IDENTIFYING AND ESTABLISHING CONSENSUS ON COMPETENCIES REQUIRED BY REGISTERED NURSES WORKING IN KENYAN INTENSIVE CARE UNITS: A MODIFIED DELPHI STUDY

By

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Dedication

This thesis is dedicated to all ICU nurses in Kenya.

DEFINITIONS

Critically ill patient	A patient with an actual or potentially life-threatening condition requiring intervention to support organ function
Consensus	General agreement or a tendency towards group solidarity on an issue or belief
ICU experts	People who have significant competence in terms of knowledge, skills, and attitudes through critical care practice and education
Task shifting	The process of delegation whereby tasks are moved, where appropriate, to less specialised healthcare workers
New graduate registered nurse	For this study, registered nurses who have graduated and are in their first year of practice

LIST OF ABBREVIATIONS

Abbreviation	Expanded Form
AACN	American Association of Critical Care Nurses
ACGME	Accreditation Council for Graduate Medical Education
ACCCN	Australian College of Critical Care Nurses
ACLS	Advanced Cardiac Life Support
AKUSONAM	Aga Khan University School of Nursing and Midwifery
ANA	American Nurses Association
BLS	Basic Life Support
CACCN	Canadian Association of Critical Care Nurses
CC3N	Critical Care National Network Nurse Leads Forum
CFIR	Consolidated Framework for Implementation Research
COVID-19	Corona Virus Disease 2019
CPD	Continuous Professional Development
CPR	Cardiopulmonary Resuscitation
CINAHL	Cumulative Index of Nursing And Allied Health Literature
CLABSI	Central Line Associated Blood Stream Infection
CRRT	Continuous Renal Replacement Therapy
CVC	Central Venous Catheter
CVP	Central Venous Pressures
EBP	Evidence-Based Practice
EOLC	End Of Life Care
GUALS	Griffith University Affective Learning Scale
HIC	High-Income Countries
ICU	Intensive Care Unit
IOM	Institute of Medicine Competencies
KMPDU	Kenya Medical Practitioners, Pharmacists and Dentists Union
KMTC	Kenya Medical Training College
KNBS	Kenya National Bureau of Statistics
LMIC	Low- and Middle-Income Countries
MOH	Ministry of Health
NCK	Nursing Council of Kenya

NCD	Non-Communicable Diseases
NGO	Non-Governmental Organisations
NGRN	New Graduate Registered Nurse
NNAK	National Nurses Association of Kenya
NP	Nurse Practitioner
OSCE	Objective Structured Clinical Examination
PARiHS	Promoting Action on Research implementation in Health Services
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
ICN	International Council of Nurses
RE- AIM	Reach, Effectiveness, Adoption, Implementation, and Maintenance
RN	Registered Nurse
SARS-COV-2	Severe acute respiratory syndrome Corona virus 2
SPSS	Statistical Package for the Social Sciences
SSA	Sub Saharan Africa
TA	Thematic Analysis
UK	United Kingdom
USA	United States of America
WFCCN	World Federation of Critical Care Nurses
WHO	World Health Organisation
EfCCNA	European Federation of Critical Care Nurses National Associations

Abstract

Background

Nurses form the largest professional group in the Intensive Care Unit (ICU) workforce. Their proficiency in care delivery contributes to improved patient outcomes, reduced morbidity and mortality, and overall reduced cost of care. Many countries have established frameworks to support a set of core competencies held by all qualified ICU nurses. Kenya has yet to embark on a unifying competency framework, leading to ICU nurses' poor transferability of knowledge, skills, and attitudes because of differences in the scope and depth of competencies learned. Literature on the barriers and enablers for implementing a competency framework in Kenya is scant. How unification of competencies may best be achieved requires stakeholders' agreement on the required set of competencies and a procedural pathway to guide the implementation.

Aim

The primary aim of this study was to identify and establish consensus on competencies required by registered nurses working in Kenyan ICUs. The study also explored potential barriers, facilitators and strategies for implementing these competencies. This study is the first of its kind in the Kenyan context.

Methods

The study adopted a mixed-method design with a multistage approach. This involved three stages: an integrative review, two rounds of e-Delphi, and a virtual focus group consensus meeting. The integrative literature review on competencies/competency frameworks for ICU nurses aided in the generation of 91 competencies. Two rounds of Delphi were held; round two had an additional 12 competencies generated from the participant's feedback; all the competencies gained consensus. Following the Delphi rounds, a virtual consensus meeting was held with a subset of participants as key stakeholders to agree on implementation strategies. The study included a heterogeneous group of experts, justifying generalisability in applying the competencies nationwide.

Findings

All the competencies in both rounds achieved consensus by attaining a priori mean of ≥4. Notably, despite ICU competencies being universal, some competencies are culturally specific and may require contextual tweaking for their acceptability. These include competencies touching on palliative and end-of-life care, involvement of patients and their families in pain management, and competencies that require autonomous practice of nurses, like performance of invasive procedures. The key barriers and facilitators towards implementing the competencies that stood out spun around three key themes: resources, lack of stakeholders' involvement, and political influence. The key implementation strategies included clustering the competencies and establishing competencies champions in the clinical practice.

Conclusions and Recommendations

This study offers great insight into policy, practice, education, and future research. The competencies could be used to inform the Kenyan ICU curricula, orientation programs for nurses transitioning into ICU, and continuous development of ICU nurses.

Keywords: *Competencies, Competency framework, Intensive Care Unit, Registered Nurses, Kenya*

The Structure of the Thesis

This thesis is organised into nine chapters.

Chapter One

The thesis starts with an introduction and a brief overview of the research issue. Background information and context of the research are outlined to facilitate the readers' understanding of the research process. The research problem, significance, aim, objectives and questions are delineated here. The drivers sustaining the need to identify and establish consensus with these competencies are explored. The motivation of the researcher to conduct this study is also explained.

Chapter Two

Chapter two describes the concepts underpinning the study, analysing competency and competency framework. The chapter also discusses contemporary literature on nursing competencies, their assessments, teaching, and implementation. The theoretical frameworks that underpin this research are also discussed in this chapter, and how they inform the study.

Chapter Three

The chapter presents a critical appraisal of the literature pertaining to ICU nurses' competencies. An integrated literature review was conducted to set the scene, identify gaps, and review the existing competency frameworks to help compile a preliminary set of competencies further subjected to two rounds of Delphi for consensus. Justification of the use of an integrated review has also been provided in this chapter. The search process, search strategy and a table with a summary of the appraised literature are presented. A synthesis of the literature follows this according to the emerging themes. The identified gaps are highlighted, as well as the contribution of the literature to the current study.

Chapter Four

The philosophical aspects of the research paradigms are discussed in this chapter as to how they have influenced the methodological choice of the research design.

Chapter Five

Chapter five provides an explanation of the research methods and the process that was used to carry out this study. The research design and methods which employ the Delphi technique are discussed. The study area, population, sample selection, data collection and analysis procedures, reliability and validity, and ethical considerations are discussed.

Chapter Six

This chapter describes the results of the two rounds of Delphi. The demographic characteristics of the participants in the two rounds are presented. This is followed by results of each round of Delphi highlighting the competencies that achieved consensus, the highest rated and the lowest rated competencies. In the first round of Delphi, content analysis of other competencies deemed important by the participants is discussed with the resultant additional competencies. Potential barriers and facilitators towards the implementation of the competencies are also discussed.

Chapter Seven

This chapter presents the results of the virtual consensus meeting that followed the two Delphi rounds. The overview and the purpose of the meeting are outlined. The outcome of the meeting is discussed, guided by the meeting objectives.

Chapter Eight

This chapter presents a discussion of the study findings in relation to the literature and study context. This includes the Delphi findings and the virtual consensus meeting.

Chapter Nine

This chapter concludes this research project. Research contribution to the existing knowledge is discussed. Recommendations from the research findings are also provided. Study limitations are also declared.

CHAPTER ONE: INTRODUCTION

1.1 Introduction

Nurses comprise the most numerous professional group in the Intensive Care Unit (ICU) workforce. Their competence in care delivery has been shown to contribute to improved patient outcomes, reduced morbidity and mortality and overall lowered cost of care (De Silva et al., 2015; (Lakanmaa et al., 2015). In this regard, many developed countries across the world have developed critical care competencies/competency frameworks for their nurses that focus on the needs of a critically ill patient and include practice competencies underpinned by knowledge, behaviours, and ethos of critical care as its key components (Bench et al., 2003; Hadjibalassi et al., 2012; Macey et al., 2022). The competency frameworks address issues like what Kenya and other low- and middle-income countries (LMIC) are facing today, such as lack of an ICU competency-based curriculum, unstructured continuous professional development of ICU nurses, lack of formal orientation and assessment of competence of ICU nurses, and lack of standardisation of ICU nursing care (Bench et al., 2003; Ndirangu-Mugo et al., 2022; Zhang et al., 2019). This study, therefore, aims to identify and establish consensus on competencies required by Kenyan registered nurses working in ICUs.

This chapter introduces the study, providing background information, an overview of the research context, the author's motivation for conducting this study, and the drivers sustaining the need to identify and establish consensus on these competencies. The research problem, the significance, the aim, objectives, and the research questions will be laid out.

1.2 Background information

ICUs are highly technological departments of a hospital where critically ill patients with conditions of high mortality and morbidity are monitored. Nurses are the most numerous workforce that work round the clock with the patients. They must be competent and confident in dealing with the life-threatening conditions that patients present with for improved care, safe care and better outcomes (Baxter & Edvardsson, 2018; Wei, et al., 2018). There is a strong correlation between ICU nurses'

competencies and the quality of care they provide; the more competent they are, the better the quality of care (Osman et al., 2019). Unlike nurses working in general wards, ICU nurses are expected to have in-depth knowledge of the assessment, management, and care of the highly dependent patient with life-threatening conditions and be able to translate this knowledge into clinical practice (Deacon et al., 2017). In the high income countries (HIC), ICU nurses are well prepared for their role through post-registration education, transition programs, structured orientation programs, short-period training sessions, continuous education, and short lecture simulation skills (Ndirangu-Mugo et al., 2022). HICs have constructed competency frameworks that address and match the specific needs of their nurses (Zhang et al., 2019).

In the United Kingdom (UK), a National Competency Framework for Registered Nurses working in Critical Care was established to address the inconsistency of critical care registered nurses' education, training, and competency development (Deacon et al., 2017). In the United States of America (USA), the American Association of Critical Care Nurses (AACN) issued the AACN Synergy Model for Patient Care to facilitate ICU nurses' competence in providing optimal outcomes for patients and families. The Australian College of Critical Care Nurses (ACCCN) published standards for their specialist ICU nurses to provide benchmarks for their practice and conduct (Dunn et al., 2000).

Conversely, in LMIC, there is a dearth of literature describing the training and preparation of ICU nurses for their role (Macey et al., 2022). From the available literature, training of ICU nurses is offered mostly as post basic training and on-job-training with unstructured orientation and continuous education (Ndirangu-Mugo et al., 2022).

Whereas specialised ICU course is shown to increase the level of confidence in nurses, globally there is a shortage of specialised ICU nurses, which leads to employment of non-experienced nurses in ICUs (Baxter & Edvardsson, 2018; Gohery & Meaney, 2013). It is also a common practice for new graduate registered nurses (NGRN) being hired in ICUs, as is the case in the USA where new nurses may choose to enter practice directly into the ICU (DeGrande et al., 2018). In the UK, the decline in the nursing workforce, especially in specialty areas, has necessitated the employment of newly graduated registered nurses in the ICU (Elias & Day, 2020). Sub-Saharan Africa (SSA) is worst hit by the shortage of ICU prepared nurses, according to Bvumbwe and Mtshali (2018), with a disproportionately greater burden of critical illness from trauma, maternal

morbidity, pneumonia, meningitis, and other infections (Baker et al., 2015). The recent severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) further emphasised the scarcity of ICU nurses, necessitating task shifting in ICU and other healthcare settings (Vincent et al., 2022). The aetiology of these shortages includes retirements, service training costs, out migrations, effects of disease burden, e.g. Human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS) and an ageing workforce (Sousa et al., 2014; Vindigni et al., 2014).

The situation in Kenya is similar, where the shortage of trained nurses has necessitated non-specialised and NGRN being employed in the ICU. For example, a survey of the Kenyan ICU workforce in 2015 revealed that only 204 nurses among the 414 nurses serving in the country's 21 ICUs, with a bed capacity of 130, had formal ICU training (Okech et al., 2015). The highly technological and demanding ICU environment poses transition challenges such as transition shock, lack of confidence and stress to such nurses (Serafin et al., 2021). This may be attributed to their lack of knowledge and skills and the intensity of care the patients demand (Farnell & Dawson, 2006; Gohery & Meaney, 2013). This consequently poses quality and safety threats to ICU patients and their families. Therefore, a successful transition program for such nurses through structured orientation with ICU core competencies is required.

Literature supports specialty training as one of the determinants of healthcare outcomes. In her search for evidence about the relationship between nursing specialty certification and patient outcomes in acute care settings, Boyle (2017), found that higher rates of nursing specialty certification led to lower rates of total patient falls, pressure injuries, selected hospital-acquired infections, failure to rescue, and death. However, inconsistent, or contradictory evidence was also reported for the association of specialty certified nurses and lower total patient fall rates, selected hospital-acquired infection rates, and hospital-acquired pressure injuries (Martin et al., 2015). Anecdotal evidence from observations of ICU departments across Kenya has revealed variances in the knowledge, skills and, attitudes, values and technical abilities underpinning safe and effective critical care nursing and interventions. A standard set of competencies would also help promote the transfer of skills from one ICU to another across the country.

1.3 Overview of the research context

1.3.1 Healthcare in Kenya

Kenya, a lower–middle-income country in East Africa, has an estimated population of 46.05 million (2015 estimates). Communicable diseases still make up the leading causes of death, but Non-Communicable Diseases (NCDs) are creating an increasing burden on the health system (McCollum et al., 2018).

Healthcare services in Kenya are provided by public government-owned hospitals, private-for-profit organisations, and non-governmental organisations (NGOs) (Chuma et al., 2014; Tama et al., 2018). Private and Non-Governmental Organisation (NGO) facilities offer a superior level of care compared to public facilities of comparable scope, though they remain out of reach for most of the population due to their higher costs (Turin, 2010). Public health facilities are organised around a four-level system: (1) community services, (2) primary health services, (3) county referral services and (4) national referral services (Kenya Health Policy 2012-2030).

Kenya is a heterogeneous country, geographically, culturally, and economically. Healthcare needs in each region vary due to differences in geographic patterns of diseases (Moses et al., 2021). To respond to these unique challenges, Kenya is constitutionally divided into 47 counties, and healthcare was also devolved from national level to county level government in 2013 (Moses et al., 2021). Under devolution, the health service delivery function was transferred to county governments while the national government retained policy and regulatory functions (Tama et al., 2018). With devolution, the county government is expected to design innovative models and interventions that suit the unique health sector needs in their contexts. There has been improvement in health structural development with devolution, but not without a major challenge of lack of adequate resource allocation by the national government, leading to understaffed facilities and lack of supplies (Masaba et al., 2020).

1.3.2 History of ICU Nursing in Kenya

ICU nursing is a recent specialty in Kenya which emerged in the 1960s following a polio outbreak, which led to the opening of the first two-bedded ICU by the Japanese in one of the then (and now)

biggest national referral hospitals, Kenyatta National Hospital, formerly known as King James Hospital (Waweru-Siika et al., 2020). Consequently, the local nurses present received no formal training, only undergoing some on-the-job training from the Japanese. This was initially a three-month training programme, which later extended to nine months of training until the establishment of the first formal one-year in-service critical care nursing diploma programme at the Kenya Medical Training College (KMTC) in 1975 (Waweru-Siika et al., 2020).

The growing demand for ICU services led to other nurse training institutions, public, private, and faith-based, launching this programme to match the demands. Despite several institutions training ICU nurses, there is an acute shortage of specialised ICU nurses, as evidenced by a survey on the ICU workforce in the country in 2015, which revealed that only 204 (49%) of nurses among the 414 (serving in the country's 21 ICUs with a bed capacity of 130) had formal ICU training. Most nurses working in ICUs have no formal ICU training (Okech et al., 2015). An ICU nurse in Kenya is a Registered Nurse (RN) who practices in an ICU and whose education is at Diploma, Bachelor or master's level with or without any specialisation. Specialisation occurs as Higher Diploma in Critical Care for the general Diploma nurses who undertake specialist Diploma in ICU, post-graduate Diploma in Critical Care for Bachelor of Science in Nursing graduate nurses, or Master in Critical Care nurses who undertake ICU training at the master's degree level. These nurses assume the same job responsibilities and duties in the clinical areas regardless of their level of education and expertise.

The Nursing Council of Kenya is the regulatory body responsible for registering and licensing nurses in Kenya. According to the NCK current report, the number of ICU trained nurses in the country stands at 922 against a population of 47.5 million people (Kenya National Bureau of Statistics (KNBS) 2019). This could have been affected by such factors like an aging workforce with subsequent retirements and low recruitment and migration of young nurses (Miseda et al., 2017; Wakaba et al., 2014). A study on the impact of migration on the nursing workforce in Kenya showed that for every 4.5 nurses that Kenya adds to its nursing workforce, one nurse applies to migrate (Gross et al., 2011). The overall shortage of nurses in the public sector (the major employer of the health workforce) as per the Kenya Health Workforce Information System, ranges from 0.08-1.2 per 1000 (Wakaba et al., 2014).

1.3.3 ICU Nursing Education in Kenya

Nursing education in Kenya is offered at college and university levels and is regulated by the Nursing Council of Kenya (NCK) and the Commission for University Education (CUE) of Kenya. The NCK licences nurses at the end of their training and regulates their practice by providing the scope of practice for each cadre. ICU education in Kenya is offered on two levels: as a post-registration diploma programme for one year at a nursing college and as a postgraduate degree for two years (Fitzgerald et al., 2023). The NCK accreditation role involves evaluating and approving educational programmes, institutions, and clinical training centres (Wakaba et al., 2014). The NCK gives broad guidelines on curriculum development and approves the curriculums thus developed by the colleges. The guidelines provided include the content to be covered, and the required assessments, but no competencies. A mismatch of competencies to patient population needs are among other challenges facing Sub-Saharan Africa (SSA) health professionals' education and may impact the quality of care (Bvumbwe & Mtshali, 2018). The developed ICU competencies may provide the NCK with a building block for all other competencies for specialty courses in the country.

In Kenya, if a nurse considers applying for employment in an ICU department, a specialist diploma in ICU nursing is highly recommended. However, the nurses who hold a specialist diploma in ICU are few and cannot meet the demands. Hence, all RNs are eligible to work in ICUs, whether they are NGRNs or RNs transitioning from other departments.

Anecdotal evidence from observations of ICU departments across Kenya has revealed variances in the competencies of ICU nurses in various ICU settings within the country. This is thought to be related to the lack of consistency in their recruitment, transition into practice, and the post registration curriculum offered in different institutions nationwide.

1.4 Motivation for the study

The motivation for this study emanated from my personal experience and professional exposure. In my early career, I underwent a transition as an RN from a ward to ICU and this was a personal choice in a quest for a change in my career path. On induction to the ICU, I was not taken through any formal orientation, and my first few months felt like what Duchscher (2008) describes as being

thrown into the deep end of the pool to swim alone. I felt incompetent to handle a critically ill patient, and this caused much distress. On reflection, I would self-assess my knowledge, skills and attitudes and liken them to that of an advanced beginner in Benner's novice to expert model, Which describes an advanced beginner as an inexperienced nurse who relies on protocols and oversight from colleagues for practice (Benner, 1982). In Bloom's taxonomy of teaching, learning, and assessment, I would assess my initial knowledge, skills, and attitudes as lower-order skills (Bloom et.al. 1956).

As an academic at Aga Khan University School of Nursing and Midwifery (AKUSONAM), I became involved in the development of the post-registration ICU curriculum. It was at this juncture I was able to access post-registration ICU curricula from other institutions, and I noted variances in the organisation and content. The curricula are also content-laden rather than competency-based, with learning objectives and no learning outcomes. Such anomalies could lead to a theory-practice gap, inconsistencies in practice and consecutively impact the quality of care delivered in ICUs (Deacon et al., 2017).

My pursuit of a Master's degree in nursing education and my role as a nurse educator allowed me to become receptive to the issues of a theory-practice gap that exists in the experience of nurses who transition into ICU. The nurses are not adequately prepared to face the realities in these highly specialised clinical areas, even as registered nurses from various clinical contexts. I believe a well-defined competency framework would provide a blueprint for a curriculum with standard learning outcomes, assessment strategies, and graduate attributes. This may help standardise ICU education and ensure that nurses have standard skills transferable from one ICU to another across the country.

From what I have read in the literature, some countries like the Netherlands that experienced a shortage of ICU nurses used a strategy of recruiting non-ICU nurses who worked under the guidance of the specialised ICU nurses (Binnekade et al., 2003). Their presence generated an extra hour of care per patient per 8.5 hour shift for the specialised nurse but did not wholly sort out the shortage problem (Binnekade et al., 2003). What is recognised from this study is that what would have helped was recruiting non-ICU nurses and empowering them through provision of knowledge and skills to work autonomously in ICU. This is supported by a review of literature related to recruitment and retention of specialty nurses by Morphet et al. (2011), which revealed preceptorship and self-directed education to help in improved clinical component of nurses

transitioning to specialty care. This is further supported by a study by Farnell and Dawson (2006), which posited preceptorship and support of nurses transitioning from ward to ICU as a major requisite for their progress from novice to expert levels.

1.5 Drivers behind identifying and establishing consensus on ICU competencies

One of the major key foci of the Kenya Health Policy 2012-2030 is to produce competent health workers to match the job market. This is to be achieved by aligning curricula and training with the competencies required in the healthcare settings, promoting multi-skilling and multitasking (Ministry of Health [MoH], 2015). These competencies may contribute to the achievement of this goal. Kenyan society is in dire need of a reformed healthcare system that offers quality, culturally and ethically acceptable healthcare and identification of the competencies may be a step towards satisfying this need. The NCK and the Ministry of Education, Science and Technology (2015) are also committed towards the move to competency-based education. The starting point of any competency-based education is identification of the key competencies that then guide development of curricula articulating the key attributes in each competency (Albarqouni et al., 2018). These competencies will therefore be timely towards supporting this move.

As a proponent of competency-based education, I believe this method is inherently valuable and affords a good foundation for the provision of quality nursing care.

The COVID-19 pandemic is also a driver of this study. The pandemic created an urgent need for additional ICU beds and manpower to deal with the upsurge of COVID-19 patients. The Kenyan government was swift to establish and equip ICUs in all the eight regions of the country but without capacity building leading to limitations in the utilisation of those equipment (Ndirangu-Mugo et al., 2022). This resulted in transitioning of non-experienced nurses into ICU environments with no formal transition program to prepare them. Additionally, the pandemic exposed gaps in the readiness of ICU nurses to care for such patients. The competency framework is timely, envisioned to prepare such nurses to work in ICU providing a smoother transition and assist in the response to any future contemporary issues, such as a global pandemic or major incident.

1.6 Problem statement

The problem that is addressed in this study is the identification of competencies required by Kenyan registered nurses working in ICUs beyond their basic training. Currently there is no nationally agreed set of competencies for the nurses working in Kenyan ICUs. Kenya like any other developing country, is experiencing a shortage of nurses, particularly in specialised areas like ICU nursing and this calls for more innovative approaches like task shifting as a short-term measure to address the gap (Miseda et al., 2017). The COVID-19 pandemic and ICU overflows saw deployment and task shifting of many nurses, both specialised and general nurses in the ICUs. A balance must, however, be struck between task shifting and quality care. Identification of key competencies can be useful to ensure adequate preparation of nurses transitioning into the ICU. This could be imparted in their induction or orientation programs.

A recent study on the current state of critical nursing worldwide revealed insufficient training and poor training, lack of knowledge, and lack of ongoing education to be the largest barriers to quality of critical care services especially in low-resource setting (Ndirangu-Mugo et al., 2022). Additionally lack of core competencies to ensure competency-based licensure has contributed to uncertainty about roles and responsibilities of critical care nurses (Ndirangu-Mugo et al., 2022). These findings resonate with the Kenyan context and therefore the need to address the gap. This is further supported by a study on ICU nurses' perception on competency requirement and training demand which revealed gaps in knowledge and skills despite training and recommendation for adopting training to the professional stage of each nurse was made (Santana-Padilla et al., 2022).

