعاطي الحبوب

الحمية الغذائية

الطب التكميلي

#### السؤال 8

في رأيك، ما تعتقد هي المخاوف أو المتاعب، إن وجدت، التي تكون لدى الأشخاص الذين يعانون من مرض السكري؟

**استكشف:**

نقص سكر الدم

فرط سكر الدم

دوران الدم

الجهاز العصبي

مشاكل الجلد

9

**السؤال**

الإصابة بمرض السكري يعني أنه من المتوقع أن شخص المصاب به يلتزم باتباع مجموعة واسعة من المسؤوليات لكي يتمكن من  
ما تعتقد ما هي هذه المسؤوليات؟

**استكشف:**

الأنسولين

اختبار نسبة السكر في الدم

اختبار البول

اتباع حمية غذائية

الجلد

التكيف مع العادات الاجتماعية

هناك أوقات ولأسباب مختلفة وجيدة يكون الشخص غير قادر على الالتزام بالعلاج. هذا لا يعني أن الشخص يفتقر إلى ضبط النفس.  
هل يمكن أن تعطيني بعض الأمثلة على هذه الحالات عندما؟

5 أ) وجدت صعوبة في الالتزام بعلاجك

بعلاجك

تلتزم

لم

(ب)

5

## السؤال 11

من وقت لآخر الشخص المصاب بمرض السكري يعاني من أعراض جانبية بسبب مرض السكري، وبسبب عدم التزامه بتعاطي علاج مستمر. أنت شخصياً، هل واجهت أي آثار جانبية أو مضاعفات من وجود مرض السكري أو بسبب عدم التزامك بتعاطي العلاج الموصوف لك؟

## السؤال 12

بصفة عامة، إن أي شخص يميل إلى التعامل بشكل أفضل مع مرض السكري إذا كان هناك دعم مستمر متوفر لهذا الشخص. في حالتك، ما يمكن أن تقوله أنه كان أفضل مصدر للدعم المستمر في مساعدتك على التعامل مع مرض السكري؟

### استكشف:

الطبيب

فريق رعاية مرضى السكري

كتيبات المعلومات عن مرض السكري

أفراد الأسرة

الأصدقاء

## السؤال 13

عند التفكير	في الدعم،	كيف تصف	الدعم الذي	تتلقاه	من؟
1.	فريق	رعاية	مرض	السكري	
2.	أفراد	الأصدقاء	الأسرة		
3.	الأصدقاء	الأقارب			

## السؤال 14

إلى أي مدى أن الدعم الذي تحصل عليه يتطابق مع التوقعات الخاصة بك و ما كان مدى فعالية هذا الدعم؟

### السؤال 15

كل حالة طبية تحمل درجة معينة من المخاطر. بقدر ما يهم الأمر مرض السكري لديك، ما تقول أنها هي همومك الخاصة عن إصابتك بمرض السكري؟

### السؤال 16

من المؤمل أن الذين يعيشون مع الإصابة بمرض السكري لا تمنعهم هذه الإصابة بهذا المرض من ممارسة حياة طبيعية خالية من المتاعب. على المستوى الشخصي، كيف تنظر إلى المستقبل بقدر ما يتعلق الأمر بالعيش مع الإصابة بمرض السكري؟

### السؤال 17

في رأيك، بأي طرق أن التشخيص بالإصابة بمرض السكري يكون له تأثير على حياة الفرد؟

استكشف:

الزواج / الطلاق

إنجاب الأطفال

العزلة الاجتماعية

العمل

18

### السؤال

ما عدد المرات التي تحضر بها عيادة مرض السكري؟ في رأيك، لماذا تعتقد أنه من المهم أن تحضر إلى عيادة مرض السكري؟

19

### السؤال

أخيراً، ما هو الجانب/ الجوانب من علاجك الذي تجده أسهل للالتزام بالعلاج وما هو الجانب/ الجوانب التي تجدها أكثر صعوبة للالتزام بالعلاج؟

نهاية المقابلة. شكراً جزيلاً لك على المشاركة في هذه المقابلة.