Nurses transitioning into ICU are expected to possess entry level competencies to be able to work there. However, there is a well-established and documented theory-practice gap in the new graduate nurse transition literature which states a lack of readiness for their professional role (Halcomb et al., 2012; Rush et al., 2019). Over 65-76% of new graduate nurses in the United States (US) did not meet expectations for entry level clinical judgement and similarly Swedish new graduate nurses were found to be lacking in clinical skills (Rush et al., 2019). This is related to a theory-based curriculum which nurses undergo during pre-registration. According to Charette et al. (2019), new graduates from a competency- based program deployed in acute care still require some transition support to attain new levels of nursing expertise. This is further supported by a

study on newly graduated nurses' clinical competencies in an acute care setting which recommends support for these nurses (Willman et al., 2019). Other countries have established induction programmes for their NGRNs transitioning into ICU unlike Kenya and SSA (Willman et al., 2019).

The quality of training offered at various institutions and the clinical practicum experiences varies across the institutions and this leads to variances in the competencies gained. An assessment on relevance, adequacy, and quality of health training in Kenya revealed major gaps in terms of preparation for students for clinical practice and response to national health needs (Mumbo & Kinaro, 2015). This is consistent with the issues pointed out by Deacon et al. (2017) that led to the development on a national competency framework for registered nurses in adult ICU. These issues include variability in the academic content of the curriculum and clinical competence attained at the completion of the course, leading to lack of transferability of critical care knowledge and skills across geographical boundaries (Deacon et al., 2017). Identification of ICU competencies may also help curriculum developers and reviewers to align some of the competencies of ICU nursing in the curriculum.

An integrative literature review on transition of NGRN and novice nurses in ICU revealed paucity of studies in this area and a recommendation was made for ICU to determine specialty skills and competencies required by these nurses (Innes & Calleja, 2018). There is also a paucity of studies emerging from critical care communities in low-income countries (Murthy et al., 2015; Ndirangu-Mugo et al., 2022). This study will therefore add to the body of knowledge in the critical care specialty in the country. Many developed countries, unlike developing countries, have competency frameworks that are tailored to the specific needs of their ICU nurses and provide room for their continuous development (Bench et al., 2003; Deacon et al., 2017; Gill et al., 2017; Zhang et al., 2019), hence the need for contextual competencies across Kenya.

The emergence of the COVID-19 has revealed deficiencies in the Kenyan health system. Among the deficiencies is a shortage of trained specialised ICU workforce that includes nurses and doctors, and a lack of preparedness (Ndirangu-Mugo et al., 2022). There was a call for mass hiring of nurses even in specialised units by the government, but the question was how prepared were those nurses to work in specialised units? A recent scoping review revealed that nurses who work in the few existing ICUs in LMICs have no specialised training and some rotate between ICU and general wards make it a challenge to hone necessary ICU competencies (Macey et al., 2022). The outcome

of this study, which is competencies of ICU nurses, may offer a quick fix to the orientation newly hired nurses in Kenyan ICU, contributing to the body of knowledge in this field of nursing.

1.7 Significance of the study

The output of this study is a set of ICU nurses' competencies that is of significance to many audiences in Kenya. Employers of ICU nurses may consider adoption of the competencies as part of the orientation of the new nurses and foundation for assessment and continuous development of their current nursing staff. Competency frameworks have been shown to provide consistency in clinical practice as stated by Stanford (2016). The results of this study are envisioned to provide a foundation for development of competency framework which may help to harmonise clinical practice across the country, consequently affecting the quality of care and patients' outcomes positively. The competencies may provide insight to the curriculum developers and educators, to consider inclusion of some competencies as a pre-qualification requisite for final year nursing students. Prior studies have reported lack of confidence and competence by novice nurses hence a need for transition programmes for NGRN (Calleja et al., 2019; Hussein et al., 2017; Serafin et al., 2021). According to Kaihlanen et al. (2019), a well-structured final practicum for nursing students has been shown to enhance smooth transitioning of NGRNs into clinical practice. This is supported by studies showing that new graduate nurses from competency-based curriculum are ready for practice and they only require minimal transition support to attain new levels of nursing expertise (Batch-Wilson, 2016; Charette et al., 2019; Holland et al., 2010). The recommendations may also be replicated by other low and middle-income countries who may be struggling with the same issues as Kenya.

1.8 Aim of the study

Given the critical importance of ICU competencies and a lack of them in Kenya, this study aims to identify and establish consensus on competencies required by registered nurses working in Kenyan Intensive Care Units.

1.9 Research objectives

1. To identify the competencies of nurses working in ICU through an integrative literature review
2. To compile a preliminary set of competencies based on the obtained data for rating.
3. To gain consensus on the preliminary set of competencies with ICU experts
4. To elicit potential barriers and facilitators towards implementation of the competencies from the experts
5. To agree on how to roll out the competencies in Kenya.

1.10 Research questions

1. What competencies can be identified in the existing literature for nurses working in ICU?
2. How can these competencies be organized into a coherent and comprehensive set for rating?
3. How can the preliminary set of competencies gain consensus with ICU experts?
4. What barriers and facilitators do the ICU experts foresee in the effective implementation of the identified competencies?
5. How can the identified competencies be rolled out in Kenya?

1.11 Summary

The specialised and highly technological care of ICU patients requires competent nurses for better patient outcomes. Lack of competencies has been cited in the literature as one of the major drawbacks in nurses transitioning into clinical practice and acute care areas (Boyle et al., 2008; Kinghorn et al., 2017; Willman et al., 2019). Studies to address issues of ICU nurses' competencies and their transitioning into clinical practice have been conducted in many countries like UK (Elias & Day, 2020), Australia (Boyle et al., 2008; Innes & Calleja, 2018), Sweden (Willman et al., 2019), Europe (Gohery & Meaney, 2013), but there is a paucity of such studies in SSA and in Kenya despite having similar challenges.

Therefore, this study aims to address this challenge through identification and establishment of consensus with ICU competencies required by registered nurses in Kenya. These competencies can be used by the NCK to inform the training and practice of ICU nurses. They can also be replicated in other developing countries facing the same challenges as Kenya. The chapter has set the scene for the study, provided the problem statement, drivers, motivation, significance of the study, and has outlined the research objectives and questions. The next chapter provides definition of the key concepts in this study which include competencies and competency framework.

CHAPTER TWO: DEFINITION OF CONCEPTS

2.1 Introduction

Nursing competency is a core ability that a nurse is required to fulfil their responsibilities, and therefore, a clear understanding of what it constitutes is important (Fukada, 2018). Competence and competency frameworks have been conceptualised in several ways with no universally accepted definitions. The discussion here considers several definitions and narrows down to those applied in this study. The sources of evidence used in these definitions included empirical and grey literature. The grey literature involved the review of documents from relevant organisations such as AACN, ACCCN and the Critical Care National Network Nurse Leads Forum (CC3N). Other operational definitions explained include scope of practice and clinical guidelines.

2.2 Concepts of Competence/Competency

The words competence and competency are common terms used in most professions globally. These words have been used interchangeably with variations in meaning by different entities and researchers in the nursing profession. Different scholars have made several attempts to define and delineate the two terms. A concept analysis conducted by the College of Nurses in Ontario, Canada, to delineate the two terms came up with the following definitions: competency is a component of knowledge, skill, and judgment demonstrated by an individual; competence is an individual's capability for consistently integrating the required knowledge, skill, and judgment for safe, ethical, and effective nursing practice (Moghabghab et al., 2018). Competencies are objectively measured, while competence is subjectively measured (Moghabghab et al., 2018). However, a person's competence should be judged by their actions, and therefore, one should not be declared competent until they are evaluated (Hu et al., 2016). The American Nurses Association (ANA) defines competence as an expected level of performance that integrates knowledge, skills, abilities, and judgement (More, 2017).

On the other hand, Benner views competence as a progressive experience with five distinct levels: novice to advanced beginner, competent to proficient, and expert nurse (Benner, 1982). According to Benner, when nurses have achieved a competent level of performance, they can function safely,

but as they gain more experience, they develop a more holistic and complete awareness (Benner, 1982). Experience plays a major role in the development of competence. In the UK's National Competency Framework for Registered Nurses working in Adult Critical Care, Deacon et al. (2017) posits that there is no delineation of the two terms competence and competency. Rather, the term competence has been used to encompass a combination of skills, attitudes, values, and technical abilities that underpin safe and effective critical care nursing care and interventions. This is followed by a set of competency statements which are objectively measured by a preceptor (Deacon et al., 2017), realising that competence is determined by measurable knowledge and skills. According to Fukada (2018), nursing competency is a complex combination of knowledge, including professional judgement, skills, values, and attitude. Professional judgement helps nurses integrate their skills, values, and attitudes (Fukada, 2018).

Competency in this study describes the knowledge, skills, attitudes, values, and technical abilities required by a nurse for effective professional, cultural, and clinical practice. Competency is measured through established standard statements, whereas competence is self-judgment and can be measured through self-assessment and reflective tools (Moghabghab et al., 2018).

According to Benner (1982), nursing competency is developed through a combination of education, experience and reflection that leads to a deeper understanding of the nursing role and patient needs. This means competency is acquired over time as experience teaches the nurse what events to expect in a given situation and how to modify plans in response to these events (Benner, 1982). In recognition, the UK developed a National Competency Framework for registered nurses working in the adult ICU and organised it into three steps (Deacon et al., 2017).

Step one competencies are commenced when a nurse enters the ICU with no prior experience and is incorporated into a preceptorship program. Step one competencies give the critical care nurse foundation as they move on to access critical care education (Deacon et al., 2017). Steps 2 and 3 accompany the academic course, and the learner is expected to gain depth of related knowledge and theory (Deacon et al., 2017). However, this is not the case in Kenya, where it is not mandatory for RNs working in the ICU to pursue critical care education, nor are they exempted from some competencies.

In some studies, competence has been viewed as a single entity (Moghabghab et al., 2018), while others have classified competence into clinical, cultural, and professional (Ääri et al., 2008).

Lakanmaa et al. (2012) classified competencies into two broad categories: professional competencies and clinical competencies, with sub-domains in each category. DeGrande et al. (2018), however, define professional competence as the ability to make sound judgements and decisions when faced with life-threatening situations in the ICU, amplifying it as the thinking behind clinical skills. Ääri et al. (2008), on the other hand, views clinical competence as principles of nursing care, clinical guidelines and nursing interventions, and professional competence as ethical activities, multidisciplinary collaboration, decision making and professional development.

There is often a lack of shared assumptions of what to expect from a nursing graduate between various health stakeholders, including patients, employers, nursing regulatory bodies and nurse educators (Pijl-Zieber et al., 2014). A competent nurse possesses technical skills and nursing knowledge for patients, with interpersonal attributes becoming the major determinants of quality nursing care (Calman, 2006).

2.3 Competency framework

A competency framework is a set of required behaviours that provides a structured guideline for admission, development, training, and evaluation in a profession (Stanford, 2016; Zhang et al., 2019). Similarly, Mills et al. (2020) define a competency framework as an organised collection of related competency statements. Other terms, such as competency standards, guidelines, and classifications, have been used to describe competency frameworks (Lakanmaa et al., 2012). Nursing competency frameworks serve various roles, including outlining the characteristics of a competent nurse, analysing, and assessing expertise, and guiding training and professional development (Batt et al., 2020).

There are various ways of developing competency frameworks. The competencies could be mapped specifically to each other, grouped under thematic domains, or kept separate (Mills et al., 2020). However, the most important aspect of developing a competency framework is to capture and represent the complexity associated with healthcare practice, including regional or contextual variability and unique practice patterns, among many others (Batt et al., 2020). For example, there is complexity in an ICU environment, where technology competes with psychosocial challenges and ethical conflicts associated with critical illnesses (Lakanmaa et al., 2015).

Another important aspect is the involvement of various stakeholders, including other health professionals and end users, to help align the competencies with the service demands (Lepre et al., 2021). From the literature, an ICU competency framework is intended to ensure that an ICU nurse progresses and maintains effective practice to provide safe and high-quality services that match the patients' needs and can adapt to today's complex and dynamic environment (Bench et al., 2003; Zhang et al., 2019). Therefore, a robust competency framework should be clear, relevant, and practicable to support clinical practice and be adjustable to contemporary issues.

Other terms used concurrently with competency frameworks include clinical guidelines, scope of practice and standards of care. Scope of practice in nursing refers to a range of activities, responsibilities, and functions that a registered nurse, licensed practical nurse, or advanced practice nurse is legally authorized to perform (ANA, 2015). The scope of practice delineates the boundaries of their professional role and the extent of their involvement in patient care and standards of care. Standards of care represent the established criteria and expectations that healthcare professionals, including nurses, must adhere to when providing patient care (ANA, 2015). Professional nursing organizations and regulatory bodies often develop these standards. Clinical guidelines are systematically developed statements or recommendations based on the best available evidence, aiming to standardize and improve patient care quality (National Institute for Health and Care Excellence, 2009).

2.4 Chapter summary

This chapter has provided definitions to this study's key concepts: what nursing competencies are in general and for ICU, and what a competency framework is. The next chapter will explore the literature related to competencies to identify the gaps further and provide further justification for the study. This is guided by the research objectives listed in chapter one, section 1.9.

CHAPTER THREE: LITERATURE REVIEW

3.1 Introduction

Literature reviews aim to answer focused questions to inform professionals of the best evidence to make healthcare decisions, influence policy, and identify future research priorities (Noble & Smith, 2018). A review must follow a comprehensive method and reporting to be considered rigorous and bias-free (Toronto & Remington, 2020). There are various reviews, and the choice of review should be determined by the purpose (Noble & Smith, 2018). The three major reviews are narrative, integrative, and systematic (Toronto & Remington, 2020).

A narrative review does not follow a systematic approach for locating and analysing studies but discusses important topics from a theoretical point of view and is therefore considered an important educational tool in continuous education (Jahan et al., 2016). Integrative reviews are similar to systematic reviews, and they use a systematic process to identify, analyse, appraise and synthesise all selected studies. However, unlike systematic reviews, they do not include statistical synthesis methods (Toronto & Remington, 2020). An integrative review includes all research designs and other documents, e.g. opinions, discussion papers, and policy documents (Lubbe et al., 2020).

3.2 Justification of the use of integrative review

Integrative review, as defined by Torraco (2005), is a form of research that reviews, critiques, and synthesizes the representative literature on a topic in an integrated way so that new frameworks and perspectives are generated. It also provides a synthesis of knowledge and applicability of results of significant studies to practice and allows a combination of different methodologies (Souza et al., 2010; Whittemore & Knafl, 2005). Additionally, it allows a combination of data from both theoretical and empirical literature, hence the diversity of the sampling frame and the potential to capture the complexity of varied perspectives and emerging phenomena (Hopia et al., 2016; Whittemore & Knafl, 2005). To this end, integrative reviews, therefore, have the potential to build nursing science and inform research, practice, and policy initiatives (Whittemore & Knafl, 2005). Different from other reviews, the quality of each of the

studies in an integrative review is evaluated, and individual studies are then interpreted and synthesised into meaningful conclusions (Toronto & Remington, 2020).

The purpose of integrative reviews includes evaluating the strength of evidence, identifying gaps in the current literature, connecting between related areas of research, investigating issues related to a specific topic or developing new research questions (Kutcher & LeBaron, 2022). Integrative reviews are popular in nursing because they utilise diverse data sources to investigate the complexity more broadly, whereas systematic reviews utilise narrowly focused clinical questions (Toronto & Remington, 2020).

In this study, the researcher sought to investigate issues related to the competencies of ICU nurses, which is complex due to associated technological, ethical and safety issues and the various lenses through which different researchers have viewed the competencies. The integrative review was preferred as it aligns with the researcher's pragmatic belief. Pragmatists believe that acquiring knowledge is a continuum rather than two opposing and mutually exclusive poles of either objectivity or subjectivity and thus offers a more flexible and reflexive approach to research design (Kaushik & Walsh, 2019). The literature search is extensive to include a range of relevant databases and hand-search; unlike in a systematic review, there is no literature synthesis (Noble & Smith, 2018). This aspect resonates with the researcher's philosophical stance of pragmatism. The broad nature of an integrative review allows for gathering evidence from heterogeneous sources and helps define concepts (Whittemore & Knafl, 2005). The review also helped look at various definitions of competence/ competency framework concepts.

3.3 Objective of the Integrative Review

The main objective of this integrative review was to identify, integrate and critique the best available evidence regarding competencies/ competency frameworks for registered nurses working in ICU. The identified competencies/ competency frameworks informed the development of the research tool.

3.4 Steps of an Integrative Review

This integrative review followed Whittemore and Knafl (2005) five steps: problem identification, literature search, data evaluation, data analysis and presentation.

3.4.1 Formulate purpose and review question

The starting point and the most important step in an integrative review is to identify a broad review question to help widen the scope of enquiry (Kutcher & LeBaron, 2022). One broad question guided by the objective of this study was used to guide the review and help to establish the key search terms: *"What competencies do Kenyan registered nurses (RNs) need to possess to deliver quality and safe healthcare in ICU?"*

This integrative literature review aimed to synthesise the current evidence-based knowledge regarding the competencies of registered nurses working in ICUs.

3.4.2 Literature search

The literature search should be comprehensive and systematic to enhance rigour (Whittemore & Knafl, 2005; Toronto, 2020). Therefore, two or more methods are recommended for a literature search, including multiple electronic databases, a descendant approach and a hand search (Toronto & Remington, 2020). A search flow diagram such as PRISMA helps report the literature selection process for review (Toronto & Remington, 2020).

3.4.3 Search terms

The key search terms were derived from the review question. Synonyms for each key concept were identified using MeSH and subject headings on individual databases. Search terms were refined through phrase searching, truncation signs, and Boolean operators 'AND' and 'OR' to generate new searches.

The key search terms and synonyms are presented in Table 3.1 below:

Table 3.1: Search terms and synonyms

			Thesaurus or MeSH Headings & other search terms
P	Population	Registered Nurses	• Nurse • Personnel, Nursing • Nursing Personnel • Nurse, Registered • Nurses, Registered • Registered Nurse • Qualified nurses
C	Concept	• Competencies • Competency framework	• Competency, Clinical • Competence, Clinical • Clinical Competency • Clinical Competencies • Competencies, Clinical • Clinical Skill • Skill, Clinical • Skills, Clinical • Clinical Skills
C	Context	Intensive care units	• Care Unit, Intensive • Care Units, Intensive • Intensive Care Unit • Unit, Intensive Care • Units, Intensive Care • Critical care units

3.4.4 Identifying relevant studies

A wide range of databases were searched to offer a comprehensive review. The following databases were used: Cumulative Index for Nursing and Allied Health Literature (CINAHL), MEDLINE, PubMed, Hinari, ProQuest, Scopus, and Cochrane and African Journals Online (AJOL). CINAHL database provides access to nursing and allied health literature, including nursing journals and publications from the National League for Nursing and the American Nurses Association. MEDLINE databases include many journal indexes and full-text databases for academic medical journals covering biomedicine, life science, and much more. WHO has set up Hinari to allow low- and middle-income countries access to one of the world's largest biomedical and health literature collections. Cochrane contains high-quality, reliable, evidence-based resources, while AJOL is the world's largest and preeminent platform of African-published scholarly journals and peer-reviewed journals.

Using databases ensures access to safe, accurate, current, validated, copyright-clear, and organised information. The chosen databases are known for high-quality and peer-reviewed articles, and they have wide coverage and ensure the credibility of my study.

Other strategies that were used to search for evidence were:

- Use of reference lists from already identified journal articles and abstracts.
- Google Scholar to get grey literature.
- Existing organisations and professional bodies, e.g., AACN, Australian College of Critical Care Nurses (ACCCN), Critical Care National Network Nurse Leads Forum (CC3N) and European Federation of Critical Care Nursing Associations (EfCCNa).
- The British Library Ethos and Networked Digital Library of Theses and Dissertations (NDLTD) for relevant doctoral theses.

Endnote Version 9, a reference management software, was used to store the references of the searched papers.

3.4.5 Selection of studies

The guidance and confirmation of the search method occurred through collaboration with a university academic librarian. Initial inspection of citations indicated that many irrelevant studies had been sourced. Inclusion and exclusion criteria were used to eliminate irrelevant papers. To this end, an academic librarian assisted with the selection of the articles using the following inclusion and exclusion criteria shown in Table 3.2 below:

Table 3.2: Inclusion and Exclusion Criteria

	Exclusion criteria
Research papers of any kind, position statements, frameworks, and policy documents from government or professional bodies	Studies focusing on health professionals other than nurses
Studies published in English	Non-English published studies
Studies focusing on competencies and competency frameworks for ICU nurses	Studies focusing on nurses in other healthcare settings
Studies published between 2002-2023	

3.4.6 Charting the data

According to Peters et al. (2015), a draft charting table should be developed to record the characteristics of the included studies and the key information relevant to the review question, which helps in synthesising results and concluding, as well as identifying research gaps and future steps in research (Toronto & Remington, 2020). The researcher developed a data chart with the following elements: authors, year of publication, country of the study, study design, sample characteristics, aim of the study, findings related to the research question, and limitations.

An additional tool was used to map competency items and see which items were common in the studies reviewed. See Table 3.3.

3.4.7 Screening process

A detailed review was performed as depicted in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) tool. The PRISMA tool offers clarity and transparency in reporting systematic reviews (Liberati et al., 2009), as depicted in Figure 3.1 below:

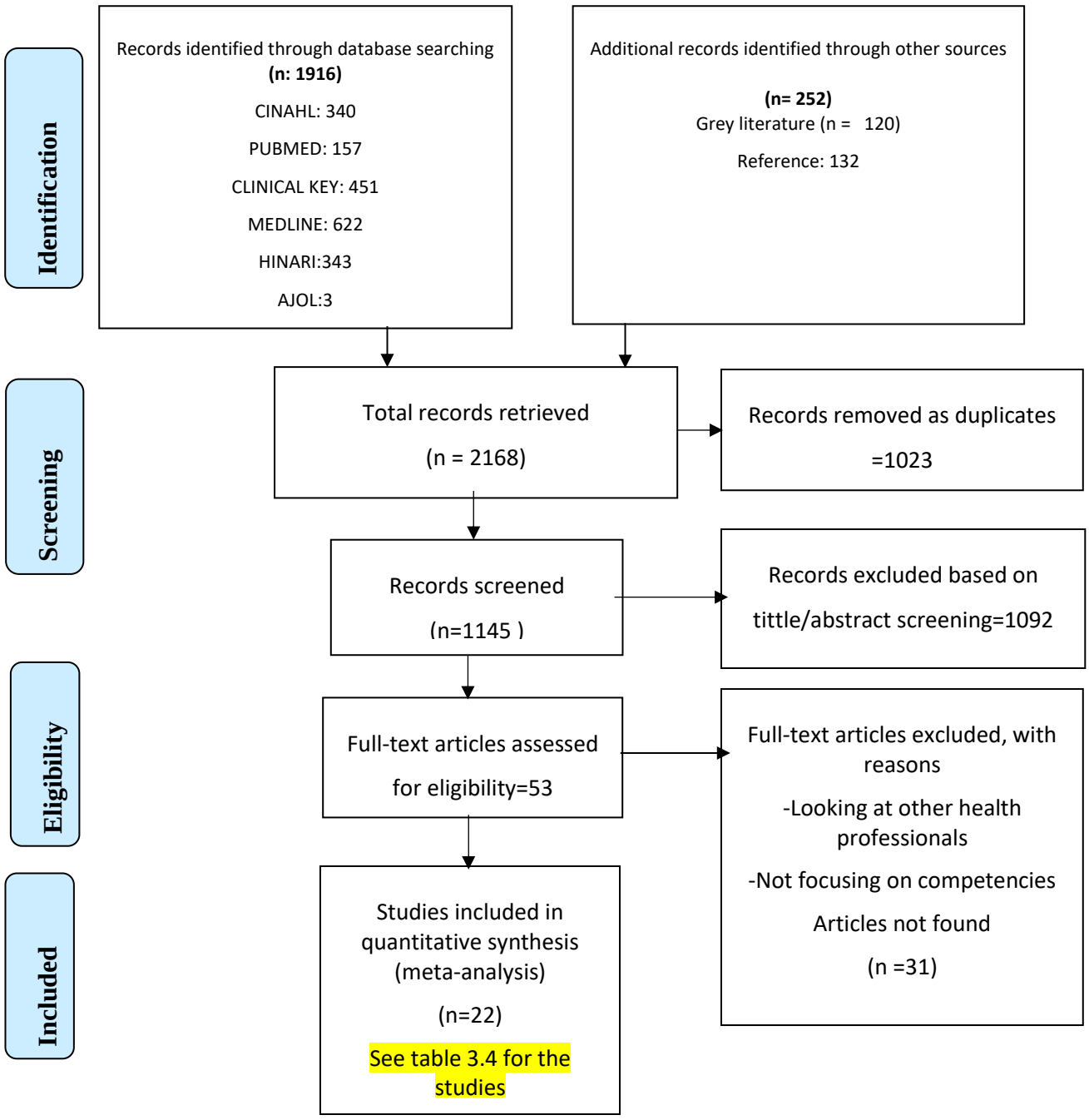

Figure 3.1: PRISMA Diagram

3.4.8 Collating, summarising, and reporting the results

The researcher used the information obtained from the Excel data chart to summarise the total number of studies, authorship, year of publication, geographical origin of article, type of study (e.g., qualitative), aim or objective of the studies, major findings, and limitations. Data were organised into the chart to allow the organisation of the themes and to provide the reader with supportive references and a summary of the articles.

3.5 Summary of the competencies studies

Several studies on the competencies of ICU nurses have been conducted globally to identify core competencies and develop competency frameworks, standards and guidelines that are used to inform practice, assessment and curricula of ICU nurses and inform continuous professional development (Ääri et al., 2008; Bench et al., 2003; Chamberlain et al., 2018; DeGrande et al., 2018a; Hadjibalassi et al., 2012; Zhang et al., 2019). A study on novice nurses' readiness to practice in an ICU revealed communication, teamwork, professional self-confidence, knowledge, and practical use as the most needed competencies (Serafin et al., 2021). Table 3.3 below gives a mapping of the competencies that have been developed globally.

Table 3.3: Competencies mapping

Competence / Author	(Suzanne Bench et al., 2003)	(Fisher et al., 2005)	AACN,(2008)	(Ääri et al., 2008)	(Lakanmaa et al., 2012)	(Camelo, 2012)	(Hadjibalassi et al., 2012)	EfCCNa, (2013)	(R.-L. Lakanmaa et al., 2015)	(CACCN 2015)	AACN synergy model (2016)	(Deacon et al., 2017) CC3N	(Gill et al., 2017)	(E. Alfieri et al., 2017)	(Heather DeGrande et al., 2018a)	(S. Kopf et al., 2018)	(Wei et al., 2018)	(Zhang et al., 2019)	(Henriksen et al., 2021)	(Serafin et al., 2021)	Endacott et al, 2022	Sakurimoto, et.al 2023
Knowledge base				**x**	**x**																**x**	
Skills base				**x**	**x**																**x**	
Attitude and value base				**x**	**x**																**x**	
Nursing experience base				**x**	**x**																**x**	
Personal base					**x**																	
Principles of nursing care					**x**				**x**												**x**	**x**
Clinical guidelines					**x**				**x**												**x**	
Nursing interventions	**x**				**x**				**x**	**x**											**x**	
Assessment of the body systems	**x**									**x**		**x**					**x**				**x**	**x**
Infection prevention and control												**x**									**x**	
Education and Development work			**x**		**x**	**x**	**x**	**x**	**x**	**x**				**x**		**x**	**x**	**x**			**x**	**x**
Clinical inquiry											**x**										**x**	**x**
Collaboration and teamwork			**x**		**x**			**x**	**x**	**x**	**x**	**x**		**x**	**x**		**x**	**x**	**x**	**x**	**x**	**x**
Humanity and ethicality			**x**		**x**		**x**	**x**	**x**	**x**				**x**			**x**		**x**		**x**	
Work motivation					**x**																**x**	
Scientific foundation/evidence base								**x**		**x**		**x**				**x**	**x**	**x**			**x**	**x**

Procedural skills										**x**				**x**		**x**		**x**			**x**	
Diagnostic studies										**x**						**x**					**x**	
Management of complex diseases/emergencies						**x**	**x**			**x**						**x**					**x**	
Mechanical ventilation										**x**						**x**					**x**	
End-of-life care										**x**		**x**				**x**					**x**	
Patient safety								**x**		**x**						**x**					**x**	
Pharmacology												**x**				**x**					**x**	
Quality assurance								**x**		**x**												
Documentation												**x**		**x**								
Professional competence		**x**							**x**						**x**				**x**	**x**	**x**	
Managing situations	**x**	**x**								**x**					**x**						**x**	
Decision making					**x**	**x**	**x**	**x**	**x**	**x**	**x**			**x**	**x**		**x**	**x**			**x**	**x**
Communication						**x**		**x**		**x**		**x**						**x**	**x**	**x**	**x**	
Leadership &management		**x**	**x**			**x**	**x**	**x**		**x**		**x**	**x**					**x**			**x**	
Admission and discharge												**x**	**x**								**x**	
Professionalism			**x**				**x**					**x**						**x**			**x**	
Cultural competence																						
Response to diversity										**x**	**x**											
Clinical competence				**x**				**x**		**x**					**x**							
Assessment and nursing diagnosis								**x**		**x**											**x**	
Planning	**x**							**x**		**x**												
Implementation								**x**		**x**												
Evaluation								**x**		**x**												
Provision of care							**x**			**x**											**x**	
Reflective practice										**x**											**x**	

Table 3.4: Studies on competencies that were reviewed

Author, year	**Country**	**Aims/purpose**	**Study population**	**Sample**	**Methodology**	**Key findings (themes)**	**Limitations/Implications**
1. (DeGrande et al., 2018)	USA	To examine the current understanding of professional competence as it relates to ICU nurses and their clinical practice	ICU nurses	21 peer-reviewed articles	Integrative review	Domains of professional competence: a) Managing situations b) Decision-making-critical thinking and making judgements based on assessments c) Teamwork-collaboration and interpersonal relationships	
2.(Kopf et al., 2018) AACN	USA	To develop a competency-based curriculum for critical care nurses' practitioners transition to practice	Critical care nurses' practitioners transitioning into ICU	31 participants	Modified Delphi (focus group, lit. review and consensus method **Participants** -Practicing ICU nurses	• Domains of competencies with subdomains of: Knowledge, skills and attitude • Diagnostic studies • Mechanical ventilation • Management of complex diseases • End-of-life care • Patient safety • Pharmacology	• Small sample size of experts • No interviews

					-ICU nurse educators -Academic leaders		
3.(Zhang, et.al. 2019)	China	To construct a competency framework specific to specialist critical care nurses	Specialist critical care nurses	30	Modified Delphi study: **Phase 1**- Literature review and focus group **Phase 2**: 3 rounds of modified Delphi Participants: critical care physicians Managers, specialist critical care nurses, educators,	**Domain: Evidence-based pract** • Respiratory system nursing practice • Cardiovascular system nursing practice • Renal system nursing practice • Gastrointestinal system nursing practice • Neurological system nursing practice • Rehabilitation nursing practice **Domain: Complex decisions** • Clinical judgement • Evidence-based decision • Integrative thinking **Domain: Professionalism** • Participation in professional organizations **Domain: Communication and co-operation**	Lack of cultural competer No patient representativ stakeholder

						• Communication and cooperation with a multidisciplinary team • Communication and cooperation with patients and their family members **Domain: Education and development** • Personal, professional education and development • Multidisciplinary team members' • professional education and • development **Domain: Leadership** • Team management • Unit management • Maintain safe and supportive environment • Quality assurance • Sense of mission • Empathy and humanism **Gaps:** Patient not included in the stakeholders Cultural aspects not considered in the framework	

4. EfCCNa (2013)	Europe	To allow mapping of competencies and articulate acceptable levels of clinical skills and knowledge for the critical care workforce across Europe	ICU nursing workforce		Review of existing frameworks and consultation with the stakeholders	**Clinical domain:** • Assessment & nursing diagnosis • Planning • Implementation • Evaluation **Professional domain:** • Complex decision making • Ethical and legal • Communication **Managerial domain:** • Unit management • Team management • Health and safety • Quality assurance **Education and development domain:** • Personal development • Development of others • Evidence-based practice	
5.(Camelo, 2012)	Brazil	Identification and analysis of professional	Nurses working in ICU	Ten articles	Integrative review	• -Nursing care management • -High-complexity nursing care delivery • -Decision making • Nursing leadership	Implementation of the competencies needs to be researched on

		competencies for nurses to work in ICU				• -Communication • -Continuing/permanent education	
6.(Lakanmaa et al., 2012)	Finland	Competence requirements for ICU nurses	ICU nurses Physicians		Classical Delphi	**Clinical competence** • Principles of nursing care • Clinical guidelines • Nursing interventions **Professional competence** • Collaboration • Decision-making • Ethical activity and familiarity with healthcare laws • Development work **Attitude and value base of competence** **Knowledge base of competence** **Skill base of competence** **Experience base of competence**	• Drop out between the Delphi rounds • Limitations of experts (didn't include patients and their families and nurse educators

7.(Hadjibalassi et al., 2012)	Cyprus	To develop an instrument to determine what competencies are expected of a postgraduate critical care nurse	Postgraduate critical care nurses		Mixed method study	Leadership/management and professional development Decision-making and management of emergencies Provision of care and professional practice Ethical practice.	Patients and relatives were not involved. Multidisciplinary team members not involved. Study conducted in one country: no validation in other countries
8.(Deacon et al., 2017)	UK	Inconsistencies which led to a lack of transferability of attained critical care knowledge and clinical skills across geographical boundaries	Registered nurses in adult critical care		Consultations with stakeholders	**Step one competencies** • Promoting positive patient experience • Respiratory system • Cardiovascular system • Renal system • Gastrointestinal system • Neurological system • Integumentary system • Medicines administration • Admission and • discharge • End of life	

						• Intra and inter-hospital transfer • Rehabilitation • Communication and • Infection prevention and control • Evidence-based practice • Professionalism • Defensible documentation • Mental capacity • Leadership • teamwork	
9.(CACCN ,2015)	Canada					*Standard 1:* Assess, monitor and manage patients for promotion of optimal physiological balance *Criteria:* • Gathersphysiological, psychological, developmental and cultural data • Analyses data to inform decisions on patient/ family needs • Makes decisions about priorities of life-threatening and non-life-threatening situations • Integrates assessment findings	

						to make a plan of care • Implements plan of care to one's scope of practice • Intervenes in life-threatening situations • Monitors and evaluates effectiveness of therapy *Standard 2:* Facilitate optimal comfort in a highly technological environment *Criteria:* • Manage the environment to mitigate the effects of noxious stimuli • Discern sources of comfort and implement strategies to alleviate suffering • Preserve dignity by respecting personal privacy and dignity • Communicate information in a respectful manner to patients/families *Standard 3:* Foster mutual partnership with patients/families based on trust, dignity, respect,	

						communication and collaboration *Criteria:* • Gather data concerning patient/ family responses and needs to the critical care experience and address identified concerns • Share and validate information with patient/ family in an open, accurate and consistent manner to establish a plan of care and assist in decision-making • Seeks out, listens and honours the patient/ family's perspectives when planning and delivering care • Advocates with patient/family to address their needs • Provide unrestricted access to family members based on the patients' wishes while respecting privacy needs *Standard 4: Provides care that adheres to evidence informed guidelines and established safety guidelines and protocols*	

						Criteria: • Integrates data to anticipate, prevent and recognise injury or dysfunction that may contribute to life-threatening health crisis • Documents patient care and ongoing evaluation • Seeks and incorporates patient/ family feedback into quality improvement • Uses quality improvement to promote positive change in nursing practice • Advocates for a reasonable number of competent critical care nurses • Actively participates in adverse events and near miss recognition, responses to, disclosure, reporting and prevention of recurrence *Standard 5: Support to patient and family through end of life care* *Criteria:*	

						• Promotes discussions of advanced directives planning • Integrate principles of palliative approach in end-of-life care • Promote inter-professional team collaboration to determine end of life wishes and provide available resources. • Identifies potential candidates and engages in discussion about organ and tissue donation • Access appropriate resources for complex ethical issues • Maintain ongoing communication about palliative care and provide emotional suport *Standard 6: Promote collaborative practice between the inter-professional team and patient/ family* *Criteria:* • Explains their roles to patient/ family and other inter-professional team members • Demonstrates effective	

						interpersonal communication, leadership, negotiation and conflict resolution skills to promote positive relationships with colleagues, patients and families • Collaborate with concerned teams to review plan of care and promote continuity of care • Invites participation of patient/ family in the plan of their care *Standard 7: Provides leadership by fostering a culture conducive to collaboration, quality improvement, safety, professional growth and prudent resource utilisation* *Criteria:* • Incorporate professional, legal ethical and critical care standards into practice • Maintain critical care and professional competency by engaging in reflective practice, self-assessment of	

						learning needs and engaging in continuous professional development • Promote research and evidence-informed practice and dissemination of nursing knowledge. • Contributes to and supports initiatives that foster a critical care environment and quality of work-life balance • Acts as a resource person, educator, role model, preceptor, and advocate for students, peers and inter-professional team members	
10.(Henriksen et al., 2021)	Norway	To develop a conceptual framework of the core qualities and competencies of the intensive and critical care nurse based on the experiences	Critical care nurses Patients and families	19 studies included	Meta-ethnography	• Professional skills • Communication skills • Teamwork • Technical skills	•

		of intensive care patients, their relatives and the intensive and critical care nurses.					
11.(Lakanmaa et al., 2015)	Finland	To describe and evaluate the self-assessed basic competence of intensive care unit nurses and related factors.	Critical care nurses	n=431	Cross-sectional survey	Basic competence = clinical competence and Professional competence *Clinical competence* • Principles of nursing care • Clinical guidelines • Nursing interventions *Professional competence* • Ethical activity • Decision making • Development work • Collaboration	• Only university hospitals were covered • Low response rate • Self-assessment should be used with other methods as it is subjective in nature.
12.(Gill et al., 2017)	Australia	To revise the ACCCN Competency Standards for Specialist Critical Care Nurses to ensure they	Critical care nurses, reprepresentatives from Critical	Phase 1:12 focus group-79 participants	2-phased project (Focus group and Delphi)	• professional practice • provision and coordination of care, • critical thinking and analysis • collaboration and leadership	• Standards not grouped into domains • Small Delphi panel of 40 in round 3

		continue to meet the needs of critical care nurses and reflect current practice.	care education, research, clinical	Phase 2:64 critical care specialists			
13.(Ääri et al., 2008)	Finland	To define and describe the concept of competence and domains of competence in critical care nursing		45 studies	Literature review	Specific knowledge base, skill base, attitude and value base and experience base. Divided into: *Clinical competence* • principles of nursing care • clinical guidelines • nursing interventions *Professional competence* • ethical activity • decision-making • development work • collaboration	• Only two databases were reviewed • Sample sizes and response rates of the included reviews were low
14.(Martha, 2007) AACN synergy model	USA	To match the patient's needs with nurse competencies			Standard development	• Clinical judgement • Advocacy and moral agency • Caring practices • Collaboration • System thinking • Response to diversity • Facilitation of learning • Clinical inquiry (Innovator)	•

15.(Wei et al., 2018)	China	To investigate the current state of core competencies	ICU nurses	451 nurses	Multicentre cross-sectional study	The core competencies of ICU nurses were above average. The seven dimensions ranked from first to last were; • Medical ethics • Clinical practice • Nurse-nurse cooperation • Assessment and decision-making • Personal and professional development • Teaching and research • NNurse-physician cooperation	• Lack of generalisability (study conducted in one type of hospital) • Data collection method-convenient sampling • Self-completed questionnaires could be a source of bias
16.(Alfieri et al., 2017)	Italy	To get a mapping of nurse's competencies working in critical care	ICU nurses Doctors Health care assistants	22	Qualitative design	The competencies were classified into: • Activities (Procedural skills) • Relational capacities • Cognitive skills • Professional competencies	
17.(Fisher et al., 2005)	Australia	To determine the construct validity of the ACCCN competency standards as a tool for assessing the clinical practice of	ICU nurses	540	Comparative descriptive design	Four-factor competency model was developed, which includes: • Clinical problem solving • Professional practice • Leadership • Enabling	

		specialist ICU nurses					
18.(Bench et al., 2003)	UK	To develop a competency framework for critical care to match patient needs	Critical care education group Expert nurses		Functional analysis	Four competency statements were derived: • Integrates comprehensive patient assessment and interpretive skills to achieve optimal patient care • Manages therapeutic interventions and regimes. • Evaluate and respond effectively to rapidly changing situations • Develops and manages a plan of care to achieve optimal patient outcomes and considers implications for discharge	
19.(Price, 2013) National Critical Care Competency Framework	UK	The framework was developed to guide practice and inform post-registration critical care nurse educational programs.	Key critical care stakeholders (BACCN and other professional bodies	National Critical Care working group	Consultative meeting	The competencies cover a range of systems and topics relevant to critical care practice *Body systems* • Respiratory system • Cardiovascular system • Renal system • Gastrointestinal system	

						• Neurological system • Integumentary system *Additional areas* • Medicines administration • Admission and • discharge • End of life • Intra and inter-hospital transfer • Rehabilitation • Communication and • Infection prevention and control • Evidence-based practice • Professionalism • Defensible documentation • Mental capacity • Leadership • teamwork	
20.(Serafin et al., 2021)	Poland	To explore novice ICU nurses' readiness to practice in ICU, identify most needed competencies	Novice nurses	17	Qualitative phenomenological study	Majority of the nurses were not prepared to work in ICU after graduation The most needed competencies to work in ICU were: • Communication • Teamwork	Use of social media to recruit limited some participants

21.(Endacott et al, 2022) 22.(Sakuramoto et. al., 2023)	UK Japan	To identify and define core competencies for advanced nursing roles in adult intensive care units To develop a consensus based set of ICU standards to provide a framework for critical care nursing education, training and evaluation	ICU Nurses Physicians, nurses, and physical therapists		Three-round e-Delphi and consensus meeting Multistep modified Delphi (systematic review, focus group, three round web-based Delphi and external validation process	• Professional self-confidence • Knowledge and its practical use • Assessment skills • Decision-making based on evidence • #Decision-making in complex circumstances • Procedural skills • Leadership of care • Professional leadership • Supervision • Communication skills • Quality and safety • Persona attributes **Major domains** • Therapeutic management of disease and clinical decision-making • Caring • Advocacy and moral agency • Evidence based practice • Collaboration and management ability • Education and self-development ability	High attrition rate No involvement of patients and families Lack of ranking system in the Delphi and prioritization in the expert panel

3.6 Summary of the results

A total of 22 documents were identified. These included competency frameworks, competency-based curriculum, competency standards and guidelines. Most of the literature on ICU nurses competencies emerges from European countries (Deacon et al., 2017; Henriksen et al., 2021; Price, 2013; Serafin et al., 2021), USA (Price, 2013; (DeGrande et al., 2018a), Australia ((Fisher et al., 2005; Gill et al., 2017) and China (Wei et al., 2019; Zhang et al., 2021). There is a dearth of literature on ICU competencies emerging from SSA. The few studies focusing on nurses' competencies in SSA emerge from South Africa (Perrie et al., 2014; Scribante, et al., 1996). To the best of my knowledge, there is no literature on the competencies of ICU nurses in Kenya. However, a study on the assessment of the educational needs of emergency nurses in two tertiary urban hospitals revealed major gaps and educational needs. The study identified injuries/trauma, cardiovascular, respiratory, and neurological disease, and other emergencies as topics of focus areas with a high need (Ndung'u et al., 2022). So, this is the first study to identify such competencies.

The ICU competencies, competency frameworks, standards, and guidelines have been developed to address issues like informing education, training and curricula of ICU nurses (Price, 2013; Zhang et al., 2019), NGRN transition to practice (Kopf et al., 2018; Sakuramoto et al., 2023), to address practice issues and inconsistencies of care (Deacon et al., 2017; Price, 2013); and match nurses competencies with patient care needs (Bench et al., 2003; Martha, 2007). However, none of these developments looked at the potential barriers and facilitators towards implementing the competencies, standards, or competency frameworks. Additionally, no study spoke to the strategies for implementing the competencies.

Most researchers investigating ICU nurses' competencies have utilised the Delphi technique or multistage method with an aspect of Delphi and literature review and focus group discussion or consensus meeting. Zhang et al. (2019) utilised a two-phased procedure to develop a competency framework for ICU nurses in China. Phase one involved a literature review and focus group discussion followed by three rounds of modified Delphi (Zhang et al., 2019). Similarly, Kopf et al. (2018) and Sakuramoto et al. (2023) undertook a literature review, followed by a focus group and consensus meeting to investigate competencies. Other commonly used methods adopted by

other researchers include functional analysis (Bench et al., 2003), consultations with stakeholders (Deacon et al., 2017), cross-sectional surveys (Lakanmaa et al., 2015; Wei et al., 2018) and mixed methods (Hadjibalassi et al., 2012).

Most of the studies included members of the multidisciplinary team in the development of the competencies, such as nurses, doctors, educators, and clinicians (Alfieri et al., 2017; Gill et al., 2017; Lakanmaa et al., 2012), with some including nurses only but at various professional levels such as specialist critical care nurses and ICU practitioners (Kopf et al., 2018; Zhang et al., 2019), and post-graduate ICU nurses (Hadjibalassi et al., 2012). It was important to include all these studies since, in the Kenyan context, specialised ICU nurses and non-specialised ICU nurses share the same job responsibilities. Notably, patients and families as stakeholders and consumers of ICU services were only included in one of the studies evaluated, a meta-ethnography study conducted by Henriksen et al. (2021) to develop a conceptual framework with core competencies of ICU nurses based on patients, their families, and ICU nurses' experiences. Including patients and their families was deemed important to add their voices as key stakeholders and determinants of nurses' competencies. However, the lack of inclusion of patients and families was declared as a limitation in most of the studies (Hadjibalassi et al., 2012; Lakanmaa et al., 2012; Sakuramoto et al., 2023; Zhang et al., 2019), which could be related to the ethical issues associated with such inclusion.

Nevertheless, Bench et al. (2003) developed a critical care competency framework through functional analysis with critical care nurses analysing their functions with consideration to patients. Their philosophy guided this that the patient is the key focus of critical care delivery, and therefore, in all the competencies, the patient needs should be central to the critical care competency framework (Bench et al., 2003). This is consistent with the UK's synergy model, where the nurse's competencies are matched with the patient's needs (Martha, 2007). Bench et al. (2003) identified three key roles of a competent nurse: assessment/interpretation, therapeutic intervention, and evaluation strategies. These were translated into four competency statements, each with performance criteria as integrating comprehensive patient assessment and interpretive skills to achieve optimal patient care; managing therapeutic interventions and regimes; evaluating and responding effectively to rapidly changing situations; developing and managing a plan of care to achieve optimal patient outcome and consider implications for discharge (Bench et al., 2003).

Later, critical care networks across the country developed a UK National Critical Care Competency Framework to address the inequity of critical care registered nurses' education and competency development (Deacon et al., 2017). The framework is a collection of the core clinical competencies that are believed to be fundamental to the optimal performance of adult critical care nurses. It has three steps, with step one aimed at new ICU nurses with no experience in speciality care, and steps two and three aimed at staff developing specialist skills through post-registration programs (Deacon et al., 2017). The components of each step are the same, but the outlined areas of learning become more in-depth as a nurse progresses from one step to another. The framework uses a body systems approach; for example, under the respiratory system, a nurse should be able to assess, monitor and observe a patient with respiratory disorders (Deacon et al., 2017; Price, 2013).

The other components in this framework include professionalism, evidence-based practice, communication, teamwork, infection prevention and control, end-of-life care, and defensible documentation (Deacon et al., 2017). Step one of the competency frameworks is recommended to be completed within one year of a nurse commencing in the critical care unit. The competencies of this step are also believed to form the foundation for future competency development and could be used for induction and preceptorship programs (Price, 2013). This framework provides the development of an adult critical care nurse from novice to expert as they progress through the three steps of the framework. Mentorship and preceptorship have been recommended for the nurse to achieve the competencies, and their achievement should form part of their portfolio (Price, 2013).

The European Federation of Critical Care Nursing Associations (EfCCNa), Education Committee (2013) developed a competency framework to respond to their need to standardising the level of clinical skill and knowledge for the critical care nursing workforce across Europe and to facilitate continuous development of ICU nurses and influence the curriculum of formal post-registration critical care course. After consultation with key stakeholders and country representatives, they came up with the key domains and sub-domains of the competency framework. The key competency domains included clinical, professional, managerial, education, and professional development. The subdomains of the clinical domain comprise the steps of the nursing process: assessment and nursing diagnosis, planning, implementation, and evaluation. The professional domain includes complex decision-making, ethical-legal and communication as the sub-domains.