## **Appendix 15**

### **Interview Guide**

#### **Appendix 15: Interview questions – Health Care Professional**

This interview is part of a course project for my PhD, The aim is to evaluate the nature of support given to people with T2DM in order to enable them to adhere to the prescribed diabetes self-care regimen while in the latter context it is envisaged to assess how people with T2DM perceive the efficacy of the support they receive from health care professionals as well as families and friends.

##### **Question 1**

Tell me something about yourself

##### **Question 2**

How long have you been working as a diabetes educator/ staff nurse?

##### **Question 3**

What formal educational training have you undertaken for this role?

##### **Question 4**

How would you describe your knowledge of diabetes?

##### **Question 5**

On average how many people with diabetes do you see in a month?

##### **Question 6**

In your opinion, how would you describe the relationship between the diabetes care team and people with diabetes?

##### **Question 7**

How would you describe the expectation of people with diabetes from the diabetes care team?

##### **Question 8**

In your opinion, how would you rate the knowledge of people with diabetes in order to manage their diabetes?

##### **Question 9**

What kind of knowledge do you think people with diabetes ought to have in order to effectively manage their diabetes?

##### **Question 10**

Based on your experience, how effective are the self-care activities of people with diabetes?

**Question 11**

In your opinion how would you describe the relationship that exist between people with diabetes and the diabetes educator/staff nurse?

**Question 12**

What aspect/s, if any, of that relationship do you think could be improved?

**Question 13**

In your opinion what kind of training do you feel you require, if any, in order to further improve the effectiveness of your role?

**Question 14**

Based on your experience how much support do people with diabetes receive from their family members/friends?

**Question 15**

In your opinion, how important is this support for the person with diabetes when undertaking self-care activities?

**Question 16**

In there anything you would like to add to this interview?

**End of interview. Thank you very much for taking part in this interview.**

## Arabic version for Interview Guide, Interview questions for HCPs

أسئلة المقابلة – موظفي الرعاية الصحية

السؤال 1

أخبرني شيئاً عن نفسك

السؤال 2

منذ متى وأنت تعمل كموظف تثقيف / أو كمرضى لمرض السكري؟

السؤال 3

ما هو التدريب الرسمي التعليمي الذي اضطلعت به لكي يمكنك من القيام بهذا الدور؟

السؤال 4

كيف تصف معرفتك عن مرض السكري؟

السؤال 5

في المتوسط كم عدد الأشخاص الذين يعانون من مرض السكري الذين تراهم في الشهر؟

السؤال 6

في رأيك، كيف تصف العلاقة بين فريق رعاية مرضى السكري ومرضى السكري؟

السؤال 7

كيف تصف ما يتوقعه الناس المصابون بمرض السكري من فريق رعاية مرضى السكري؟

السؤال 8

في رأيك، كيف تقيم معرفة الناس المصابين بمرض السكري لكي يتمكنوا من تدبير مرض السكري؟

السؤال 9

ما هو نوع المعرفة بحسب ما تعتقد الذي يجب أن يكون لدى الناس الذين يعانون من مرض السكري لكي يتمكنوا من تدبير مرض السكري لديهم بفعالية؟

السؤال 10

بناءً على خبرتك، ما مدى فعالية أنشطة الرعاية الذاتية للأشخاص الذين يعانون من مرض السكري؟

السؤال 11

في رأيك كيف تصف العلاقة القائمة بين الأشخاص الذين يعانون من مرض السكري وموظف التثقيف عن مرض السكري/المرضى؟

السؤال 12

ما هو الجانب/الجوانب، إن وجدت، من العلاقة بحسب ما تعتقد التي يمكن تحسينها؟

السؤال 13

في رأيك ما هو نوع التدريب الذي تشعر أنك تحتاجه، إن وجد، لكي تتمكن من زيادة تحسين فعالية دورك؟

السؤال 14

بناءً على تجربتك ما مدى الدعم الذي يحصل عليه الناس الذين يعانون من مرض السكري من أفراد أسرهم/أصدقائهم؟