Unit management, team management, health and safety, and quality assurance are the sub-domains of the managerial domain. The education and development domain comprises personal development, the development of others, and evidence-based practice as the subdomains. The component of attitude is not prominent in this framework. The EfCCNa Critical Care Nursing competencies are intended to be used by critical care nurses, managers and mentors, and nursing educators, who might be responsible for delivering critical care nursing training within the clinical setting or an academic institution. However, unlike the UK's National Critical Care Competency Framework, the EfCCNa does not clearly state at what level and duration a nurse must complete each competency.

In Australia, Dunn et al. (2000) developed competency standards for specialist critical care nurses through a qualitative approach which occurred within the context of nursing practice, taking into account varied interactions occurring within the nurse-client environment. The outcome was four domains of competence, each with several competency standards and performance criteria. These domains are professional practice, reflective practice, clinical problem-solving, leadership, teamwork and enabling (Dunn et al., 2000). These competencies are consistent with competencies developed in other countries (Camelo, 2012; DeGrande et al., 2018; Gill et al., 2017; Lakanmaa et al., 2015). The major limitation of these competency standards is that they were not validated (Dunn et al., 2000). The Australian competency standards were later revised and were categorised into four main domains (Gill et al., 2017). The standards were developed through a two-phase study involving focus group discussion with critical care nurses to develop themes that were then subjected to an e-Delphi for consensus (Gill et al., 2017). The domains include professional practice, provision and coordination of care, critical thinking and analysis, collaboration, and leadership (Gill et al., 2017). Each domain was further divided into subdomains which are similar to other findings: professional practice (DeGrande et al., 2018; Henriksen et al., 2021), decision-making, humanity and ethicality, collaboration, and teamwork (Camelo, 2012; Hadjibalassi et al., 2012; Lakanmaa et al., 2015).

An integrative review of professional nurses working in the ICU by Camelo (2012) revealed almost the same competencies as recommended by the EfCCNa framework. This integrative review aimed to identify and analyse nurses' competencies required to work in the ICU, which could further be used to develop an ICU nurse profile (Camelo, 2012). The key professional

competencies were nursing care management and complex care delivery, decision-making, nursing leadership, communication with the health team, patients, and families, continuing professional education, and human and material resource management (Camelo, 2012). However, it is unclear how nurses develop professional competence and who implements these competencies.

A literature review by Ääri et al. (2008) on competence in intensive and critical care nursing came up with almost similar components of ICU competencies as the previous studies. This review divided the concept of competence into two broad categories: clinical competence and professional competence (Ääri et al., 2008). Four domains of clinical competence were identified, including principles of nursing care, clinical guidelines, and nursing interventions. The components of professional competence include ethical activity, decision-making, development work, professional development and evidence-based practice, and collaboration (Ääri et al., 2008). Similar to the previous studies, Ääri et al. (2008) study has not considered how the competencies are acquired and over which duration. Similarly, a study in Finland on ICU nurses' self-assessed basis competence classified basic competencies into patient-related clinical competencies and general professional competencies. Further, it classified these competencies into knowledge, skill, attitude, value, and experience bases (Lakanmaa et al., 2015).

In Cyprus, an instrument to determine the competencies of postgraduate ICU nurses was developed, and four dimensions of competencies were identified (Hadjibalassi et al., 2012). Like Gill et al. (2017), this was a two-phase study with a focus group as the first phase, followed by a Likert scale questionnaire (Hadjibalassi et al., 2012). The four competencies identified included leadership, management, and professional development; decision-making and management of emergencies; provision of care and professional practice; and ethical practice (Hadjibalassi et al., 2012). These were further categorised into sub-dimensions to spell out the expectations from each dimension (Hadjibalassi et al., 2012). The competencies identified are consistent with other studies findings (Camelo, 2012; DeGrande et al., 2018; Lakanmaa et al., 2015).

China also developed a competency framework for specialist critical care nurses to provide a foundation for assessing nursing performance and improving clinical practice (Zhang et al., 2019). This was developed through a modified Delphi process, which involved a literature review and validation of the competencies by stakeholders through focus group discussions and, finally, a

consensus through a web-based panel of experts' opinions. The principal domains of this competency framework are similar to other competency frameworks, and they include evidence-based domains with a systemic approach practice, e.g. cardiovascular and respiratory, among other systems (Ääri et al., 2008). It also includes complex decisions, communication and cooperation, education and development, leadership, and quality assurance (Ääri et al., 2008). The only difference with the other studied frameworks is the lack of inclusion of cultural competence.

Caring for culturally diverse patients was identified as a major challenge because of linguistic and cultural barriers in a study that looked at the experiences of ICU nurses in caring for culturally diverse patients (Listerfelt et al., 2019). This can be overcome by the inclusion of a component of cultural competence in the nursing education curriculum, which should consequently be enhanced as the nurses continue to practice in the ICU. Previous work in China by Wei et al. (2018) on competencies for nurses in Chinese ICUs identified competencies which were ranked in order of priority as medical ethics, clinical practice, nurse-nurse cooperation, assessment and decision-making, personal and professional development teaching and research, and nurse-physician co-operation.

(DeGrande et al., 2018), in their integrated literature review on competencies of ICU nurses, came up with competencies which they termed as professional competencies and classified them into three main domains: managing situations, decision-making and teamwork. A recent meta-ethnographic study aimed at developing a conceptual framework of core qualities and competencies geared towards patient safety and person-centeredness in the ICU has provided insight into the phenomenon of feeling safe (Henriksen et al., 2021). A range of qualities and competencies of ICU nurses from the patient's and relatives' perspectives were revealed in this study, and they include technical skills and biomedical knowledge, creating a good atmosphere and having a supportive and encouraging attitude (Henriksen et al., 2021).

The American Association of Critical Care Nurses (AACN) developed a competency-based curriculum to respond to the need to transition novice critical care nurse practitioners (NP) to practice (Kopf et al., 2018). The Association developed nine competencies: professional development, scientific foundation, procedural skills, diagnostic studies, mechanical ventilation, complex disease management, end-of-life care, patient safety and pharmacology (Kopf et al., 2018). However, their curriculum was more medically oriented than nursing-focused, as the

critical care NPs are expected to practice independently (Kopf et al.2018). As such, this curriculum was informed by the Accreditation Council for Graduate Medical Education (ACGME). The sub-domains of these competencies are spread across the knowledge, skills, and attitude categories (Kopf et al., 2018). The AACN also developed a synergy model that focuses on patients' needs, the nurses' competencies and the healthcare environment as its key components (Kaplow & Reed, 2008). The American Association of Critical-Care Nurses (AACN) synergy model was developed as part of a requirement of Magnet Designated hospitals to have a professional model of care (Kaplow & Reed, 2008). The core concept of the model is that the needs of critical care patients and their families drive the competencies of the nurse (Kaplow & Reed, 2008). These nurse competencies include advocacy and moral agency, caring practices, collaboration, system thinking and response to diversity. The patient and family characteristics that drive these competencies include resiliency, vulnerability, stability, complexity, resource availability, participation in care, decision-making, and predictability (Kaplow & Reed, 2008).

In Norway, Henriksen et al. (2021) developed a conceptual framework of the core qualities and competencies of intensive and critical care nurses through a meta-ethnography. Henriksen et al. (2021) explored qualitative studies on nurses, patients, and their relatives' experiences and drew up four key competencies: professional skills, communication skills, teamwork skills, and technical skills. Nurses mainly informed this conceptual framework through their experiences and patients and their relatives (Henriksen et al., 2021).

In Italy, Alfieri et al. (2017) conducted a study to examine ICU nurses' competencies through interviews to collect opinions. This study was conducted in two different ICU contexts with a group of 11 participants: nurses, nurse coordinators, doctors, departmental assistants, and healthcare assistants (Alfieri et al., 2017). The following competency domains were generated: education, activities, technical competencies, relational capacities, cognitive skills, and professional competencies (Alfieri, et al., 2017). These are similar to most other competencies developed apart from the activity's domain, which are more emphasized (Ääri et al., 2008; DeGrande et al., 2018; Wei et al., 2019).

A study conducted in Poland to explore novice nurses' readiness to work in the ICU revealed the unpreparedness of nurses to work in the ICU and, therefore, called for a professional orientation (Serafin et al., 2021). However, the nurses in this study identified five key competencies that would

help them practice in the ICU: communication, teamwork, professional self-confidence, knowledge, and practical use (Serafin et al., 2021). This shows the value professional and relational competencies play in the practice of ICU nurses. The novice nurses need to feel confident and part of the larger team.

From the literature overview on the key competencies and competency frameworks, the concept of competence is multidimensional, and various researchers have grouped the competencies into various domains and aspects. Key domains have been drawn and synthesized from the integrated literature review and additional literature where emphasis is required. The key domains of knowledge are cognitive, psychomotor, and affective, with three important aspects of competence being clinical, cultural, and professional competencies. These six key domains are discussed as themes in this study.

3.6.1 Domains of Knowledge

The domains of knowledge discussed here and considered for the competency framework development have been derived from synthesis of evidence from the integrated review. Domains of knowledge are based on three levels: cognitive, affective, and psychomotor, which are best explained by Benjamin Bloom in his work on educational objectives (Bloom, 1956). Knowledge in all three domains of competence is essential for full professional development and is the cornerstone of the nursing profession (Miller, 2010; Staykova et al., 2017). The three domains cannot be separated in the nursing field and must be transferable to clinical practice. Basic knowledge, a positive attitude, and correct practice are necessary to enhance the quality and safety of nursing care (Zhang et al., 2021). A good example of how a nurse combines the three domains in her care for patients is the one drawn from Miller (2010); a nurse requires psychomotor skills to assess a patient, the affective skills of communication and appropriate behaviour towards the patient being assessed, and the cognitive ability to interpret the data and plan care. Similarly, the AACN has organised the competencies of ICU nurses into three main domains: knowledge, skills, and attitude base and subdomains of competencies under each domain (AACN, 2015). On the other hand, Lakanmaa et al. (2015) grouped the competencies into two main domains of clinical and professional competence, and each domain included knowledge base, skill base, attitude and value base, and experience base.

3.6.1.1 Cognitive domain

The cognitive domain, or the knowledge base, involves developing a nurse's mental skills and acquiring knowledge (Hoque, 2017). Learning processes in the cognitive domain include a hierarchy of skills involving processing information, constructing understanding, applying knowledge, solving problems, and conducting research. There are six cognitive domain levels: knowledge, comprehension, application, analysis, synthesis, and evaluation (Bloom, 1956). The higher the level in the cognitive taxonomy, the more complex the mental operation (Hoque, 2017). The cognitive domain emphasises that nurses need sound theoretical knowledge to be competent at work, including recognising specific facts and concepts to evaluate clinical decisions (Pepin et al., 2011). Nurses should be able to translate knowledge into practice; therefore, teaching methods should be geared towards this achievement. According to the literature, simulation-based education is a preferred method for translating knowledge into practice (Fukada, 2018; Serafin et al., 2021).

3.6.1.2 Skill base

The skill base, or the psychomotor domain, is concerned with utilising and coordinating motor skills (Hoque, 2017). This domain has six levels: imitation, manipulation, precision, articulation, and naturalisation (Gogus, 2012). Acquiring psychomotor clinical skills is essential for a competent nurse, as a lack of it can compromise patients' care and safety (Mwale & Kalawa, 2016). Psychomotor skill acquisition is a process which starts in class and continues in the clinical environment. A clinical preceptor is the best-placed resource for a graduate nurse to continue to acquire skills in the clinical areas (Mwale & Kalawa, 2016). A study on factors contributing to the theory practice gap in nursing education in the United Arab Emirates revealed a tripod of clinical practice with three subthemes: prepared students, aware and supportive preceptors, and qualified clinical faculty (Saifan et al., 2021). The competence of clinical preceptors in the ICU is of utmost importance.

3.6.1.3 Attitude and Value Base

Attitude and values, also known as affective domain, involve listening, responding in interactions with others, and demonstrating emotions, attitudes, or values appropriate to particular situations (Hoque, 2017; Miller, 2010). This domain is categorised into five subdomains: receiving

phenomena, responding to phenomena, valuing, organisation, and characterisation (Hoque, 2017). The affective domain is the most problematic area for assessing the clinical or practical component in health and teaching profession courses. There is more tendency to focus on cognitive and psychomotor domains of competence (Miller, 2010). The aspect of the caring behaviour of a nurse is associated with the affective domain, and it is the essence of the nursing profession (Brown, 2011). A meta-ethnographic study on core qualities and competencies of ICU nurses based on the experiences of ICU patients and their families and ICU nurses revealed a desire for personal and compassionate relations from patients and their families (Henriksen et al., 2021). Some scholars have linked affective skills with professionalism (Ääri et al., 2008).

Teaching strategies for the affective domain have been researched, and clinical simulation and reflective practice are two strategies that can enhance affective learning (Isabell et al., 2017). Reflection has improved patient care and communication (Chong et al., 2016). There has been an attempt to develop tools to assess the affective domain (Epstein, 1977; Rogers et al., 2018). One of those tools is the Epstein Framework. This qualitative tool allows students to self-assess themselves for the long-term impact of learning activities, such as reflection, that activate affective domain development. On the other hand, Rogers et al. (2018) developed an assessment scale for the affective domain known as the Griffith University Affective Learning Scale (GUALS). This was also based on reflective learning after a simulation encounter, where an assessor rates a student's journal on a scale. Stephens and Ormandy (2019) tested the Epstein framework and found it superior to GUALS because it could be used in many clinical practice settings.

3.6.2 Domains of Competence

Most studies have divided the competencies into domains, and each domain includes specific competencies. For example, Zhang et al. (2019) grouped specialist critical care nurses' competencies into five domains, each having subdomains. The domains include evidence-based practice, complex decisions, professionalism, communication and cooperation, education and development, and leadership. The subdomains in complex decisions, for example, include clinical judgement, evidence-based decision, and integrative thinking (Zhang et al., 2019). Researchers have named the domains differently, but the competencies included in these domains tend to overlap. The EfCCNa's ICU nurses framework, as cited by Kopf et al. (2018), grouped the

competencies in almost similar ways (Zhang et al., 2019). The domains include clinical, professional, educational and development, and managerial domains (Kopf et al., 2018). This study discusses the competencies under three major domains, which include clinical, professional, and cultural competencies.

3.6.2.1 Clinical competence

According to most studies, clinical competence pertains to the principles of nursing care, clinical guidelines, and nursing interventions (Ääri et al., 2008; Klas & Schäfer, 2015). Most studies intertwined the clinical competencies across knowledge, skills, and attitude domains. For example, the AACN competency framework (Kopf et al., 2018; Lakanmaa et al., 2012). An ICU nurse should be able to perform physical assessments, formulate a nursing diagnosis, plan, implement, and evaluate (Klas & Schäfer, 2015). They should be familiar with the clinical guidelines that direct the care of critically ill patients and follow them (Lakanmaa et al., 2015). A plethora of literature reports the clinical practice readiness gap between nursing curricula and actual clinical practice expectations (AlMekkawi & El Khalil, 2020; Benner et al., 2011). Additionally, relevant education has been cited as the most important barrier to competent ICU nurses (Kim et al., 2019).

A study on the experiences of NGRNs hired and retained in adult ICUs revealed that these nurses could survive to become competent ICU nurses if exposed to various clinical situations early to promote resilience and self-care (DeGrande et al., 2018). It is therefore recommended to have a transition program for NGRNs that helps them bridge the gap between theory and practice. However, infection prevention and control as a competence for ICU nurses has only been mentioned in one paper (Deacon et al., 2017). This could be because as much as Health Care-Associated Infections (HCAIs) are a major global challenge, the burden is more prevalent in developing and developed countries (AL-Rawajfah, 2016).

3.6.2.2 Professional competence

DeGrande et al. (2018), define professional competence as the ability to make sound judgments and decisions when faced with life-threatening situations in the ICU. It is the thinking behind the clinical skill and uses prior experiences with clinical knowledge (DeGrande et al., 2018). Further, Ääri et al. (2008) posit that professional competence pertains to ethical activities, multidisciplinary collaboration, decision making and professional development. Beyond clinical competence, ICU

nurses need to mobilise special humanisation, competencies for effective performance, combining scientific and technical knowledge, mastery of technology, humanisation and individualisation of care, leading to high-quality care delivery (Camelo, 2012). Literature in the professional domain is heterogeneous; it varies among researchers with common overlaps in the specific competencies. In some studies, professional competence is referred to as professionalism (Zhang et al., 2019) and professional development (Kopf et al., 2018). The key professional domains discussed in the literature are highlighted below:

Communication/Collaboration

ICUs are highly technologized environments majorly focused on intensive medical interventions, and this leaves families feeling frightened and isolated from information and patient contact (Adams et al., 2017). Hence, competent communication is fundamental for adequate and productive interactions between teams in the ICU and in response to patients' and their families' needs (Camelo, 2012). Poor nurse communicative competencies can be detrimental to the quality of care, nursing practice, and safety, which suggests that communication competence is a required skill for all (Kwame & Petrucka, 2020). Communication failure has been ranked as one of the leading causes of error and sentinel events in healthcare (Jones et al., 2021). Inter-professional communication and collaboration skills are also important as they promote teamwork in decision-making focused on patient needs while ensuring respect for team member contributions (Herbert, 2005; Serafin et al., 2021).

In a study on novice nurses ' readiness to practice in an ICU in Poland, communication was reported to be among the key valuable competencies required by novice ICU nurses (Serafin et al., 2021). The nurses in this study felt inter-professional medical education would help to prepare them for future multi-professional team communication and cooperation. A study conducted by Manojlovich et al. (2009), on the evaluation of team communication in the ICU demonstrated a positive correlation between communication and the development of ventilator-associated pneumonia and timeliness communication and presence of pressure ulcers. A literature review on ICU nurses' communication with patients' families revealed inadequate training as one of the barriers of effective communication between the nurses and patients and their families (Adams et al., 2017).

Several strategies have been recommended in the literature to improve interdisciplinary and intra-disciplinary team communications in the ICU. These include interdisciplinary rounds, shared

planning and decision-making, and daily goal sheets, which would help in understanding daily goals of care, including required tasks with designated responsibilities for each team member (Pronovost et al., 2003). It also includes using protocols and checklists developed, implemented, and evaluated by the interdisciplinary team (Rose, 2011). The IOM also highly recommends the Situation-Background-Assessment-Recommendation (SBAR) method for communication with interdisciplinary teams (Institute of Medicine Committee on Quality of Health Care in, 2001). The other communication aspect is between the nurse, patient, and their families. ICU patients and their families/ caregivers are vulnerable to communication breakdown as a direct consequence of critical illness and its management. Nurses are the most frequent communication partners to these patients and their families, and they are not specially prepared for this role (Radtke et al., 2012). A study conducted on ICU nurses' perception on communication training revealed changed and improved attitudes and practices regarding communication with non-speaking ICU patients (Radtke et al., 2012).

Nursing leadership and management

Nursing leadership and management has been recognised as a key professional skill for ICU nurses in many articles (Camelo, 2012; Deacon et al., 2017; Endacott et al., 2022; Lakanmaa et al., 2012; Zhang et al., 2019). Components of leadership and management overlap in many articles, including team and unit management, maintaining a safe and supportive environment, quality assurance, empathy and humanism, and collaboration (Gill et al., 2017). Leadership as an important skill has been reported to be a very difficult competency for NGRN and requires a longer time to be demonstrated. Charette et al. (2019) studied how NGRNs in acute care settings from a competency-based curriculum demonstrate their competencies. They rated leadership and supervision as the two least required competencies on a list of 30. For this reason, it has not been included in the competency statements.

Decision-making and managing situations.

Decision-making and managing situations were also common competencies highlighted across many studies (Ääri et al., 2008; Hadjibalassi et al., 2012; Lakanmaa et al., 2012). Decision-making has been recognised as a key competency for nurses working in the ICU as they deal with life-threatening conditions and complex situations. Lakanmaa et al. (2015) classified decision-making as one of the competencies in the professional domain, while Zhang et al. (2019) classified

complex decision-making as a stand-alone competence domain with three subdomains under it, which includes clinical judgement, evidence-based decision, and integrative thinking.

3.6.2.3 Cultural competence

Transcultural nursing dates back to the 19th century, with Florence Nightingale advising the British nurses working in India to consider their patients' cultural backgrounds (Beer & Chipps, 2014). Care and culture are intertwined, and knowledge and means of practices of diverse cultures are vital to guide nursing decisions and actions to provide culturally congruent care (Beer & Chipps, 2014). Cultural competence provides effective, safe, and quality care to patients from different cultural contexts (Sharifi et al., 2019). ICU patients and their families' complexity and vulnerability call for a culturally competent healthcare team to respond to their needs (Dobrowolska et al., 2020). Cultural competence is especially important to nurses in countries with cultural diversity, like Kenya, to provide culturally sensitive care.

In their position statement paper on culturally sensitive critical care nursing, World Federation of Critical Care Nurses (WFCCN) as cited by Dobrowolska et al. (2020), highlighted five key principles on the right of patients to receive culturally sensitive care, the rights of nurses to have their cultural differences respected, and the need for critical care nurses to have knowledge, skills and attributes to deliver culturally sensitive care. Several cultural frameworks for nursing education have been developed in many countries, as cited by Jirwe et al. (2009), and the common themes that were identified are cultural awareness, knowledge, skills, encounters, and sensitivity. A concept analysis by Sharifi et al. (2019) also identified similar attributes of cultural competence, including cultural awareness, knowledge, sensitivity, and skill.

Cultural awareness pertains to nurses becoming sensitive to the patient's values, beliefs, lifestyles, and practices and reflecting on their own values, prejudices, and biases. Cultural knowledge pertains to the nurse being able to seek information from other cultures and different worldviews and how these impact on the patient’s health. A culturally skilful nurse should be able to collect relevant cultural data regarding the patient’s presenting symptoms and accurately perform a culturally based physical assessment. The nurse encounters patients from different cultures, and these repeated encounters refine and modify existing beliefs about a cultural group and prevent stereotyping. Cultural sensitivity encompasses compassion, empathy, respect, flexibility, and openness towards difference (De Beer & Chipps, 2014). Lack of knowledge and skills in cultural

competence was ranked amongst the highest barrier to providing quality end-of-life care by ICU nurses (Crump et al., 2010). Listerfelt et al. (2019), in their study on exploration of experiences of critical care nurses and enrolled nurses on caring for culturally diverse patients, found out that cultural and linguistic barriers posed a major challenge. A study by Dobrowolska et al. (2020) revealed that cultural education helped nurses to develop cultural competence and recommended exposure to different cultures as one of the training methods in cultural education.

3.7 Competency items generation through literature review

Phase one of this study aimed to meet objectives one and two by gathering substantial information from the literature to help formulate the competencies.

- To describe the competencies of RNs working in ICU through an integrative literature review
- To compile a preliminary set of competencies based on the obtained data.

A list of 91 competency items was developed, as shown in Table 3.5 below:

Table 3.5: Competencies from literature review

No.	Competency statement
1.	The nurse communicates effectively and in a timely manner to ICU patients and their families (Deacon et al., 2017; (Zhang et al., 2019)
2.	The nurse is sensitive to the values, beliefs, lifestyles, and practices of the patient and identifies their own values, biases, and prejudices (Hadjibalassi et al., 2012; Kopf et al., 2018)
3.	The nurse practices with cultural sensitivity and awareness of social factors to enhance patient and family well-being (Gill et al., 2017; Hadjibalassi et al., 2012; Kopf et al., 2018)
4.	The nurse expresses both cultural and spiritual sensitivity while counselling patients and their families (Gill et al., 2017; Kopf et al., 2018)
5.	The nurse can update the patients and their families with information concerning nursing care and the patient's clinical situation (Camelo, 2012)
6.	The nurse understands ethical principles and applies these to their patient's care (Gill et al., 2017; Zhang et al., 2019)
7.	The nurse demonstrates responsibility and accountability for nursing practice and complies with the profession's code of ethics and code of conduct (Hadjibalassi et al., 2012)
8.	The nurse makes complex and informed independent decisions within their own level of competence and scope of practice (Heather DeGrande et al., 2018a)
9.	The nurse respects the rights of patients and their families (such as privacy, confidentiality, provision of appropriate information, and choice in health care). (Price, 2013)
10.	The nurse maintains patient records and information in accordance with best practice and institutional guidelines (Price, 2013)
11.	The nurse contributes to ethical decision-making issues in the multidisciplinary team in their unit (Alfieri et al., 2017; Camelo, 2012)

12.	The nurse manages their time effectively and can prioritise patient care (Price, 2013)
13.	The nurse understands and can describe effective change management processes (Price, 2013)
14.	The nurse actively participates in the change management process in their unit (Price, 2013)
15.	The nurse is adaptable and open to change (Price, 2013)
16.	The nurse is aware of their scope of professional practice and acts autonomously within it (Hadjibalassi et al., 2012; S. Kopf et al., 2018)
17.	The nurse can demonstrate competence in Basic Life Support (BLS) techniques (Alfieri et al., 2017; Hadjibalassi et al., 2012)
18.	The nurse can demonstrate competence in Advanced Cardiac Life Support (ACLS) techniques (Alfieri et al., 2017; Hadjibalassi et al., 2012)
19.	The nurse utilises current best practice guidelines in BLS and ACLS (Alfieri et al., 2017; Hadjibalassi et al., 2012)
20.	The nurse can safely administer commonly used medications in the ICU via a variety of routes (Intravenous, Nasogastric, Percutaneous Endoscopic Gastrostomy (PEG), Peripherally Inserted Central Catheter (PICC line), Central Venous Catheters (CVC) (Price, 2013).
21.	The nurse effectively manages the care of a critically ill patient with acute alterations/disorders in vital organs or body systems (Hadjibalassi et al., 2012)
22.	The nurse effectively manages the technology that is related to the scope of their practice and experience in the care of critically ill patients (Alfieri et al., 2017; Hadjibalassi et al., 2012)
23.	The nurse recognizes early warning signs of potential deterioration or complications in their patient (Hadjibalassi et al., 2012)
24.	The nurse thinks critically and effectively utilises a systematic approach to solve problems (Kopf et al., 2018)
25.	The nurse delegates care where appropriate whilst maintaining patient safety (Gill et al., 2017; Hadjibalassi et al., 2012)
26.	The nurse understands the importance of careful prescribing of antimicrobial drugs to reduce antibiotic resistance (Kopf et al., 2018)

27.	The nurse adheres to clinical guidelines in the administration and management of medications in the ICU (Kopf et al., 2018)
28.	The nurse can undertake a comprehensive assessment of the patient and explain this to the patient/family (Kopf et al., 2018)
29.	The nurse can competently assess and document findings of the cardiovascular system and identify any abnormalities (Deacon et al., 2017)
30.	The nurse can competently assess and document respiratory system findings and identify abnormalities (Deacon et al., 2017)
31.	The nurse can competently assess and document findings of the digestive system and identify any abnormalities (Deacon et al., 2017; (Zhang et al., 2019)
32.	The nurse can competently assess and document findings of the renal system and identify any abnormalities (Deacon et al., 2017; Zhang et al., 2019)
33.	The nurse can competently assess and document findings of the neuromuscular system and identify any abnormalities (Deacon et al., 2017; Zhang et al., 2019)
34.	The nurse can competently assess and document findings of the endocrine system and identify any abnormalities (Price, 2013)
35.	The nurse acts with assistance from an inter-professional team on assessment findings of their patient to initiate, monitor, and manage interventions (Alfieri et al., 2017)
36.	The nurse formulates a plan of care for the patient and evaluates the outcomes (Gill et al., 2017; Kopf et al., 2018)
37.	The nurse explains the indications and contraindications of common procedures performed in the ICU, e.g. intubation central line insertion (Price, 2013)
38.	The nurse distinguishes the procedures they can perform under their national professional scope of practice (Kopf et al., 2018)
39.	The nurse demonstrates knowledge of the institutional and national guidelines and standards of practice for procedures performed in ICU (Kopf et al., 2018)

40.	The nurse respects the patient's autonomy to refuse any procedures in ICU (Kopf et al., 2018)
41.	The nurse demonstrates a high level of competence in carrying out a range of procedures, treatments, and interventions within their scope of practice (Kopf et al., 2018)
42.	The nurse adheres to institutional and national guidelines and standards of practice for procedures performed in the ICU (Alfieri et al., 2017; Kopf et al., 2018)
43.	The nurse understands the benefits of non-invasive ventilation over invasive ventilation (IV) where possible (Deacon et al., 2017; Kopf et al., 2018)
44.	The nurse can safely care for a patient on NIV and take precautions to prevent iatrogenic problems (e.g. pressure ulcers) (Deacon et al., 2017)
45.	The nurse understands different modes of invasive ventilation (pressure vs volume cycled) (Kopf et al., 2018)
46.	The nurse can administer oxygen therapy safely via a simple face mask, a venturi system, a nasal cannula, and a reservoir mask (Deacon et al., 2017)
47.	The nurse demonstrates the ability to collaboratively manage a mechanically ventilated patient (Deacon et al., 2017; Kopf et al., 2018)
48.	The nurse recognizes when to escalate to advanced modes of therapy when standard mechanical ventilation is unsuccessful (e.g., prone ventilation, Extracorporeal Membrane Oxygenation) (Kopf et al., 2018)
49.	The nurse can obtain a blood sample for arterial blood gas from the arterial line and interpret the results (Alfieri et al., 2017)
50.	The nurse can work collaboratively with other team members to wean a patient from mechanical ventilation (Kopf et al., 2018)
51.	The nurse understands ventilator settings and can troubleshoot ventilator alarms (Deacon et al., 2017; Kopf et al., 2018)
52.	The nurse is competent with the extubation of a patient and post-extubation management (Alfieri et al., 2017)

53.	The nurse can identify the need for suction and safely suction a patient via endotracheal tube, tracheostomy, or oropharyngeal route (Deacon et al., 2017)
54.	The nurse can assess the patient before, during, and after suctioning (Price, 2013)
55.	The nurse can confidently explain the reasons for mechanical ventilation and the care of the ventilated patient to the family (Kopf et al., 2018)
56.	The nurse can identify signs of pneumothorax in a ventilated or non-ventilated patient (Price, 2013)
57.	The nurse can prepare the equipment ready for insertion of the chest drain and can monitor the patient with underwater seal drainage in situ (Deacon et al., 2017)
58.	The nurse understands indications, complications, and troubleshooting for underwater seal drainage (Deacon et al., 2017)
59.	The nurse knows the indications for both invasive and non-invasive hemodynamic monitoring of a critically ill patient (Price, 2013)
60.	The nurse is able to prepare for and assist in the insertion of an arterial line (Price, 2013)
61.	The nurse can care for, monitor, and interpret arterial line blood pressure readings (Price, 2013)
62.	The nurse is able to safely prepare for and assist with the insertion of a central venous catheter in a critically ill patient (Price, 2013)
63.	The nurse can safely use the central venous line and monitor and interpret central venous pressure readings.
64.	The nurse is able to assess and manage the skin of a critically ill patient to prevent the development of pressure ulcers (Alfieri et al., 2017)
65.	The nurse safely undertakes hygiene care (washing, eye care, oral care, urinary catheter care) for the critically ill patient.
66.	The nurse ensures a safe environment for patients, families, and staff by identifying, minimizing, and eliminating risks (Price, 2013)
67.	The nurse explains common complex conditions and their treatment plans (Kopf et al., 2018)
68.	The nurse describes the relationship of comorbid conditions and their risks for deterioration in the ICU patient (Kopf et al., 2018)

69.	The nurse describes the importance of early initiation of nutrition in a critically ill patient (Kopf et al., 2018)
70.	The nurse distinguishes enteral and parenteral nutrition and indications and contraindications of each (Kopf et al., 2018)
71.	The nurse understands the risks of administering parenteral nutrition and takes precautions to avoid complications (Kopf et al., 2018)
72.	The nurse can rapidly assess a patient in an emergency using a systematic approach (Kopf et al., 2018)
73.	The nurse describes the importance of pain management for critically ill patients (Kopf et al., 2018)
74.	The nurse can accurately assess and manage pain in a critically ill patient using an appropriate pain assessment tool (Kopf et al., 2018)
75.	The nurse can assess the sedation level in a patient using an appropriate and valid tool (Alfieri et al., 2017)
76.	The nurse can recognise and describe signs of iatrogenic withdrawal from opiates/sedatives (Alfieri et al., 2017)
77.	The nurse recognises delirium, understands the impact of delirium and takes steps to prevent it (Alfieri et al., 2017)
78.	The nurse includes patients and their families in pain management (Kopf et al., 2018)
79.	The nurse understands the importance of reporting errors and near-miss errors and reports them promptly.
80.	The nurse participates in the development of protocols and guidelines for the safe administration of medication within the ICU (Alfieri et al., 2017)
81.	The nurse can describe the iatrogenic complications associated with medical devices such as arterial lines, urinary catheters, central venous catheters, etc. (Kopf et al., 2018)
82.	The nurse can describe risk factors for iatrogenic events (pressure ulcers, falls, healthcare-associated infections, thromboembolism) (Kopf et al., 2018)
83.	The nurse can describe the preventive measures and management of these iatrogenic events (Alfieri et al., 2017; Kopf et al., 2018)

84.	The nurse understands how safety processes can be maintained in an ICU (Gill et al., 2017; Kopf et al., 2018)
85.	The nurse explains the importance of offering palliative and end-of-life care to patients with terminal illnesses (Kopf et al., 2018)
86.	The nurse participates in multidisciplinary end-of-life discussions with patients and their families (Deacon et al., 2017; Kopf et al., 2018)
87.	The nurse values patient and family autonomy in the end-of-life care decisions (Kopf et al., 2018)
88.	The nurse describes how to get up-to-date information for clinical practice (Gill et al., 2017; Kopf et al., 2018)
89.	The nurse incorporates evidence-based best evidence into their practice (Gill et al., 2017; Kopf et al., 2018)
90.	The nurse can describe some quality improvement initiatives in ICU (Gill et al., 2017; Kopf et al., 2018)
91.	The nurse participates in quality improvement efforts to enhance quality and safety in an ICU environment (Gill et al., 2017; Kopf et al., 2018)

3.8 Barriers and facilitators of implementation of competencies

The development of competencies was undertaken to curb the challenges facing Kenya ICUs, including lack of standardised nursing practice, unstructured transition, and orientation of nurses from other departments and NGRNs into ICU setups, unstructured programs for new RNs and continuous professional of ICU nurses. The researcher hopes these competencies will provide solutions to these problems. However, it is not enough to have the competencies without considering the potential barriers and facilitators towards their implementation. Knowledge of barriers and facilitators is the first step towards formulating strategies and effective implementation. Tailored multifaceted implementation strategies that address the contextual barriers lead to effective implementation (Cormican et al., 2023). There is a dearth of literature regarding barriers and facilitators specific to ICU competencies but rather barriers and facilitators to implementing general competencies, healthcare guidelines, and protocols. One study by Lavoie et al. (2022) explored the barriers and facilitators to the national implementation of a nursing competency framework, generating five themes. These include making the competencies accessible to the nurses, securing time for self-assessment to create a continuous learning culture and creating value for assessment (Lavoie et al., 2022). Therefore, the discussion of the barriers and facilitators is around such literature.

3.8.1 Macro barriers and facilitators

In a systematic meta-review to establish contextual barriers and facilitators in implementing clinical guidelines, the following were established to be the barriers: lack of prioritisation of health issues and lack of finances (Correa et al., 2020). On the other hand, clear communication, integrated information health system, and financial incentives were identified as the political and social context facilitators (Correa et al., 2020).

3.8.2 Meso barriers and facilitators

At the health organisation level, lack of protocols and processes, insufficient institutional support, workload, and inadequate staffing were established to be barriers to implementing clinical guidelines (Correa et al., 2020). Similarly, a systematic study exploring health professionals'

perceived barriers and facilitators in implementing clinical guidelines revealed organisational factors as the major barriers (Cormican et al., 2023). Time and resources were mentioned in all the 22 studies evaluated as major barriers towards the implementation processes, but on the other hand, as facilitators if there was provision of time for guidelines implementation and availability of resources such as staffing and equipment (Cormican et al., 2023).

Other organisational processes impacting the implementation included insufficient training and education and a lack of performance guidelines (Cormican et al., 2023). The organisational processes facilitators identified in this systematic review included organised dissemination of guidelines and training, alignment of the existing protocols with the guidelines and regular performance monitoring (Cormican et al., 2023). Lack of multidisciplinary communication and collaboration may also impede the implementation efforts as nurses do not work in silos (Niesten et al., 2021).

3.8.3 Micro Barriers and Facilitators

Negative attitudes and resistance to change were identified as barriers to implementing clinical guidelines (Correa et al., 2020). Good communication, behaviour change skills, and a positive attitude were listed among the facilitators' skills for successfully implementing the clinical guidelines (Correa et al., 2020). Leadership should be able to create a culture of change, and the guidelines should be made simple and clear for easy understanding, as this would foster team motivation. Electing champions to act as agents of communication and collaboration with key stakeholders is also a recognised implementation strategy (Niesten et al., 2021; Pasternack et al., 2016).

3.9 Theoretical frameworks

Nursing theories and models help to shape nursing education, research, and practice by providing guiding frameworks (Murray et al., 2019). Several models, frameworks, and theories were explored to identify the most appropriate framework for this study. These models and theories are discussed here.

3.9.1 Patricia Benner's Model of Novice to Expert

One of the major models that the researcher explored but rejected was Benner's (1982) model of Novice to Expert. It was important to outline the framework here as the researcher would strongly consider it in her post-doctorate work of putting the competencies in levels. Scribante, et al. (1996) posited that a competency framework should be a continuum and recognise nurses' need for continuous education and professional growth from one level to another. The five competence levels reflect changes occurring in three aspects of skilled performance, which include a movement from reliance on rules and abstract principles to the use of concrete past experiences as the basis of decision-making, increased ability to see the situation, increased involvement within the situation (Murray et al., 2019).

Benner's model is based on the premise that expertise is context, and the development of competencies is dynamic and occurs over time; hence, it is also a favourable foundational framework for a transition program (Chamberlain et al., 2019). The model postulates that a nurse can move from novice to expert through transformational experience and that experience is strongly related to competence development (Kim & Choi, 2015; Lakanmaa et al., 2015). However, this notion has been criticised since experience cannot be a predictor of competency; experience does not always translate to competency (Garland, 1996). Benner's model has been utilised to help better understand the cause-effect of transition and new graduate nurses (Sparacino, 2016). The key aspects of this model are summarised according to Benner (1982):

- The novice has no prior experience with situations they are expected to perform. They learn measurable nursing rules and procedures, but there is a lack of situational context to correlate theory to rules, which results in an inflexible approach to nursing. Novice practitioners are hence taught rules to guide their actions in the form of objective attributes.
- Advanced beginners have been exposed to marginal patient situations because of sufficient variety and complexity to progress to marginal accepted performance. Rules are no longer context-free as they see the bigger picture. However, they need support and mentoring in setting priorities since they operate on general guidelines and are just beginning to perceive recurrent meaningful patterns in their clinical practice.

- Competent practitioners can see their nursing actions as long-term goals. This nurse plans care based on priorities rather than stimulus-based interventions. This nurse lacks the speed and flexibility of a proficient nurse but can cope with and manage challenging contingencies.
- Proficient practitioners can perceive the entirety of the clinical situation. Their practice is guided by substantial practice experience, an understanding of the key principles of nursing and basic nursing needs. Holistic understanding allows them to make clinical judgments without consulting learned rules or procedural guides.
- With their wealth of experience, expert practitioners possess an intuitive grasp of clinical situations. They function with certainty, fluidity, and flexibility. Gut feeling plays a major part in their reasoning. Not that the expert practitioner is not analytical, but they only use analytical reasoning when they find behaviors that are not occurring as per the expectations.

The model was rejected because the researchers' aim at this point was not to classify the competencies to match the nurse level along the continuum of novice to expert but rather to identify general competencies for all ICU nurses.

3.9.2 Benner's Domains of Practice

The researcher also explored Benner's domains of practice in critical care nursing outlined in their book Clinical Wisdom and Interventions in Acute and Critical Care: A thinking in Action Approach (Benner et al., 2011). There are nine domains of practice, as outlined by Benner et al. (2011), which include:

- Diagnosing and managing life-sustaining physiologic functions in acutely ill and unstable patients
- The skilled know-how of managing a crisis.
- Providing comfort measures for the critically and acutely ill
- Caring for patients' families
- Preventing hazards in a technological environment
- Facing death: End-of-life care and decision making
- Making a case: Communicating clinical assessments and improving teamwork

- Patient safety: Monitoring quality, preventing, and managing breakdown.
- The skilled know-how of clinical and moral leadership and the coaching and mentoring of others.

These competencies were developed following an ethnographic study of critical care and acute care nurses, including beginners and experts (Benner et al., 2011). The researcher borrowed from these competencies to develop the preliminary set of competencies.

The domains that were borrowed from include: The domains of the skilled know-how of managing a crisis and diagnosing and managing life-sustaining physiologic functions are captured in the competencies as the nurse being able to effectively manage the care of a critically ill patient with acute alterations/disorders in vital organs or body systems. The domains of providing comfort measures for the critically and acutely ill and caring for patients' families are reflected in the competency statement that ensures a safe environment for patients, families, and staff by identifying, minimizing, and eliminating risks. The nurse assesses and manages the patient's pain, involving the patient and the family in pain management, becoming accessible to the patient's family for information concerning nursing care and the patient's clinical situation. The domain of preventing hazards in a technological environment is outlined in the competencies of the nurse being able to demonstrate the ability to troubleshoot ventilator alarms, providing a safe environment for patients, families, and staff by identifying, minimizing, and eliminating risks, being able to assess, manage and prevent common iatrogenic events in ICU and effectively managing technology that is related to the scope of their practice and the care of critically ill.

The domain of end-of-life care and decision-making is captured in the competencies as the nurse being able to participate in multidisciplinary end-of-life discussions with patients, families and caregivers, being able to explain the importance of offering palliative and end-of-life care to patients with terminal illnesses, valuing the patient and family autonomy at the end of life care decisions and contributing to ethical decision-making issues in the multidisciplinary team in her unit. The domain of making a case, communicating clinical assessments, and improving teamwork is reflected in the following competency statements: maintaining patients' records and information in accordance with best practice and institutional guidelines, negotiating and delegating care to optimize matching between own scope of practice and the complexity of care, and acting on assessment findings to

initiate, monitor, and manage interventions. The domain of patient safety: monitoring quality, preventing, and managing breakdown is reflected in the competency statements as the nurse is able to describe the quality measures and participate in quality improvement efforts to enhance quality and safety in the ICU.

3.9.3 Bloom's Taxonomy

Bloom's taxonomy is also widely used as a model to measure competence, and it has three domains, which include cognitive (knowledge), psychomotor (skills) and affective (attitude) (More, 2017). The researcher also considered Bloom's taxonomy in formulating the competencies. The competencies of language reflect the cognitive, psychomotor, and attitude domains. The cognitive domain involves the development of intellectual skills and ranges from recalling information to evaluating information. The psychomotor domain involves learning new skills and moving from observation of a skill to being able to perform the skill independently and adapting the skill to specific situations. Effective skills involve the development of behaviors that surround values, feelings, and appreciation. However, the affective domain has always proven hard to teach and measure (Stephens & Ormandy, 2018). New knowledge, skills, and values positively affected patient outcomes, as reported in a study where students from different health professions underwent an inter-professional education for six weeks (Stephens & Ormandy, 2018). The researcher attempted to have the three domains reflected in most of the competency statements.

3.9.4 Deliberative Nursing Process

The nursing process theory by Jean Orlando is a scientific approach to providing nursing care (Zamanzadeh et al., 2015). The nursing process has evolved and has five cyclical phases: the assessment, diagnosis, planning, implementation, and evaluation phases. The nurse interacts with the patient to find and address their immediate needs. This model was rejected because of its limitation on unconscious patients in the ICU who may not be able to talk for themselves. Further, there is no consideration of the families in the plan of care. In addition, the model addresses only immediate needs and not long-term goals (Zamanzadeh et al., 2015). This theory was therefore rejected to guide the competencies for ICU nurses.

3.9.5 The AACN synergy model

In 1993, the AACN developed the AACN synergy model to delineate the scope of practice for critical care nurses (Caterinicchio, 1995). The model's core assumption is that the needs of patients and families drive the nurses' competencies. Synergy results when the needs and characteristics of a patient, clinical unit, or system are matched with a nurse's competencies (Curley, 1998). However, this model has been critiqued for lack of empirical evidence of its effectiveness. Further, organizational, environmental factors and contemporary issues have not been considered (Kerfoot et al., 2006).

3.10 Summary

ICU competencies and competency frameworks are a well-researched area of nursing. A plethora of studies are emerging from the developed countries. However, little literature is available providing a Kenyan and SSA perspective. There are some variations in the definition of competencies. These competency frameworks, standards, and guidelines have been developed to respond to issues like inconsistencies in practice, the need for an assessment and evaluation of ICU nurses, and the professional development of ICU nurses. The three dimensions of competence are knowledge, skills, and attitude, with two broad aspects: professional and clinical competencies. Many researchers have not addressed the aspect of cultural competence. Yet, it is an important aspect that allows a nurse to provide holistic and culturally congruent care to a diverse population. The shared domains in most competencies are leadership and management, evidence-based practice, patient safety, education and professional development, high-complexity nursing care and end-of-life care, communication, teamwork and collaboration, ethicality, patient care and procedural skills. The competencies have been developed through a collaboration of practice and education with the involvement of nurses, managers, ICU physicians, nurses' educators, and regulatory bodies as the key stakeholders. Another major gap identified in these studies was the lack of inclusion of recipients of care (patients). This is, however, a complex issue that requires a lot of ethical considerations.

There are many studies on the transition of nurses into clinical practice and their positive outcomes. The commonest forms of transition programs are preceptorship and residency programs. There is

a paucity of studies on the role transition of nurses in developing countries and, specifically, Kenya, yet anecdotal evidence shows that nurses transitioning into practice and other departments experience the same problems as those of developed countries. The researcher hopes that following the outcome of this work, a transition program that will utilise the developed competencies may be looked at. This will be considered for post-doc work.

This study will aim to close some gaps identified in the literature, including constructing a competency framework that will address the needs of RNs working in Kenyan ICUs and including cultural competencies in the national competency framework, as Kenya is a multi-ethnic nation. The study will also attempt to gain consensus on the contextual definition of competence/competency. The developed framework will include the aspects of knowledge, skills, and attitude. The value and attitude aspects are poorly addressed in most competencies already studied. A recommendation will be made for similar studies in the future to consider the inclusion of recipients of ICU care as key stakeholders.

The following chapter focuses on my philosophical underpinning and how it has informed the choice of research methods. The concepts of Epistemology, Ontology, Axiology, and methodology have been discussed.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 Introduction

Like many other developing countries, Kenya has no defined competencies in its nursing curriculum. This includes the ICU nursing curriculum, which has led to disparities in the training of the nurses, lack of standardised care and transferability of skills. Developed countries have defined competencies through competency frameworks, guidelines, and standards for their nurses. These form a basis for these nurses' training, orientation, professional development, and assessment.

This study aimed to identify and reach a consensus on the competencies required by RNs working in Kenyan ICU set ups. It was a mixed method study that involved three phases: integrative literature review as phase one to identify the competencies and a two-round modified Delphi as phase two, followed by a consensus meeting with ICU stakeholders to reach a consensus with the competencies and agree on an implementation plan as phase three.

This chapter presents an overview of methodological considerations for the mixed method. The researcher has clarified her philosophical stance and how it has influenced her methodological choice. The two other major research paradigms should be discussed with justification of why they were not considered.

4.2 Philosophical underpinning

A paradigm is a set of beliefs that represents a worldview (Guba, 1994). It can also be analogically defined as a mental framework of thought or belief through which one interprets reality. A researcher’s philosophical paradigm reflects their abstract beliefs and values that guide their interpretation of reality and consecutively determine their choice of research methodology (Kawulich, 2012; Singh, 2019). It is the conceptual lens through which the researcher examines the methodological aspects of their research project to determine the research methods used and how the data will be analysed (Kivunja & Kuyini, 2017). This is guided by their view of what constitutes truth and knowledge (Kawulich, 2012). Identification and utilisation of research

paradigms is considered an important aspect of rigorous research as it influences what should be studied, how it should be studied and how the results of the study should be interpreted, leading to a better understanding of scholarly research projects (Brown & Dueñas, 2019; Kivunja & Kuyini, 2017).