السؤال 15

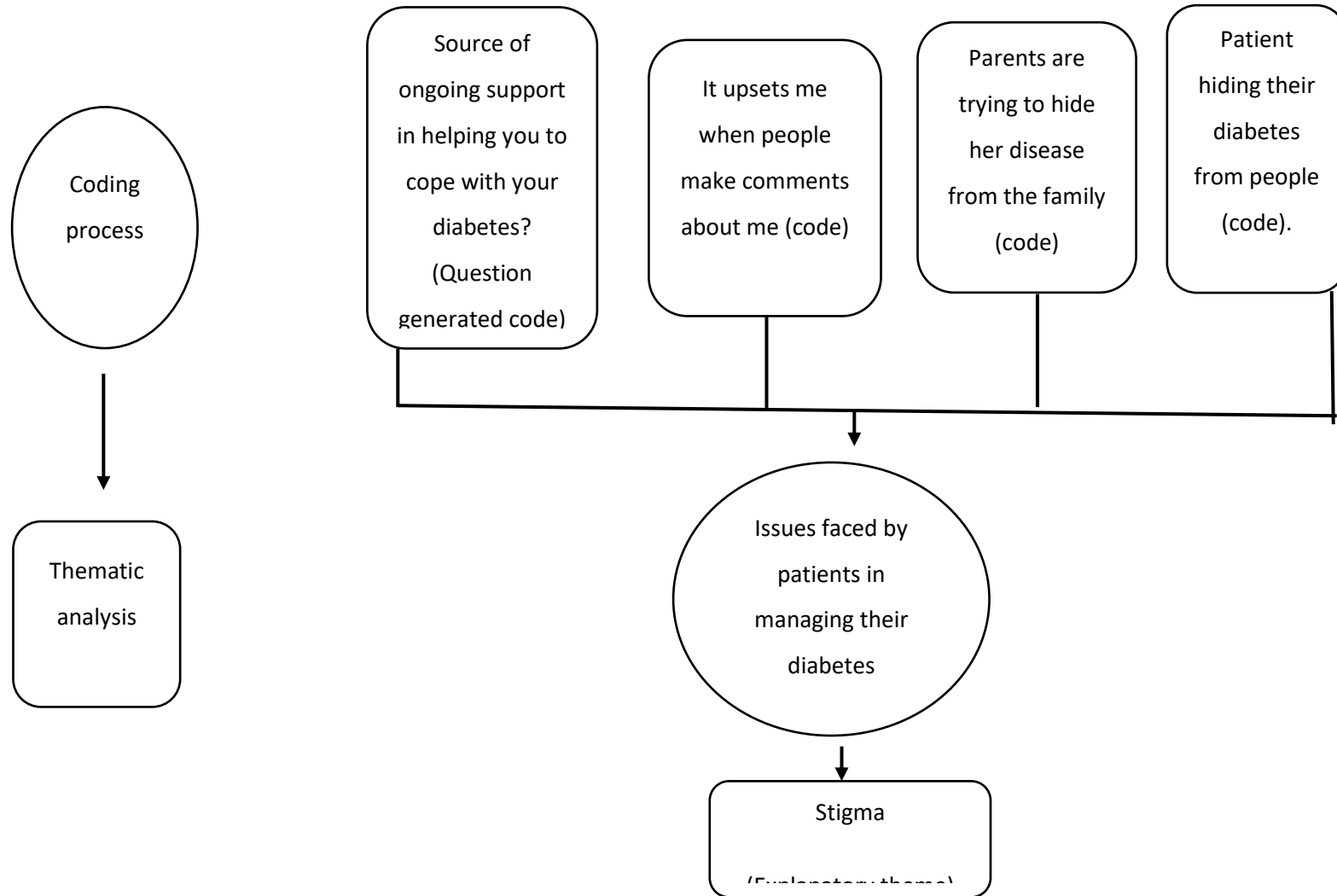
في رأيك، ما مدى أهمية هذا الدعم للشخص الذي يعاني من مرض السكري عند القيام بأنشطة الرعاية الذاتية؟

السؤال 16

هناك أي شيء تريد أن تضيفه إلى هذه المقابلة؟

نهاية المقابلة. شكراً جزيلاً لك على المشاركة في هذه المقابلة.