There are two major research paradigms that, over the years, have caused paradigm war: positivists (quantitative) and interpretivists/constructivists (qualitative) (Johnson & Onwuegbuzie, 2004). The positivists maintain that social science should be objective and that there should be no connection between the researcher and the one being researched. Positivists believe only one reality exists, which should be statistically investigated (Kivunja & Kuyini, 2017). The ontology of the positivist paradigm is naïve realism, epistemology is objectivism, and methodology is experimental (Singh, 2019). Interpretivists/ constructivists maintain that knowledge is constructed and researchers cannot separate themselves from the research (Johnson & Onwuegbuzie, 2004). They believe that reality is subjective, also known as constructivism, as reality is socially constructed (Singh, 2019). The interpretive paradigm, therefore, does not question ideologies and accepts them as they are (Scotland, 2012). Pragmatism is the third research paradigm, which is a philosophy to help build bridges between the two conflicting philosophies (Johnson & Onwuegbuzie, 2004). The researcher explored the common research paradigms, such as positivists, post-positivists, constructivists, and interpretivists, as detailed in Appendix 18.

To this end, the researcher's research paradigm of choice is pragmatism. Pragmatists believe that there can be single or multiple realities and that the reality can be investigated using many tools of research that reflect both deductive and inductive evidence and are therefore associated with multiple methods or mixed methods (Kaushik & Walsh, 2019). This resonates with the chosen research design of mixed method and aligns with pragmatism's belief that the process of acquiring knowledge is a continuum rather than two opposing poles of subjectivity versus objectivity (Goles & Hirschheim, 2000).

The preliminary set of competencies was developed from diverse views of different researchers from an integrative literature review. The competencies were converted to a set of items for rating on a five-point Likert scale ranging from "1=not important,2= possibly important, 3=Neutral, 4=very important, 5= Essential, and fed on survey monkey. This was then subjected to an iterative process of two rounds of online Delphi for rating by a heterogeneous panel of experts. The experts

were also asked to give their opinions on any other important competencies at the end of the questionnaire in the first round of Delphi. This brought about ten more competencies included in the second round of Delphi. They were also asked to give their opinions on whether the competencies applied to all ICUs and their perceived barriers and facilitators towards implementing the competencies. From the pragmatist point of view, this was important as it included diverse views in developing the competencies.

Important characteristics of the pragmatism paradigm are that the researcher is free to choose research methods that can best solve the problem at hand, adapt to a worldview, and design research methodology according to the purpose of the study (Singh, 2019). As a research paradigm, pragmatism refuses to engage in contentious metaphysical concepts such as truth and reality (Kaushik & Walsh, 2019). Instead, it accepts that there can be single or multiple realities that are open to empirical inquiry (Creswell and Clark 2011). One aspect of Delphi is that it relies on expert knowledge to negotiate a shared reality and to co-construct knowledge (Jünger et al., 2017). The pragmatic approach to constructing national competencies supports my philosophical stance.

Another major underpinning of pragmatist philosophy is that human actions can never be separated from experiences and the beliefs that are socially constructed from those experiences (Kaushik & Walsh, 2019; Morgan, 2014). My experience and beliefs about ICU and what knowledge, skills, and attitudes are required are major motivators of this study and are bound to influence it. For this reason, a reflective journal has been maintained throughout the study. Pragmatists choose reality over another based on how well a choice helps achieve the anticipated results and defines concepts based on their utility (Kaushik & Walsh, 2019). This explains why definitions of concepts of interest in this study have been explored at length and operational definitions established.

Additionally, pragmatism research philosophy allows the integration of more than one research approach and strategy within the same study. This explains why the researcher has used several methods to answer the research questions.

A research paradigm consists of axiology, ontology, epistemology, and methodology. Understanding these elements helps the researcher understand the basic assumptions, norms, beliefs, and values that their research paradigm holds and be guided by them (Kivunja & Kuyini, 2017; Scotland, 2012). Ontology is the lens through which one views reality and what constitutes the world (Al-Saadi, 2014; Scotland, 2012). The ontological lens of a researcher helps orientate

their thinking about the research problem, its significance, and the approach to answer the research question and contribute to its solution, as well as making meaning of the gathered data (Kivunja & Kuyini, 2017).

To assess own ontological assumption, the researcher should ask themselves whether they believe in one verifiable reality, “realism”, or multiple socially constructed realities “, relativism” (Brown & Dueñas, 2019). Positivists and post-positivists have the ontological assumption of realism, while constructivists, critical theorists and pragmatists have the ontological assumption of relativism (Brown & Dueñas, 2019). Realism ontology assumes that reality exists independent of the individual perceiving it (Kivunja & Kuyini, 2017). This means that reality exists out there, and it is the researcher’s responsibility to access and assess this reality objectively (Oppong, 2014). On the other hand, relativist ontology believes that the situation studied has multiple realities that can be explored and meaning made from them. Alternatively, in relativist ontology, meaning can be constructed through human interactions between the researcher and the research subjects (Kivunja & Kuyini, 2017). To this end, the researcher’s ontological stance is that of relativism. The researcher engaged in an integrative review to source the diverse views of other researchers on the subject matter. Further, she has subjected the views of other researchers to a team of experts through a quantitative questionnaire to help reach to a consensus with the competencies of ICU nurses in Kenya.

Epistemology focuses on the world's meaning, how we can make sense of it, and how knowledge can be created, acquired, and communicated (Al-Saadi, 2014; Scotland, 2012). Epistemology is very important in doctoral work as the research is judged by its original contribution to the body of knowledge in the field of study (Kivunja & Kuyini, 2017). Axiology refers to the ethical issues or the nature of ethical behaviour that needs to be addressed in research, and this is informed by the researcher’s value in their research (Kivunja & Kuyini, 2017). Axiology answers whether the research is biased against the social actors. Axiology affects how researchers conduct their research and treat the findings.

There are several axiological stances, the three common ones being value-free, balanced, and value-laden axiology (Poni, 2014). My axiological position leans toward heavy laden. Heavy-laden axiology believes in conducting research that benefits people and believes in the influence of truth by social actors (Kivunja & Kuyini, 2017). It also reflects the role of value placed on the

knowledge and the opinions of the participants and that of the researcher. The researcher has maintained a reflective diary as own experiences play a part in the study and must be kept in check (Morgan, 2014).

The researcher has utilised integrative review to access as many views as possible from other researchers. The online modified Delphi also allows people to voice their opinions independently from a Kenyan perspective. The researcher has also allowed space in the research tool for participant comments. This reflects the value of the truth held by the social actors regarding missing competencies and the barriers and facilitators to implementing the competencies in the future. The researcher engaged a heterogeneous group of participants to retrieve diverse views on the subject matter. The researcher values the views of the social actors and hence sought consensus with them on the identified competencies from the literature and gave them an opportunity to add more competencies that they deemed important. Consent was sought at all the stages of Delphi and consensus meeting. This study was conducted through a pragmatism lens to gather diverse views of key stakeholders. This is because the outcome of this study, which is a competency framework, is envisioned to be used across the Kenyan ICUs. Additionally, the researcher maintained a reflective log throughout the research process.

4.3 Summary

The researcher discusses her philosophical stance on choosing research methods in this section. The researcher has attempted to show how the pragmatic lens has informed the research process and execution of the research objectives. This is depicted in Table 4.1 below:

Table 4.1: Application of pragmatic lens in the research process

	Objectives	**Application of pragmatic lens**
1.	To describe the competencies of RNs working in ICU through an integrative literature review	Integrative review allowed the inclusion of different researchers' views pertaining to the competencies.
2.	To compile a preliminary set of competencies based on the obtained data	A mixed-method approach was used. The competencies were compiled and transcribed onto a survey using a five-point Likert scale to allow the participants to rate the value of the competencies for ICU nurses. Open-ended questions on additional competencies, barriers, and facilitators towards implementation were also included.
3.	To gain consensus on a set of competencies for nurses working in ICUs in Kenya	Consensus was sought through two rounds of e-Delphi and a virtual consensus focus group meeting.
4.	To elicit potential barriers and facilitators towards implementation of the competencies	The focus group participants were asked to discuss other perceived barriers and facilitators towards implementing the competencies.

CHAPTER FIVE: RESEARCH METHODS

5.1 Introduction

The previous chapter has explained the philosophical stance of the researcher and how it informed the chosen research methods. The declaration of the researcher's philosophical stance is important as it ensures the study's rigor through confirmability of the study process and findings. The study aims and objectives also determined the choice of the research method. This chapter provides an explanation of the research methods and the processes that were used to carry out this study. The research design, study population, sample selection, data collection method and analysis procedures, methodological trustworthiness and rigor, and ethical considerations are discussed in this chapter.

5.2 Research Design

This study utilised multistage mixed method framework which includes multiple stages of data collection (Fetters et al., 2013). Research design pertains to transformation of research questions into a framework of approaches and methods that enables the researcher to answer these questions (Kroll & Neri, 2009). The three main research designs are the quantitative, qualitative, and mixed methods (Creswell & Clark, 2017).

Quantitative design involves collection of data to quantify information which is subjected to statistical treatment in order to support or refute alternative knowledge claims (Creswell & Clark, 2017). Quantitative design alone would not have been a possible way of answering the research questions of this study. This is because the researcher needed to draw from the input of the ICU stakeholders. However, several studies referenced in this study in chapter three, utilised quantitative design in identification and development of ICU competencies (Fisher et al., 2005; Lakanmaa et al., 2014; W. Wei et al., 2019). Lakanmaa et al. (2015), used cross sectional survey self-assessment tool to identify the basic competencies of ICU nurses in Finland. One of the limitations of his study was the reliance on self-assessment tool alone to gather the competencies (Lakanmaa et al., 2015). Wei et al. (2019), also conducted a cross sectional multicentre study to

investigate the current state of core competencies of ICU nurses in China. Their study had limitations, among them using a self-assessment tool, and the recommendation for future studies was use of multiple evaluation tools synthetically and simultaneously (Wei et al., 2019).

Qualitative design is a holistic approach that involves discovery and enables the researcher to develop a level of detail from high involvement in actual experiences (Creswell & Clark, 2017). Studies that utilised the qualitative design alone were also among the studies included in the literature review of this study (Alfieri et al., 2017; Serafin et al., 2021). Alfieri et al. (2017), conducted a mapping of critical care nurses' competencies in two different ICUs in Italy through a series of interviews of the ICU nurses and some hospital staff. Alfieri, however, did not indicate any limitations of their study. Serafin et al. (2021), in their study to identify the most needed competencies in ICU among ICU nurses in Poland, used qualitative phenomenology design. The limitation in this study was a small sample size which was only drawn from one region of the country and therefore the study findings could not be generalised (Serafin et al., 2021). This design could not be utilised alone in the current study because of its limitation of sample size and consequently generalisation of the results.

Traditional mixed method design combines quantitative and qualitative data collection, data analysis and an inference process in a parallel form (Tashakkori &Teddlie, 1998). There are four main approaches of mixed method design which include explanatory sequential, exploratory sequential, embedded, and concurrent mixed methods (Creswell & Clark, 2017). In explanatory sequential design, the quantitative data is collected and analysed so that it informs the qualitative data collection and analysis whereas in exploratory sequential design the qualitative data is collected and analysed to inform the subsequent quantitative data collection (Fetters et al., 2013). In a convergent design also known as concurrent, the quantitative and qualitative data are collected and analysed concurrently (Fetters et al., 2013). In embedded mixed method design, either qualitative or quantitative method is dominant and the other method is added to complement data (Creswell & Clark, 2017). It is critical to note that a true mixed method is defined by integration of data at one or more stages in the process of research (Creswell & Clark, 2017). The current study does not fall in any of the traditional mixed method designs. The use of questionnaire that has rating scales and open-ended questions and/ or, collecting information from different sources such as literature reviews and key informants does not qualify as a true mixed method study (Kroll

& Neri, 2009). Further, the objective of the consensus meeting was not to supplement the quantitative information but rather it was meant to explore ways of rolling out the competencies.

Advanced frameworks of mixed method designs involve multistage, an intervention, a case study or a participatory research framework (Fetters et al., 2013). On the other hand, multistage mixed method design combines quantitative and qualitative approaches within or across the stages of research (Johnson & Onwuegbuzie, 2004). The multistage mixed method also uses staged approach in reporting of the findings; the results of each step are reported in stages and the data may be analysed and published separately (Fetters et al., 2013). Table 5.1 below shows a summary of the types of research designs.

Table 5.1: Types of Research designs

DESIGNS	**QUANTITATIVE**	**QUALITATIVE**	**MIXED METHODS**
TYPES	Experimental	Narrative	Exploratory sequential
	Nonexperimental	Phenomenology	Explanatory sequential
		Ethnography	Concurrent (convergent)
		Grounded theory	Advanced Frameworks
		Case studies	• Multistage
			• Intervention
			• Participatory
			• Case study

Research paradigms determine researcher's belief of how knowledge or evidence is uncovered (Kroll & Neri, 2009). This study utilised multistage mixed method design which is in line with the researcher's pragmatic belief that there can be single or multiple realities and that the reality can

be investigated using many tools of research that reflect both deductive and inductive evidence. The study was conducted in three stages to answer the research questions. The first stage included integrative literature review to develop a preliminary set of competencies. The second stage included a two round modified e- Delphi where the competencies were subjected to rating by ICU stakeholders. The final stage was a virtual consensus meeting to agree on the implementation plan for the future of the competencies.

Modified Delphi was the preferred method to answer the research questions as it is one of the best methods of establishing consensus in an unfamiliar clinical problem and where opinions of others count (Eubank et al., 2016). From the Kenyan perspective, identification and establishing consensus with competencies is a new thing and that is why Delphi method was deemed the appropriate method to come up with robust and rigorous competencies. This conforms to the researchers' pragmatism philosophy, where different ways can be used to address a problem, hence, different research designs.

5.3 Data collection method

This study utilised two rounds of Delphi and a virtual focus group consensus meeting to gather data.

5.3.1 Overview of Delphi Technique

The Delphi method is a consensus method used in research to generate ideas or problem-solving or determine priorities; it is suitable for developing health professionals' guidelines and poorly understood phenomena (Lindberg et al., 2012; McMillan et al., 2016). Delphi allows a plurality of views from different experts in the area of study and a wide representation of the sample, hence the generalisability of results. The Delphi technique was first adopted by the Research and Development (RAND) Corporation, a research institution founded by the United States Army, in 1946 to research issues related to security and in response to the rapid change caused by advances in technology (Dalkey & Helmer, 1963; Guzys et al., 2015; Keeney et al., 2010). The main objective of Delphi is to obtain the most reliable consensus of a group of experts using controlled opinion feedback, i.e. there is no confrontation of experts. This encourages the independent thoughts of experts (Dalkey & Helmer, 1963). Delphi has been widely utilised since its

development, with refinements being made (Keeney et al., 2010). The first study to utilise the Delphi technique in the nursing field was done by Lindeman in 1975 to establish priorities of clinical research in nursing (Keeney et al., 2010).

The Delphi method has evolved, giving rise to several types or modifications. These include modified Delphi, e-Delphi, policy Delphi, real-time Delphi, technological Delphi, and classical Delphi (Keeney et al., 2010). Policy Delphi does not aim at reaching a consensus, but rather, it is a method used to support decisions by structuring diverse views of the preferred future; it uses the opinions of experts to come up with a future policy on a given topic (Ibiyemi et al., 2016; Keeney et al., 2010). Lemieux and Scott (2011) applied a policy Delphi methodology to identify and evaluate climate change adaptation options across the primary management areas in Canada. Classical Delphi, also known as conventional Delphi, involves giving a questionnaire to a team of experts to gather their opinions regarding an issue and takes several rounds until a consensus is reached, but the first round is open to facilitate the generation of ideas (Hasson et al., 2000; Trevelyan & Robinson, 2015). This generates qualitative data in the first round, which is analysed through content analysis.

Modified Delphi uses a process similar to that of classical Delphi but with modifications, commonly replacing the first round with pre-selected items from literature other than gathering items through exploration from participants (Varndell et al., 2021). The modified Delphi starts with developing a set of selected items drawn from various sources, such as a synthesised literature review or focus group interviews with selected content experts (Hu et al., 2016). An example is a two-phased study on constructing a specialist critical care competency framework by Zhang et al. (2019), where phase one involved a literature review and focus group interviews to generate competency items.

A two-round modified e-Delphi followed this to achieve the consensus with competencies (Zhang et al., 2019). Another example is a study conducted by Woodcock et al. (2020) to identify the features of high-quality measurement plans for healthcare improvement projects. A list of 104 questions was generated through a literature review, and this was subjected to a two-round Delphi to obtain consensus (Woodcock et al., 2020). Real-time Delphi is more like Classical Delphi; the only difference is that the experts are in the same room where they exchange ideas (Keeney et al., 2010). This study utilised the Modified Delphi Technique to achieve the research aim. Table 5.2

below summarises the common types of Delphi methods and their main characteristics as explained by (Keeney et al., 2010).

Table 5.2: Common types of Delphi and their main characteristics

Type of Delphi	**Characteristic**
Modified Delphi	• Modification occurs in the first round with face-to-face interviews, focus groups, or preselected items. • May take two to three rounds
Real-time Delphi	• Experts are in the same room
e-Delphi	• Similar process to classical Delphi but administered through email or online survey
Classical Delphi	• Uses an open first round to elicit opinions or consensus • Uses three or more postal rounds • Can use emails. • Same as real-time Delphi with the exception that the participants are not in the same room
Real-time Delphi	• Similar process to classical Delphi except that experts are in the same room • Consensus is reached in real time other than through the mail
Policy Delphi	• Characterised by selective anonymity (answering questions as individuals or in groups), iteration, controlled feedback, polarised group response and structured conflict
Decision Delphi	• It is the same process as for classical Delphi, but the aim is not to attain consensus but to focus on making decisions.
Technological Delphi	• Like real-time Delphi but uses technology. • The participants respond to questions immediately using handheld devices • Technology analyses the feedback immediately and gives it to the participants

5.3.2 Justification for the use of Modified Delphi Technique

To the best of my knowledge, this study is the first of a kind in Kenya. There hasn't been any competency development through the involvement of stakeholders and experts. Seeking experts' opinions is always considered the ideal approach when developing competencies or training tools to support clinical practice (Barrett & Heale, 2020).

The Modified Delphi for this study included two rounds conducted through an online survey. There are no guidelines on the number of rounds a Delphi study should have. The number could depend on the study type, available time, and resources. However, the decline in response rate has been shown to occur with increased rounds (Keeney et al., 2001). According to Keeney et al. (2006), at least two rounds are required to provide feedback and revise the previous round. In each round, a summary of the previous round's results is included and evaluated by the panel of experts in the subsequent round. A two round Delphi was adopted for this study and a final round of consensus meeting. This was considered because predetermined competencies were provided in the first round.

A pre-selected set of competencies from an integrated literature review preceded the first round. The two rounds of Delphi were deemed appropriate to achieve consensus and to obtain any additional competencies. Consensus of all the competencies was achieved in both rounds. The Delphi rounds vary from two to three or more rounds depending on the research problem and aim (Hasson & Keeney, 2011). According to Hasson and Keeney, the three or fewer rounds of Delphi can be employed in cases where panellists have been provided with preselected items drawn from various sources within which they are asked to consider their responses. For example, a study on human factors that cause medication errors employed two rounds of Delphi, with the first round being an online survey with 25 experts asking them to list all human causes of nursing errors (Barrett & Heale, 2020). In round two, the same experts were asked to score the listed causes for importance, and ten important causes were derived from the list (Barrett & Heale, 2020).

This was followed by a virtual focus group consensus, whose participants were a subset of those who fully participated in the initial two rounds of the Modified Delphi. This group was deemed as experts to assist the researcher in reaching a final consensus and developing strategies of the implementation of the new framework of competencies in Kenya. The decision to use the Modified Delphi Technique was considered for several reasons, as outlined below:

Firstly, it is critical to note that the Delphi method is flexible and can be adjusted to the respective research aims and objectives (Jünger et al., 2017). This being the first ICU competency framework in the country, to the best of the researcher's knowledge, it was assumed that the participants would struggle to generate the initial set of competencies. Therefore, the preliminary set of competencies was informed by literature drawn across the globe and presented to the participants for rating on their importance.

Secondly, there was a need to contextualise the competencies of the study setting. Therefore, a two-round Delphi was preferred to achieve this. The participants were asked to rate the competencies on a five-point Likert scale from *"not important"* to *"essential"*. Additionally, an open box for comment was provided, and the participants were asked to add any other competence they deemed important in the first round. Twelve more competencies were generated and included in the second-round questionnaire.

Thirdly, the modified Delphi was preferred to classical or real-time Delphi and face-to-face meetings, respectively, because the conception of this study occurred at the height of the COVID-19 pandemic, and there were restrictions on physical meetings and movements. Additionally, classical, and real-time Delphi have been accused of the chances of the bandwagon effect in answering questions when panellists meet face to face (Keeney et al., 2010). Other advantages of online Delphi include the anonymity of the participants from each other, the ability to engage more diverse and representative panellists, and the absence of postage and travel (Khodyakov et al., 2011). Modified Delphi was also preferred due to its constructivist nature to answer the research question (Jünger et al., 2017).

Fourthly, the modified Delphi method was chosen to allow accessibility to a wide range of participants across the country with limited resources (Chang et al., 2010; Khodyakov et al., 2011). The questionnaire was transcribed into a Survey Monkey software tool and emailed to the identified participants nationwide.

5.4 Study population and setting

This study was conducted in Kenya, involving a heterogeneous group of ICU experts and stakeholders. These comprised ICU nurses across the country, managers of various ICUs, ICU

nurse educators, NCK representatives, nursing professional bodies representatives and intensivist and ICU doctors.

5.5 Sampling and Sampling Methods

This study employed a nonprobability sampling technique. Purposive and snowballing sampling methods were used to recruit participants through crowdsourcing based on their expertise. The participants were also reached through their professional contacts and professional networks.

The participants for round one included a heterogeneous sample of ICU stakeholders who included ICU nurses, ICU-trained and non-ICU-trained ICU managers, ICU nurse educators, nursing education and practice regulators, the NCK, Intensivists, and ICU doctors. This data was analysed to depict the overall profile of the participants. A total of 71 participants were recruited to participate in the study. Four participants dropped out after submitting the consent, leaving 67 participants.

5.5.2 Sample size

This study aimed to recruit at least 100 participants. However, only 71 participants showed interest after a call for participation was sent out and an email invitation was made to the referred participants. This decision was informed by the fact that at the time of the study's inception, only about 28 functional ICUs and 11 institutions offered ICU nurse education in the country.

5.5.2.1 Demographic characteristics

The participants included ICU nurses, ICU managers, Intensivists, ICU physicians, NCK representatives and representatives from the ICU chapter, which is the ICU nurses' professional body. This sample heterogeneity allows different views and supports the researcher's research paradigm of pragmatism. Table 5.3 below shows the sample distribution showing its heterogeneity in terms of their roles in the ICU, qualifications, type of ICU worked in, and geographical distribution.

Table 5.3: Demographic Characteristics of Round 1 Participants

	Frequency	**Percentage**
Roles of the participants	**n=67**	**(%)**
Registered nurse working in ICU	7	10
ICU-trained nurses working in the ICU	28	42
ICU nurse educator	13	19
General nurse educator	1	2
ICU nurse manager	11	16
A trained ICU doctor (Intensivist/anaesthetist)	3	5
Other roles	4	6
Highest level of qualification	**n=67**	**%**
Diploma	3	4
Specialized Diploma	22	33
Degree	23	34
Masters	12	19
PHD	2	3
Others	5	7
Type of ICU worked in	**n=65**	**%**
Mixed adult and paediatric ICU	43	66
Adult only ICU	12	18
Paediatric only ICU	3	5
Neonatal ICU	2	3
Coronary Care Unit	1	2
High dependency unit	2	3
Others	2	3

5.5.2.2 Part of the country worked by the participants

Table 5.4 below shows the parts of the country where participants worked. All the country's eight regions were represented with major representation from the Nairobi County and least representation from North-Eastern and Nyanza counties.

Table 5.46: Part of the country worked by Round 1 Participants

	Frequency (n=67)	**Percentage (%)**
Nairobi	40	59.7
Central	13	19.3
Coast	4	6
Eastern	4	6
North Eastern	1	1.5
Nyanza	1	1.5
Rift Valley	2	3
Western	2	3

5.6 The Data Collection Process

This study was conducted in three phases; phase one involved an integrative literature review, crosschecking the competencies and pilot testing. Phase two included two rounds of Delphi with a final phase of a virtual focus group consensus meeting. Figure 5.1 below shows the data collection process.

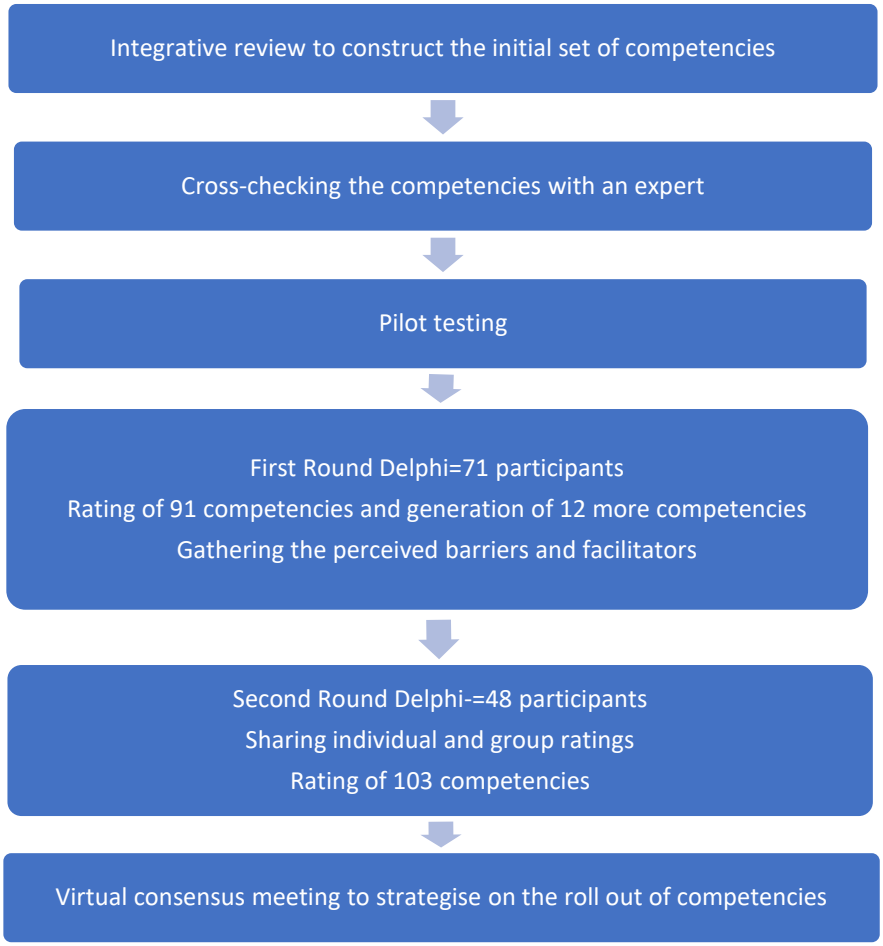

Figure 5.1: Flow diagram illustrating the Data collection process

5.6.1 Integrative literature review

A pre-selected set of items was generated from synthesised literature of other competencies/competency framework profiles, practice guidelines and standards worldwide through the integrative literature review. This review generated 91 competencies across the three domains: cognitive, psychomotor, and affective and the three domains of competence: professional, clinical, and cultural competencies. The items were not arranged in any order but were structured in English since it is the language of taught education in Kenya.

5.6.2 Cross-checking the competencies with an expert

The initial set of competencies in round one was shared with my supervisors to cross-check language consistency and clarity.

5.6.3 Pilot testing

Pilot testing of the questionnaires with the list of competencies was conducted to ensure the face validity of questions (Clibbens et al., 2012). My supervisors reviewed the questionnaire for clarity and structuring. Further, the questionnaire was sent to two ICU experts, an intensivist and an ICU educator, for pilot testing. Feedback was received on the wording of the competencies and the time taken to complete them. The initial approximated time was 45 minutes but was adjusted to 40 minutes to one hour per the pilot test's recommendations. The revision was made before it was sent to the participants, and the estimated time for completion was included in the consent part of the survey.

5.6.4 The Delphi rounds

This study used two rounds of Delphi followed by a virtual consensus meeting with key stakeholders. The decision to use two rounds was made owing to the limited time available to complete the PhD program and limited resources. Additionally, using preselected items in the first round so that the participants did not have to generate all the items in round one also necessitated the shortening of this process. The first-round questionnaire was long enough to rate the competencies, and there was fear of attrition using more than two rounds.

The preferred method involved the presentation of the competencies in an online questionnaire, which was to be rated by a group of experts to seek their opinion (Keeney et al., 2006). The returned questionnaires for round one were analysed, and data was summarised and included in the second questionnaire and sent back for rating to the group of experts (Alaloul et al., 2015; Keeney et al., 2006; McMillan et al., 2016). Participants also received individual and group analyses of the previous round before the subsequent round to know the level of agreement in comparison with the group rating so that they may reconsider their first rating in the light of the overall analysed results (Havers et al., 2019; Keeney et al., 2006).

A team of ICU experts who included ICU nurses, intensivists, ICU managers, educators, the ICU professional body (the ICU Chapter), and the country’s nursing regulators, the NCK, participated in this study. The team of experts was purposely selected through crowdsourcing in social networks and snowballing.

5.6.4.1 First round Delphi

The first round of Delphi aimed to address study objectives three and four, which are as follows:

- To gain consensus on a set of competencies for nurses working in ICUs in Kenya
- To elicit perceived barriers and facilitators towards implementation of the competencies

The questionnaire in round one consisted of three parts; the first consisted of participants' demographic characteristics; the second part presented the competencies derived from the integrative literature review, which were 91 in total. The participants were asked to rate the importance of each competency on a scale of five ranging from "1=not important, 2=possibly important, 3=neutral, 4=important, 5=essential".

The third part of the questionnaire contained open-ended questions where the participants were asked to detail perceived barriers and facilitators towards implementing the competencies and whether the competencies were applicable in all ICU setups. An open text box for additional competencies which the participants deemed important was also provided. According to Boulkedid et al. (2011), this provision allows the participants to express their views and supply the researcher with information to help develop the questionnaire for the consecutive round. See Appendix 5 for the questionnaires for rounds one and two.

5.6.4.2 Second round Delphi

Data from the first round of Delphi was analysed using descriptive statistics. The results were sent to each participant, including group and individual ratings. These were only sent to the 55 Delphi participants who completed round one. This allowed them to compare their ratings versus group ratings and probably help them consider their ratings in the next round. This was sent in the form of mean. Moreover, the questionnaire for the second round of Delphi was sent for ratings.

The questionnaire in round two consisted of two parts: the demographic characteristics of the participants and the initial questionnaire with twelve additional competencies derived from the participants' feedback in the first round. This comprised 103 competencies, which the participants were asked to rate on a scale of five ranging from "1=not important, 2=possibly important, 3=neutral, 4=important, 5=essential".

5.6.4.3 Virtual Consensus Meeting

Follow-up activities such as well-structured workshops and meetings following Delphi rounds are recommended to discuss results and planning implementation and clear any uncertainties (Boulkedid et al., 2011; Cuhls & Blind, 2001). For this study, a virtual consensus meeting was held with a subset of the two rounds of Delphi participants. The participants were purposely selected to represent each region: their area of practice, the NCK, the professional body, nurse educators, and intensivists. A total of 14 participants were invited via a doodle poll, and a follow-up phone call was made as per the list attached in Appendix 17. All invited participants confirmed attendance but only nine participated in the virtual meeting. However, this was a heterogeneous sample. Invitation to attend was made via Microsoft Teams, and this was because of its efficiency in terms of features as compared to Zoom and Google Meet. Microsoft Teams allows unlimited meeting time and has a transcription feature and recording. The meeting agenda was circulated to the participants via email ahead of the meeting.

The main agenda of this meeting was to present the competencies which had attained consensus, the potential barriers, and facilitators, and discuss how the developed competencies could be rolled out in the country and how they would support the rollout. Given the prevailing circumstances of the COVID-19 restrictions on social gatherings at the time of this study's conception, the researcher considered a virtual meeting. This also helped include participants across the various parts of the country.

A detailed discussion of the virtual focus group consensus meeting and outcomes is presented in chapter eight.

5.7 Data analysis and techniques

This multistage study involved quantitative and qualitative data collection at different levels.

5.8 Methodological rigor

Methodological rigour concerns how a study is conducted and is related to the construct of trustworthiness (Harrison et al., 2020). This study employed a multistage mixed-method design. Qualitative research should be assessed for trustworthiness by looking at the following aspects:

credibility, transferability, dependability, and confirmability (Lincoln et al., 1985). The trustworthiness of quantitative research is assessed by its internal and external validity, reliability, and objectivity (Lincoln et al., 1985). This is summarised in Table 5.5 below:

Table 5.5: Criteria for judging Quantitative and Qualitative research

Quantitative research (Polit & Beck, 2014)	**Qualitative research (Lincoln et al., 1985)**
Reliability	Credibility
Internal validity	Transferability
External validity	Dependability
Objectivity	Confirmability

5.8.1 Delphi Questionnaire: Reliability and validity

5.8.1.1 Reliability

Reliability is the extent to which a research instrument consistently produces the same results when used repeatedly (Roberta & Alison, 2015). It is related to consistency in research. Reliability is the extent to which results are consistent and reproducible, whereas validity means results measure what they are intended to measure and not something else (Breakwell et al., 2012). The Delphi study has been criticised for having no evidence of reliability. Still, a study designed to replicate a Delphi study on forecasting communication developments found the same results 16 years later (Ono & Wedemeyer, 1994). For this study, reliability analysis was conducted for the questionnaires of both rounds to show Cronbach's alpha levels. The Cronbach's alpha was high for both questionnaires at 0.970 and 0.969, respectively, indicating high internal consistency. A coefficient of 0.70 indicates the tool's acceptable internal consistency or homogeneity. A coefficient above 0.80 is very good, while anything below 0.70 is questionable (Taber, 2018). This is shown in the table 5.6 below:

Table 5.6: Internal consistency test for the Delphi questionnaires

Reliability Statistics for Delphi Round One		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.970	.972	91
Reliability Statistics for Delphi Round Two		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.969	.973	103

Inter-rater reliability was also measured using Cohens Kappa, a measure of inter-rater agreement for categorical scales when there are two or more raters.

5.8.1.2 Validity

Validity is the extent to which a concept is accurately measured (Roberta & Alison, 2015). Validity is determined by considering three main aspects: face validity, criterion-related validity, and construct validity (Long & Johnson, 2000).

Validity in a Delphi study can be achieved by comparing the findings with relevant published literature and the heterogeneity of the participants (Hasson & Keeney, 2011; Reeves & Jauch, 1978). Validity for this study was ensured by development of the study tool, which was informed by literature, and it was subjected to a panel of experts through an iterative process. The tool had a provision for the participants to put in other competencies they deemed important. The expert panel was drawn from the clinical practice, administration, medicine, education and NCK to ensure heterogeneity of the sample.

5.8.1.3 Objectivity

Objectivity in research means the researcher should remain unbiased and not influenced by our personal feelings, opinions, or prejudices (Sprenger et al., 2019). In this study, objectivity has been ensured by focusing on the facts (numerical data) and using a reliable tool that has been tested.

5.8.2 Qualitative data: Trustworthiness

The primary rigour dimension in qualitative research is known as trustworthiness and relates to the research process and the final product (Brady, 2015). Qualitative research should be assessed for trustworthiness by looking at the following aspects: credibility, transferability, dependability, and confirmability (Lincoln et al., 1985).

5.8.2.1 Credibility

Credibility refers to the believability of the research findings (Creswell & Clark, 2017). The inherent iterative feedback process in Delphi ensures credibility. The feedback process allows the participants to re-assess their initial judgments based on the group judgments and they are allowed to modify in later iterations (Hsu & Sandford, 2007). The credibility of the focus group was achieved by systematic data analysis. The generated codes and categories were shared with the supervisors to achieve agreement. Additionally, the additional competency statements generated in round one after content analysis were discussed with the supervisors and presented in a table.

5.8.2.2 Transferability

Transferability means study findings can be applied in similar contexts or settings (Lincoln et al., 1985). This study engaged a heterogeneous sample of participants drawn from eight regions of the country, ensuring the transferability of the study findings.

5.8.2.3 Dependability

Dependability refers to whether the research process, data collection and analysis are consistent and can be tracked (Creswell & Clark, 2017). Braun and Clarke (2006) framework was used to guide data analysis of the virtual focus group consensus meeting. This ensures that data can be trailed and consequently ensures dependability. The study supervisors also checked the coding and categorisation of data.

5.8.2.4 Confirmability

Confirmability refers to the extent to which the participants shape the study findings and have no researcher bias (Lincoln et al., 1985). A researcher's position, preconception, and background can influence what they choose to investigate, the methods of investigation, the reporting of the

findings and the conclusions (Malterud, 2001). However, Malterud (2001) argues that preconceptions should not be confused with bias unless the researcher fails to mention them. In this study, confirmability was ensured through maintaining a reflexive journal throughout the study and declaring my philosophical stance and how it has influenced the choice of the research method. A reflexive journal is a diary where the researcher makes entries such as methodological decisions and their justifications, one's values and beliefs etc., throughout the research process (Lincoln et al., 1985). This study ensured confirmability by allowing the participants to give their views on the competencies. An open box was provided in the first-round questionnaire for the participants to add any other competencies they deemed important. Additionally, the questionnaires in both rounds were cross-checked by the supervisors.

5.9 Instrumentation

Round one questionnaire had 91 items generated from an integrative review of literature on ICU competencies and competency frameworks. The items were structured for rating on a five-point Likert scale and fed onto Survey Monkey. Online questionnaires have been shown to save time and increase dissemination; however low response rate has also been reported (Boulkedid et al., 2011).

The consent form formed the initial part of the questionnaire and had a provision for a submit button, which was assumed to be consenting to the study. The questionnaire was divided into three parts; part one consisted of participants' demographic data, part two had the competencies (questionnaire items), and part three had open boxes provision for comments on any other additional competencies deemed important by the participants, the perceived barriers, and facilitators towards the implementation of the competency framework. The participants were also asked to comment on whether the competencies applied to all types of ICUs (Neonatal ICUs, Paediatric ICUs, and Adult ICUs). The participants were asked to rate each competency on a five-point Likert-type scale ranging from "1=not important, 2=possibly important, 3=neutral, 4=important, 5=essential".

The second-round questionnaire had an additional 12 items, making up 103 items. The additional items were generated through content analysis from the participants' comments on the other competencies they deemed important. The initial items also gained consensus by achieving a mean

of ≥4 and therefore, they were all included in the second-round questionnaire. The second-round questionnaire had two parts only. The consent form formed the initial part of the questionnaire with a provision of a submit button for consenting. Part one consisted of participants' demographic data, and part two consisted of the competency items. This was again fed on Survey Monkey for pilot testing and sending to the participants.

5.10 Data protection

Electronic data and all participants' identifiable information were password-protected and saved on the Aga Khan University server, which is secure. An external hard drive has been used as a store backup, kept in a cupboard locked at the Aga Khan University School of Nursing and Midwifery. Electronic data (audio recording) was saved on the University of Salford server, which is secure.

5.11 Data Analysis Methods

5.11.1 Quantitative data

Quantitative data was analysed using Statistical Package for the Social Sciences (SPSS) version 20 using descriptive and inferential statistics. Coded data was saved and entered into the SPSS spreadsheet. The choice of descriptive and inferential statistics methods was based on the level of measurement of each variable. Categorical data were described using counts and percentages; interval and ordinal level data were described using mean values and standard deviations. Descriptive statistics were used to examine the participants' general information, including their professions, years of experience, the type of ICUs they worked in and their roles in those ICUs. The rating of the competencies was expressed in terms of mean and standard deviations.

A priori level of consensus was set at a mean of ≥4 (essential). All the competency statements achieved the priori mean of ≥4 except one. The paired *t* test was applied to calculate the difference between round one and round two with a significance level set at ≤0.05.

Data were input into SPSS, and descriptive statistics were used to determine the mean and the standard deviations of each competency as rated by individuals and the groups. The mean was used to determine the level of consensus.

5.11.2 Qualitative data

At the end of the questionnaire, the participants were asked for any other competencies they deemed important and what they perceived would be the barriers and facilitators towards implementing the competency framework. This generated a lot of content, which was analysed through content analysis.

Qualitative data was analysed through content analysis. Content analysis helps to transform a large amount of text into an organized and concise summary (Erlingsson & Brysiewicz, 2017). Similarly, worded statements were merged into competency stems and included as additional competencies for round two for rating.

Virtual focus group consensus meeting data was transcribed verbatim and analysed thematically. Thematic Analysis (TA) is a method for identifying, analysing, organising, describing, and reporting themes within a data set (Braun & Clarke, 2012). There are different approaches to TA, all of which aim to identify and make sense of patterns of meaning across a data set (Braun & Clarke, 2021). The three approaches include coding reliability, code book, and reflexive approaches (Braun & Clarke, 2021). The code reliability approach aims to eliminate researcher biases and emphasize replicability as the main quality indicator by engaging multiple coders and having a code book (Boyatzis, 1998). Code reliability approach is positivist and seeks to establish inter-rater reliability (Boyatzis, 1998). A codebook approach, on the other hand, uses a structured coding framework for developing and documenting the analysis, but consensus between coders is not a mark of quality (Braun & Clarke, 2021).

In the codebook approach, themes are developed earlier but can be refined or new themes are developed through inductive data engagement (Braun & Clarke, 2021). The reflexive TA approach involves open coding with no use of any coding framework, and themes are the outcome of data coding and iterative theme development (Braun & Clarke, 2021). Codebook TA approach was employed in this study for the virtual focus group consensus meeting analysis, using Braun and

Clarke (2006) thematic analysis framework. This was considered because of the researcher's pragmatic philosophy, which values the researcher's subjectivity as a source of knowledge production rather than a threat to credibility (Braun & Clarke, 2021). It is a six-phased linear framework which includes:

Phase one: Familiarising self with data

This involves repeatedly actively reading the data and searching for meanings and patterns. Braun and Clarke (2012) recommend that researchers read through the entire data set at least once before beginning to code, regardless of who collected the data. This helps to shape researcher's ideas and identification of possible patterns as they familiarise themselves with all aspects of their data.

Phase two: Generating initial codes

This phase involves the initial production of the codes from the data and allows the researcher to simplify and focus on specific data characteristics (Braun & Clarke, 2006). Using a coding framework provides a clear trail of evidence for the study's credibility (Nowell et al., 2017). Nvivo version 12 software program was used to help code and keep a data trail. See Appendix 19 for the codebook.

Phase three: Searching for themes

This phase involves sorting and collating potentially relevant coded data extracts into themes (Braun & Clarke, 2006). According to Braun and Clarke (2006), a theme is not dependent on quantifiable measures but rather on whether it captures something important in relation to the overall research question.

Phase four: Reviewing themes

In this phase, researcher reviews the coded data extracts for each theme to consider whether they appear to form a coherent pattern (Braun & Clarke, 2006). Some themes may collapse into each other, and others may need to be broken down (Braun & Clarke, 2012). The researcher should be able to clearly show how each theme was derived from the data.

Phase five: Defining and naming themes

In this phase, the researcher determines what aspect of the data each theme captures and identifies what is of interest regarding their research question (Braun & Clarke, 2006). Peer debriefing with an expert in thematic analysis is highly encouraged, with written records of each peer debriefing encounter to help develop the audit trail for credibility purposes (Braun & Clarke, 2012).

Phase six: Producing the report

This phase begins once the researcher has fully established the themes and is ready to begin the final analysis and write-up. Direct quotes from participants are essential components of the final report as they aid in understanding specific points of interpretation and demonstrate the prevalence of the themes (Nowell et al., 2017).

5.11.3 Analysis of the outcome of the virtual consensus meeting

Data collected through the Microsoft Teams meeting was audio recorded and automatically transcribed via the Microsoft recording and transcription features. I listened to the audio and compared it with the transcripts to familiarise myself with the emerging codes. The transcripts were downloaded and imported into Nvivo Version 12, where they were analysed thematically.

5.12 Ethical considerations

5.12.1 Ethical and Institutional Approval

The study was reviewed by the University of Salford's scientific review committee, The Aga Khan University Institutional Scientific Ethics Review Committee (ISERC), and the Kenya National Council for Science and Technology (NACOSTI), and approvals were granted.

5.12.2 Informed consent

A downloadable participant's information sheet with a summary of the project, the researchers' contact details, involvement of the participant and what is expected of the participants were emailed to the participants who expressed interest in participating in the study. The consent form

was embedded in the online questionnaire and prefaced with a statement reminding the participant that clicking the 'Submit' button will constitute the participant providing consent to participate, in full knowledge of the information in the participant information sheet.

5.13 Delphi Technique methodological issues and how they were addressed in this study

Delphi technique is not without critique; its main features, which include the use of pre-selected items, anonymity between participants, iteration with controlled feedback, Delphi rounds, use of experts, panel size, attrition, recruitment and retention of participants, and consensus always raise methodological issues (Pieters et al., 2020; Trevelyan & Robinson, 2015). These features are discussed, and the researcher has outlined the related methodological issues and how they were addressed.

5.13.1 Use of pre-selected items

The use of pre-selected issues upon which to make a judgment does not allow the participant to supply answers outside the range of options (Tunlind et al., 2015). The participant is steered to agree on a highly visible issue in the literature, as Keeney et al. (2006) put it. However, the advantage of giving pre-selected items as a questionnaire is that a wide range of geographically dispersed groups of experts can be reached to give their input (Chang et al., 2010). In this study, the participants were presented with pre-selected items and allowed to add further items. This opportunity was provided in the first-round questionnaire as an open box for comment, where the participants were asked to include any other competencies, they deemed important. This generated 12 more competencies included in the second round of this modified Delphi study. The idea of allowing the participants to comment is supported by literature as a way of minimizing bias by preventing the participants from feeling psychologically pressured to conform to the existing information (pre-selected items) (Keeney et al., 2006).

5.13.2 Anonymity between participants

Anonymity is a major characteristic in Delphi studies compared to other data collection methods. Total anonymity is recommended. However, it poses a challenge for the researcher as they need to link each participant with their responses (John-Matthews et al., 2017). Total anonymity, where respondents cannot be linked to the participant even by the researcher, proves to be difficult because of the iterative nature inherent in the Delphi, where the participants need to be known by the researcher for provision of feedback and follow-up (Hasson et al., 2000; Keeney et al., 2001).

Total anonymity has also been linked with low response rates and lack of accountability (Chang et al., 2010). In this vein, quasi-anonymity was applied in this study, where one participant's responses were not unknown to others but known to the researcher. The quasi-anonymity was guaranteed through the exclusion of the participants' identifiable information from the demographic characteristics, and the questionnaires were emailed to the study participants individually. The participants were only known to the researcher, and questionnaires used Survey Monkey automatic numerical addresses. Sending the questionnaire privately to participants allows them to express and change their views without the larger group's influence, ensuring anonymity (Trevelyan & Robinson, 2015).

5.13.3 Iteration with Controlled Feedback

Iteration refers to the number of rounds of the Delphi, which may be set as a priori (pre-determined rounds) or up to when consensus is reached (Trevelyan & Robinson, 2015). Controlled feedback occurs between the rounds where the researcher informs individual experts about the opinion (Lakanmaa et al., 2015) of the total expert group (Lakanmaa et al., 2015; Tume et al., 2014). This iterative controlled feedback sets Delphi apart from traditional survey methods, as experts can reconsider their original responses in light of others' responses (Devaney & Henchion, 2018; Trevelyan & Robinson, 2015). This study included a priori criterion of two rounds and a virtual focus consensus group meeting with the participants to finalise the competencies. The individual and group ratings' means for round one was shared with everyone via personal emails.