**Appendix 16: An example of the coding and data analysis process**





## Appendix 17

### Sample of transcripts for one-to-one interview

Face-to-face interview with HCPs

Date: Time: 1:00pm -2:00pm

The number of participants: 1

Given code for interviewee (participant): HCP1

Given code for interviewer (researcher): R

The highlighted areas are the exact quotation used in the main thesis.

Questions	Answer	Researcher note
<b>Question 1</b> <b>R: Tell me something about yourself?</b>	<b>HCP1:</b> I am ..., a health educator. I have been working in a .... for more than fifteen years. I have a diploma in nursing. I worked in the medical ward and I have experience of working with chronic disease patients (Data removed for anonymity).	This question used to get people talking and feeling comfortable.
<b>Question 2</b> <b>R: How long have you been working as a diabetes educator/ staff nurse?</b>	<b>HCP1:</b> I have been working as a diabetes educator for seven years.	This question used to know about experiences working with diabetic patients.

<p><b>Question 3</b></p> <p><b>R: What formal educational training have you undertaken for this role?</b></p>	<p><b>HCP1:</b> I had training as a health educator, and then I obtained specialisation in health education for diabetic patients.</p>	<p>This question focuses on the qualifications of diabetic healthcare teams..</p>
<p><b>Question 4</b></p> <p><b>R: How would you describe your knowledge of diabetes?</b></p>	<p><b>HCP1:</b> Unfortunately, there is a lack of knowledge about diabetes among the healthcare teams and in public as well. I studied health and illnesses during the nursing course, but working with diabetic patients helped me to gain more knowledge and experience in diabetes.</p>	
<p><b>Question 5</b></p> <p><b>R: On average how many people with diabetes do you see in a month?</b></p>	<p><b>HCP1:</b> The number of patients in the clinic follow up and who have appointments is approximately 30 to 40 per day. The number increased after the opening of the diabetes screening clinic...unfortunately this situation in the workplace affects my relationship with the patients and I do not have enough time to activate diabetes self-care activities for the patient... I have a lot of work to do in the clinic and as a result, I do not have enough time for my patients.</p>	
<p><b>Question 6</b></p> <p><b>R: In your opinion, how would you describe the relationship between the diabetes care</b></p>	<p><b>HCP1:</b> The relationship between patients and the healthcare team has not reached the required level of trust and listening to each other, because the healthcare team do not have enough time for the patients. I do not have enough time to motivate patients to practise diabetes self-care</p>	<p>This question discusses the relationship of HCPs with their patients.</p>

<p><b>team and people with diabetes?</b></p>	<p>activities...I do not have enough time for patients' health education.</p>	
<p><b>Question 7</b> <b>R: How would you describe the expectation of people with diabetes from the diabetes care team?</b></p>	<p><b>HCP1:</b> In one visit, patients want to know about their medication and condition, how to check blood glucose level, what diet to eat. The patients want to learn everything from one visit. At these times, patients may shout and become upset, even if I try to explain the situation in a nice way and that there are other patients waiting, they are still not happy.</p>	<p>This question discusses the knowledge the patients have about their diabetes.</p>
<p><b>Question 8</b> <b>R: In your opinion, how would you rate the knowledge of people with diabetes in order to manage their diabetes?</b></p>	<p><b>HCPs 1:</b> Nowadays, the patients may become more aware about diabetes self-care management and they accept their treatment. There are some patients who want to manage their diabetes, they are really changing their diet and they eat food that is suitable for diabetics.</p>	
<p><b>Question 9</b> <b>R: What kind of knowledge do you think people with diabetes ought to have in order to effectively manage their diabetes?</b></p>	<p><b>HCP1:</b> Generally, the patient needs to know the nature of his/her illness and the symptoms of high and low blood sugar level. I encouraged the patients to learn the signs and symptoms of high and low blood sugar. They should be aware of the complications of the disease, try to control it themselves and inform the doctor if there are any complications.</p>	
<p><b>Question 10</b> <b>R: Based on your experience, how effective are the self-</b></p>	<p><b>HCP1:</b> Patients have difficulty in managing diabetes because of their lifestyle, type of job, workload burden or working shifts, which makes it difficult to eat healthily or do exercise regularly. Some patients have told me that they eat</p>	<p>This question discusses the level of adherence to</p>

care activities of people with diabetes?	unhealthy food with their family because they cannot afford to buy healthy food, for financial reasons.	self-care activities by patients.
<b>Question 11</b> <b>R: In your opinion how would you describe the relationship that exists between people with T2DM and HCPS?</b>	<b>HCP 1:</b> I have a lot of work to do in the clinic and as a result I do not have enough time to educate patients, which affects my relationship with them, and some of them keep silent and do not ask any questions, because they think of themselves as experts and have had diabetes for many years. But newly diagnosed patients are more interested to ask questions and come to their appointments regularly. However, my relationship with the patients is not good as a health educator.	This question discusses the support or the role of HCPs with regard to patients with T2DM.
<b>Question 12</b> <b>R: What aspect/s, if any, of that relationship do you think could be improved?</b>	<b>HCPI:</b> I wish I had enough time with my patients; the majority of patient are talking about issues that not related to diabetes management. I know that I need to control the conversation between me and the patients when it becomes related to their personal life, but I feel ashamed to do that, especially with male or elderly patients. I find it difficult to stop and control discussions with those types of patient, who may avoid discussing their medical condition because they deny being diabetic.	This question discusses the support or the role of HCPs with regard to patients with T2DM.
<b>Question 13</b> <b>R: In your opinion what kind of training do you feel you require, if any, in order to further improve the</b>	<b>HCPI:</b> I feel the way we teach patients is boring and old fashioned, so it would be good if I could use different techniques such as different materials, technology and a different style. It would be more interesting and the patient would like it. The patients are in different age categories, so they need different education resources that are suited to their age and gender. So, I need to have training that improves my knowledge and skills to educate the patients. I know my patients are bored from my way of teaching; that	

<p><b>effectiveness of your role?</b></p>	<p>is clear to me when the patients are unwilling to attend their appointments at the diabetic educator clinic.</p>	
<p><b>Question 14</b></p> <p><b>R: Based on your experience, how much support do people with diabetes receive from their family members/friends?</b></p>	<p><b>HCP1:</b> I do not see any support for patients, whether from the family or the community. I have some female patients who do not go to the follow-up in the clinic, with the reason being that no one brings them to their appointment, which affects their diabetes self-management. One of my female patients has now been admitted to hospital because of hypercalcaemia complications: this patient did not come for her appointment for six months. Unfortunately, patients alone cannot manage their diabetes without help from family and friends.</p>	<p>This question is to discuss the support that patients with T2DM are receiving from their family.</p>
<p><b>Question 15</b></p> <p><b>R: In your opinion, how important is this support for the person with diabetes when undertaking self-care activities?</b></p>	<p><b>HCP1:</b> I think patients are not able to manage their diabetes without help from their family. I plan everything for them, give information that they need and assume they will get better and be able to manage the condition, but they get worse, because they cannot help themselves, and so I believe the family could help patients to carry out what they are learning from us to manage their condition.</p>	
<p><b>Question 16</b></p> <p><b>R: Is there anything you would like to add to this interview?</b></p>	<p><b>HCP1:</b> I believe to achieve a better outcome for managing diabetes, the healthcare team is required to work together as partners. For example, having group meetings as a diabetes educator with the doctors as well as dieticians regularly to discuss patients' problems and treatment plans would be helpful for us, to teach the patients according to their needs.</p> <p>Together they will learn more about the patient's condition than they do individually. Together I believe the diabetes care team can achieve an improvement in diabetes self-care management for patients.</p>	<p>Ending question brings the interview to closure.</p>

**Appendix 18: Number of participants recruited for interviews**

Setting	Patients with type 2 diabetes		HCPs	
	Approached	Consented	Approached	Consented
Hospital A	10 (5 female and 5 male )	10 (5 male and 5 female)	10	7
Hospital B	10 (5 female and 5 male )	10 (5 male and 5 female)	10	5
Total		20		12

**HCP Participant Characteristics**

HCP Participants	Numbers	Years of working
Diabetic educator	9	7
Diabetic nurse	2	7- 10 years
Staff nurse	1	1 ½

**Patients with T2DM Participant Characteristics in interviews**

Gender	Age groups	Marital status	Education level	Employment	Monthly Income
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Male	10	30-59	6	Married	10	Primary	4	Employed	6	4000-8000 SAR	2
		>60	4			Intermediate	2	Unemployed	4	< 4000 SAR	8
						Secondary	3				
						Bachelor's Degree	1				
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Female	10	30-49	5	Married	8	Primary	5	Employed	2	< 4000 SAR	10
		50-59	4	Divorced	1	Intermediate	2	Unemployed	8		
		>60	1	Widow	1	Secondary	3				

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### Appendix 19: Researcher Activity

No.	Title and Contents	Activity Type
1	Meetoo, D., Wong, L. & Alsomali, S. (2016). Pharmacological options for managing type 2 diabetes. <i>Nurse Prescribing</i> , 14(7), 330-337.	Published Works
2	Meetoo, D. & Alsomali, S. (2016). NG28: Promoting patient-centred care for adults with type 2 diabetes. <i>Nurse Prescribing</i> , 14(5), 236-245.	
3	Alsomali, S. (2017). The role of health care professionals and social support systems as determinants of self-care among adults diagnosed with type 2 diabetes mellitus in Riyadh, Saudi Arabia. [Presentation]. In SPARC 17 Conference Proceedings (UK). The University of Salford.	Conference Presentation
4	Alsomali, S. (2016). The role of health care professionals and social support systems as determinants of self-care among adults diagnosed with type 2 diabetes mellitus in Riyadh, Saudi Arabia. [Conference poster]. The University of Manchester in 'Methods Fair Symposium 2016', the University of Manchester.	



5	Alsomali, S. (2015). The role of health care professionals and social support systems as determinants of self-care among adults diagnosed with type 2 diabetes mellitus in Riyadh, Saudi Arabia. [Presentation]. International Nursing Day celebration in 2015 at the University of Salford.	Presentation at the University of Salford
6	Alsomali, S. (2015). The role of health care professionals and social support systems as determinants of self-care among adults diagnosed with type 2 diabetes mellitus in Riyadh, Saudi Arabia. [Presentation]. Celebrating PGR Research Day. The University of Salford.	
7	Participated in presentation for Master's student at the University of Salford, 2015.	
8	Alsomali, S. (2016). The role of health care professionals and social support systems as determinants of self-care among adults diagnosed with type 2 diabetes mellitus in Riyadh, Saudi Arabia. [Presentation]. Celebrating PGR Research Day. The University of Salford.	
9	Participated in presentation for Master's student at the University of Salford, 2016.	

10	Alsomali, S. (2018). The role of health care professionals and social support systems as determinants of self-care among adults diagnosed with type 2 diabetes mellitus in Riyadh, Saudi Arabia. [Presentation]. Care Seminar Series 207-2018. The University of Salford.	
11	Alsomali, S. (2017). The role of health care professionals and social support systems as determinants of self-care among adults diagnosed with type 2 diabetes mellitus in Riyadh, Saudi Arabia. [Presentation]. Celebrating PGR Research Day. The University of Salford.	
12	Attendance at 'Methods Fair Symposium 2016', the University of Manchester	Conference Attendance
13	Attendance at 'Diabetes Professional Care', 2016 Olympia, London, UK.	
14	Attendance at 'Health, Wellbeing and Society Research in 2017', The University of Salford.	