5.13.4 Use of experts

A prior definition of an expert is crucial to the success of any Delphi study as it prevents self-imposed experts. Experts are informed individuals and specialists in their field or people who know a specific subject (John-Matthews et al., 2017; Keeney et al., 2001). There has been criticism on who decides who is an expert, as Delphi leaves an opening for self-imposed experts (Keeney et al., 2001). This should be clearly stated in the inclusion and exclusion criteria. As Keeney et al. (2006); pg. 209 says, "There is no magic formula to help researchers decide who the experts are *and how many there should be. Rather, as in other surveys, this decision is often based on funding, logistics and rigorous inclusion and exclusion criteria"*. However, Boulkedid et al. (2011) argue that participants should be selected based on their expertise in the study area and their willingness to participate. This could have led to biased results given that those with a higher level of interest and those more likely to be influenced by the outcome of the decisions made are more likely to become involved and committed to Delphi rounds (Hasson et al., 2000). In this study, participants were included based on their experience in the study setting, affiliation with the study setting, and willingness to participate. Inclusion and exclusion criteria were defined for that purpose. According to Keeney et al. (2001), an unbiased recruitment method and rigorous inclusion and exclusion criteria should be employed. In this study, inclusion and exclusion criteria were decided a priori. The selected experts had to meet the following criteria:

- ICU nurses who possess at least one year of experience drawn from public, private and faith-based institutions
- ICU managers
- ICU nurse educators
- Nursing education and practice regulators; the NCK
- Intensivists
- ICU doctors who were not necessarily intensivists
- ICU nurses represent professional bodies in the country: the ICU Chapter and NNAK.

5.13.5 Recruiting and retaining participants

A nonprobability sampling method was used to recruit the study participants. Crowdsourcing and snowballing strategies were utilised to recruit participants who were deemed to be ICU

stakeholders and experts. The literature supports the use of two or more recruitment strategies (Linstone & Turoff, 1975). This was used to reduce the risk of self-imposed experts and stakeholders. Crowdsourcing is obtaining services, information, ideas, or content by soliciting contributions from a large group through an online open call (Penciner, 2015; St John-Matthews et al., 2019). A recent systematic review revealed the use of crowdsourcing as an assessment method, but no published work shows its use in the development of instructional materials, policies or guidelines (Prpić et al., 2015; St John-Matthews et al., 2019). There is an increase in the use of crowdsourcing, which has been facilitated by using the Internet and social networking sites (Penciner, 2015). There is a dearth of studies utilizing crowdsourcing in fields like oncology (Desai et al., 2020; Elhalawani et al., 2019) and radiology (St John-Matthews et al., 2019), but there is a paucity of published studies utilizing crowdsourcing in the field of critical care. The researcher counted this as a unique opportunity to exhibit crowdsourcing in critical care. Like any other sampling method, crowdsourcing has its limitations, including self-acclaimed crowd expertise. However, this was overcome by using professional networks for open calls, for example, WhatsApp, Twitter and LinkedIn.

I had projected to get at least 100 participants, but this did not work well, and I augmented with snowballing. See Appendix 6 for a poster for a call to participation. In snowballing, the initial participants were asked for referrals for their colleagues who met the inclusion criteria. According to a systematic review to map the perspectives of Delphi studies, the experts' most commonly stated recruitment methods were organisational or institutional affiliation and recommendation by third parties (Niederberger & Spranger, 2020).

Strategies undertaken to enhance participant commitment included several individual email correspondences and phone calls prior to the study launch to ensure that the aims of the project and methodology were clear and provide personal clarification as to why they were chosen. Utilising user-friendly survey software, Survey Monkey, and developing a structured questionnaire were used to boost the participation rates further.

According to Keeney et al. (2010), a response rate of ≥70% is acceptable to Delphi studies. The rate of attrition is highly associated with participants' fatigue. Various techniques suggested in the literature (Helms et al., 2017; Trevelyan & Robinson, 2015) were used in this study to minimise attrition. This included using social rewards to motivate the participants, e.g. including their names

in the publications emanating from those studies (Helms et al., 2017). The turnaround timeframe between each round was minimized to one month to maintain participants' interest. Automatic weekly reminders of the participants had also been activated. I also provided airtime bundles for the participants who completed the survey in the second round of Delphi.

5.13.6 Consensus

Delphi is a consensus development technique; hence, consensus should be clearly defined (Diamond et al., 2014). The Cambridge Dictionary defines consensus as *"a generally accepted opinion or decision among a group of people"* (Cambridge University Press, 2022). What constitutes consensus is, however, not clear. Diamond et al. (2014) and Meijering et al. (2013) recommend threshold values specifying when consensus is reached and should be set as a priori, as choosing an index that reports the highest value might be tempting. A priori consensus ensures study validity and reliability. In the studies where the definition of consensus was based on percentage or proportion, the range of 50-97% with a median threshold of 75% was deemed to have achieved consensus (Diamond et al., 2014). Consensus has been challenged in the literature in that it does not mean something is right just because it has been voted by 75% of the participants. Therefore, this calls for other strategies to check the validity of the results (Keeney et al., 2006). To this end, items that have attained a mean of ≥ 4 were considered to have attained consensus.

5.13.7 Delphi rounds

There are no guidelines as to the number of rounds that should be there in a Delphi study. This could depend on the type of study, the availability of time and resources, and whether consensus has been achieved (Keeney et al., 2006). Lai et al. (2015) used three rounds in their study; the first round involved qualitative interviews to generate items, followed by two rounds of rating the items on a 7-point Likert scale. Tume et al. (2021), in their study to determine optimal outcome measures for a trial of no routine gastric residual volume measurement in critically ill children, used two round Delphi followed by a stakeholders' consensus meeting. Decline in response rate has been shown to occur with increase in the number of rounds (Keeney et al., 2001). According to Keeney et al. (2006), at least two rounds are required to provide feedback

and revise the previous round. In each round, a summary of the previous round's results is included and evaluated by the panel of experts in the subsequent round.

5.13.8 Sample size and attrition rate

The size of the panel in the Delphi study is still a grey area as there are no published guidelines on the agreed size of a panel (Keeney et al., 2010; Tume et al., 2014). Delphi study has no agreed sample size; the panel size may be as small as ten experts and as large as 1685 (Akins et al., 2005; Santaguida et al., 2018). The minimum number of samples needs to be at least 30 to provide rigour for statistical analysis (de Villiers et al. 2005). Gargon et al. (2019) showed that studies with fewer panellists had better response rates.

However, the sample size should reflect the representativeness of the study; the more the number and heterogeneity, the more the reliability of the study (Santaguida et al., 2018). Most studies recommend inclusion depending on the type of study, the availability of experts in the area of study and the representativeness of the chosen panel in the subject matter (Akins et al., 2005; John-Matthews et al., 2017; Keeney et al., 2010). In this study, the intended sample size was 100; however, only 71 participants in the first round agreed to participate in the survey, with 67 participants attempting to complete the survey and only 55 completing the survey to the final question.

Attrition of participants is common at any stage in a Delphi study. The rate of attrition is highly associated with participants' fatigue. Various techniques of minimizing attrition have been suggested in the literature, which include shortening the turnaround between each phase, choosing participants who have an interest in the topic and fostering a good working relationship with the participants (Helms et al., 2017; Trevelyan & Robinson, 2015). Social rewards have been suggested in the literature as motivators for the participants, e.g., including their names in the publications emanating from those studies (Helms et al., 2017). This study tried to overcome this limitation by recruiting participants through crowd-sourcing and snowballing sampling techniques. This ensured that the participants were interested in the study, which was anticipated to lead to low or no attrition. The turnaround timeframe between each round was minimized to one month to maintain participants' interest. Automatic weekly reminders of the participants had also been activated. I also provided airtime bundles for the participants who completed the survey. This

had been communicated in the participant's information sheet beforehand. This was made possible by the dean's fund that supported my study. See Appendix 15 for the Dean's fund approval letter. This helped to improve the response rate for round two of Delphi. Additionally, the questionnaire had many items which could have contributed to participants' fatigue and dropout. The questionnaire's Estimated completion time has been provided in the survey introduction section.

Those who did not complete the questionnaire in the first round were not included in the second round. This non-inclusion decision was made since I had to share the first-round rating in the second round of Delphi. However, the inclusion of such participants is supported in the literature in that it leads to better representation of the opinions of the originally invited participants and reduces consensus bias (Boel et al., 2021).

The second-round questionnaire was only sent to those who completed the first-round survey (n=55). However, only 50 participants responded and completed the survey.

A convenient sample of ICU stakeholders was selected from round one and round two participants to participate in the virtual focus group discussion.

The response rate for Round One Delphi was 94%; 67 out of the invited 71 participants completed the survey. However, an attrition rate of 17.9% was experienced in round one of the Delphi. However, an attrition rate of 17.9% was experienced in round one of the Delphi. Out of the 67 participants, only 55 completed the survey to the end. See Appendix 10 for the comprehensive attrition rate table.

The response rate in Round Two Delphi was 89%; 49 out of the invited 55 participants completed the survey. There was, however, no attrition rate in this round, though some participants missed one or two questions.

According to Keeney et al. (2010), a response rate of ≥70% is acceptable to Delphi studies. Table 5.7 below shows a summary of attrition and associated demographic characteristics. The attrition rate was across the heterogeneous sample of the participants. There was no notable trend.

Table 5.77: Summary of attrition rate and associated demographics in Delphi round one

	Frequency (n=21)	Percentage (%)
Region		
Nairobi	8	38.1
Rift Valley	1	4.8
Eastern	3	14.3
Central	4	19
Western	1	4.8
Unknown	4	19
Highest qualification		
PHD	1	4.8
Masters	2	9.5
Degree	4	19
Specialised Diploma	10	47.6
Unknown	4	19
Role in ICU		
ICU nurse	16	76.2
Air ambulance nurse	1	4.8
Unknown	4	19
Years of experience		
1-5 years	11	52.4
6-10 years	2	9.5
11-15 years	2	9.5
16- 20 years	1	4.8
>20years	1	4.8
Unknown	4	19
Level of attrition		
After consent	4	19
After demographic data	4	19
After attempting the questionnaire	6	28.6
Missed a question or two	7	33.3

5.14 Chapter Summary

This chapter has discussed the research methods and details of the research process. Ways of ensuring research trustworthiness for this study have been discussed, as well as the methodological rigor of the Delphi technique. The next chapter discusses Delphi rounds' findings.

CHAPTER SIX: DELPHI FINDINGS

6.1 Introduction

This chapter presents the findings from the two rounds of Delphi. The findings will be presented in two parts, i.e. Round One Delphi and Round Two Delphi.

Round two Delphi: This part will present the demographic characteristics of round two participants and the ratings of the initial competencies and the additional competencies from round one Delphi.

6.2 Round One Delphi findings

This section will present the ratings of the competencies, additional competencies, and the perceived barriers and facilitators.

6.2.1 Round 1 rating of competencies

The results of the first round of Delphi are presented in Table 6.1 below. All the 91 competencies listed in round one reached consensus by attaining a priori mean of ≥4. The standard deviation for all the competencies was narrow at ≤ 1. This means the participants rated the competencies almost similarly.

The competencies were arranged from the highest to the lowest score. Of note is that the first four competencies that achieved the highest score are related to knowledge and skills in recognising and attending to life-threatening emergencies in the ICU.

The competencies that scored the lowest included exhibiting cultural diversity in the care of patients, change management and making informed and complex decisions in the care of patients.

Table 6.1: Round one Delphi competencies rating

Competencies from highest to lowest score	N	Mean	SD
1. The nurse recognises early warning signs of potential deterioration or complications in their patient	60	4.88	0.32
2. The nurse can demonstrate competence in Advanced Cardiac Life Support (ACLS) techniques	59	4.88	0.33
3. The nurse can demonstrate competence in Basic Life Support (BLS) techniques	60	4.87	0.39
4. The nurse utilises current best practice guidelines in BLS and ACLS	60	4.85	0.40
5. The nurse demonstrates the ability to collaboratively manage a mechanically ventilated patient	57	4.84	0.37
6. The nurse can safely administer commonly used medications in the ICU via a variety of routes (Intravenous, Nasogastric, Percutaneous Endoscopic Gastrostomy (PEG), Peripherally Inserted Central Catheter (PICC line), Central Venous Catheters (CVC).	60	4.83	0.42
7. The nurse effectively manages the care of a critically ill patient with acute alterations/disorders in vital organs or body systems	60	4.83	0.38
8. The nurse adheres to clinical guidelines in the administration and management of medications in the ICU	60	4.82	0.39
9. The nurse demonstrates a high level of competence in carrying out a range of procedures, treatments, and interventions within their scope of practice	57	4.81	0.40
10. The nurse is able to administer oxygen therapy safely via a simple face mask, a venturi system, a nasal cannula, and a reservoir mask	57	4.81	0.40
11. The nurse is able to assess the patient before, during, and after suctioning	57	4.81	0.40
12. The nurse demonstrates responsibility and accountability for nursing practice and complies with the profession's code of ethics and code of conduct	62	4.81	0.40

13. The nurse can identify the need for suction and safely suction a patient via endotracheal tube, tracheostomy, or oropharyngeal route	57	4.80	0.41
14. The nurse maintains patient records and information in accordance with best practice and institutional guidelines	62	4.79	0.45
15. The nurse understands ventilator settings and can troubleshoot ventilator alarms	57	4.79	0.45
16. The nurse is competent with the extubation of a patient and post-extubation management	57	4.79	0.45
17. The nurse thinks critically and effectively and utilises a systematic approach to solve problems	60	4.78	0.41
18. The nurse can prepare the equipment ready for insertion of the chest drain and can monitor the patient with underwater seal drainage in situ	57	4.77	0.42
19. The nurse can assess and manage the skin of a critically ill patient to prevent the development of pressure ulcers.	57	4.77	0.46
20. The nurse understands different modes of invasive ventilation (pressure vs volume cycled).	57	4.75	0.43
21. The nurse can accurately assess and manage pain in a critically ill patient using an appropriate pain assessment tool	57	4.75	0.43
22. The nurse understands how safety processes can be maintained in an ICU	57	4.75	0.51
23. The nurse can competently assess and document findings of the renal system and identify any abnormalities	59	4.75	0.44
24. The nurse is able to obtain a blood sample for arterial blood gas from the arterial line and interpret the results	57	4.74	0.48
25. The nurse describes the importance of pain management for critically ill patients	57	4.74	0.44
26. The nurse can assess the sedation level in a patient using an appropriate and valid tool	57	4.74	0.48
27. The nurse safely undertakes hygiene care (washing, eye care, oral care, urinary catheter care) for the critically ill patient	56	4.73	0.65

28. The nurse formulates a plan of care for the patient and evaluates the outcomes	59	4.73	0.44
29. The nurse can safely use the central venous line, monitor, and interpret central venous pressure readings	55	4.73	0.53
30. The nurse respects the rights of patients and their families (such as privacy, confidentiality, provision of appropriate information, and choice in health care).	62	4.73	0.55
31. The nurse manages their time effectively and can prioritise patient care	62	4.73	0.48
32. The nurse can work collaboratively with other team members to wean a patient from mechanical ventilation	57	4.72	0.45
33. The nurse can identify signs of pneumothorax in a ventilated or non-ventilated patient	57	4.72	0.53
34. The nurse is able to safely prepare for and assist with the insertion of a central venous catheter in a critically ill patient	57	4.72	0.50
35. The nurse can rapidly assess a patient in an emergency using a systematic approach	57	4.72	0.49
36. The nurse can safely care for a patient on NIV and take precautions to prevent iatrogenic problems (e.g. pressure ulcers)	56	4.71	0.53
37. The nurse understands indications, complications, and troubleshooting for underwater seal drainage	56	4.71	0.46
38. The nurse can competently assess and document findings of the respiratory system and identify any abnormalities	59	4.71	0.46
39. The nurse can competently assess and document findings of the neuromuscular system and identify any abnormalities	59	4.71	0.46
40. The nurse has knowledge about the indications for both invasive and non-invasive hemodynamic monitoring of a critically ill patient	57	4.70	0.50
41. The nurse is able to care for, monitor and interpret arterial line blood pressure readings	57	4.70	0.68

42. The nurse understands the benefits of non-invasive ventilation over invasive ventilation (IV) where possible	56	4.70	0.46
43. The nurse can competently assess and document findings of the cardiovascular system and identify any abnormalities	59	4.69	0.46
44. The nurse can competently assess and document findings of the digestive system and identify any abnormalities	59	4.69	0.46
45. The nurse can competently assess and document findings of the endocrine system and identify any abnormalities	58	4.69	0.47
46. The nurse recognizes when to escalate to advanced modes of therapy when standard mechanical ventilation is unsuccessful (e.g., prone ventilation, Extracorporeal Membrane Oxygenation)	57	4.68	0.51
47. The nurse ensures a safe environment for patients, families, and staff by identifying, minimizing, and eliminating risks	57	4.68	0.69
48. The nurse can recognise and describe signs of iatrogenic withdrawal from opiates/sedatives	57	4.68	0.51
49. The nurse can describe risk factors for iatrogenic events (pressure ulcers, falls, healthcare-associated infections, thromboembolism)	57	4.68	0.51
50. The nurse acts with assistance from an inter-professional team, on assessment findings of their patient to initiate, monitor, and manage interventions	59	4.68	0.54
51. The nurse distinguishes enteral and parenteral nutrition and the indications and contraindications of each	57	4.67	0.51
52. The nurse understands the risks in administering parenteral nutrition and takes precautions to avoid complications	57	4.67	0.51
53. The nurse can describe the preventive measures and management of these iatrogenic events	57	4.67	0.51
54. The nurse understands ethical principles and applies these to their patient's care	62	4.66	0.64
55. The nurse communicates effectively and in a timely manner to ICU patients and their families	63	4.65	0.65

56. The nurse demonstrates knowledge of the institutional and national guidelines and standards of practice for procedures performed in the ICU	57	4.65	0.52
57. The nurse can confidently explain the reasons for mechanical ventilation and the care of the ventilated patient to the family	57	4.65	0.67
58. The nurse can describe the iatrogenic complications associated with medical devices such as arterial lines, urinary catheters, central venous catheters, etc.	57	4.65	0.67
59. The nurse distinguishes the procedures they can perform under their national professional scope of practice	57	4.63	0.52
60. The nurse describes the importance of early initiation of nutrition in a critically ill patient	57	4.63	0.52
61. The nurse participates in the development of protocols and guidelines for safe administration of medication within the ICU	57	4.63	0.77
62. The nurse incorporates evidence-based best evidence into their practice	56	4.63	0.52
63. The nurse effectively manages the technology that is related to the scope of their practice and experience in the care of critically ill patient	60	4.62	0.58
64. The nurse adheres to institutional and national guidelines and standards of practice for procedures performed in the ICU	57	4.61	0.70
65. The nurse is able to prepare for and assist in the insertion of an arterial line	57	4.61	0.67
66. The nurse is aware of their scope of professional practice and acts autonomously within it.	62	4.6	0.56
67. The nurse contributes to ethical decision-making issues in the multidisciplinary team in their unit	62	4.56	0.50
68. The nurse can undertake a comprehensive assessment of the patient and explain this to the patient/family	59	4.56	0.60
69. The nurse can update the patients and their families with information concerning nursing care and the patient's clinical situation	63	4.56	0.56

70. The nurse recognises delirium, understands the impact of delirium and takes steps to prevent it	57	4.54	0.60
71. The nurse describes how to get up-to-date information for clinical practice	56	4.54	0.63
72. The nurse can describe some quality improvement initiatives in the ICU	56	4.54	0.57
73. The nurse understands the importance of reporting errors and near-miss errors and reports them promptly	57	4.53	0.68
74. The nurse delegates care where appropriate whilst maintaining patient safety	60	4.52	0.54
75. The nurse explains the indications and contraindications of common procedures performed in the ICU, e.g. intubation, central line insertion	57	4.51	0.78
76. The nurse values patient and family autonomy at the end-of-life care decisions	57	4.51	0.80
77. The nurse participates in quality improvement efforts to enhance quality and safety in an ICU environment	56	4.5	0.71
78. The nurse is sensitive to the values, beliefs, lifestyles, and practices of the patient and identifies their own values, biases, and prejudices	62	4.48	0.62
79. The nurse understands the importance of careful prescribing of antimicrobial drugs to reduce antibiotic resistance	60	4.48	0.70
80. The nurse respects the patient's autonomy to refuse any procedures in ICU	57	4.46	0.66
81. The nurse explains the importance of offering palliative and end-of-life care to patients with terminal illnesses	57	4.46	0.68
82. The nurse is adaptable and open to change	62	4.42	0.69
83. The nurse describes the relationship between comorbid conditions and their risks for deterioration in the ICU patient	57	4.39	0.53
84. The nurse participates in multidisciplinary end-of-life discussions with patients and their families	57	4.39	0.77

85. The nurse includes patients and their families in pain management	57	4.37	0.86
86. The nurse practices with cultural sensitivity and awareness of social factors to enhance patient and family well-being	63	4.35	0.83
87. The nurse explains common complex conditions and their treatment plans	57	4.3	0.73
88. The nurse expresses both cultural and spiritual sensitivity while counselling patients and their families	62	4.27	0.71
89. The nurse understands and can describe effective change management processes	62	4.27	0.81
90. The nurse actively participates in change management process in his/her unit	62	4.26	0.77
91. The nurse makes complex and informed independent decisions within their own level of competence and scope of practice.	62	4.19	1.00

6.2.2 Additional competencies

The participants were asked to list any other competencies they deemed important in the open box at the end of the questionnaire. A content analysis of these statements was conducted, and the statements similar to the existing competencies were not considered. See Appendix 9 for content analysis. Unlike the listed competencies, the qualitative statements were clustered into thematic domains according to the content and similarity in meaning. There were 12 more competencies derived from this thematic analysis, and they were tailored to the language of the other statements. They were discussed with my supervisors, edited, and agreed upon. These were included in the second round of the survey to make 103 competencies. Most of the additional competencies were just a build-up of the listed competencies, apart from competencies 11 and 12 on inter and intra-hospital transfers that had not been captured. Table 6.2 below shows additional competencies derived from the participants' comments.

Table 6.2: Additional Competencies

No.	Competence	Exemplar statements
1.	The nurse performs regular and appropriate re-assessment of a critically ill patient	**ID:118018990336.00** *"Re-evaluation of critically ill patient"*
2.	The nurse demonstrates knowledge of the different dialysis modalities with a rationale for use	**ID: 118028675971.00** *"competencies and skills in renal replacement therapies such as haemodialysis, PD and CRRT"*
3.	The nurse is able to care for a patient requiring continuous renal replacement therapy (CRRT)	**ID: 118060033858.00 "***The nurse is able to care for a patient with Acute Renal Failure and is able to perform Dialysis and CRRT"* **ID:118009704001.00** *"Renal replacement therapies like CRRT"*
4.	The nurse demonstrates an understanding of invasive procedures performed in the care of patients within the ICU	**ID:118047873876.00** "*Intubation"* **ID:118014702653.00** *"Insertion of CVC line, the intraosseous line"* **ID: 118011413465.00** *"Intubation and insertion of central venous catheter"*
5.	The nurse performs invasive procedures under their scope of practice, e.g. urinary catheterisation, intravenous cannulation	**ID: 118008932879.00 "***It is critical for ICU nurses to learn how to intubate in order to perform emergency intubations when anaesthetists are unavailable"*

6.	The nurse demonstrates knowledge of the different neurological devices with rationale for use.	**ID:118013037767.00** *"Procedures related to an acute increase in intracranial pressures like monitoring and draining."*
7.	The nurse is able to care for a critically ill patient requiring neurological monitoring.	**ID:118057638664.00** *"Neuro-critical care issue troubleshooting"*
8.	The nurse is able to safely care for a patient with External Ventricular Drain (EVD)	**ID:118013037767.00** *"Procedures related to an acute increase in intracranial pressures like monitoring and draining."* **ID:118057638664.00** *"Neuro-critical care issue troubleshooting"*
9.	The nurse demonstrates knowledge of the drugs they are allowed to prescribe to a critically ill patient within their scope of practice	**ID:118011374411.00** *"The nurse will be able to prescribe emergency drugs"*
10.	The nurse demonstrates skills in the administration and monitoring of drugs they have prescribed to a critically ill patient within their scope of practice	**ID:118005942710.00** *"The nurse must be able to calculate micro dosages that are weight dependent, and use syringe pumps solu-drops to administer medications"*
11.	The nurse demonstrates knowledge of the safe inter-hospital and intra-hospital transfer of a critically ill patient.	**ID: 118028675971.00** *"competencies and skills in transporting critically ill patients and care on transit"*
12.	The nurse demonstrates skills in a critically ill patient's safe inter-hospital and intra-hospital transfer.	**ID: 118028675971.00** *"competencies and skills in transporting critically ill patients and care on transit"*

6.2.3 Perceived Barriers and facilitators towards implementation of competencies

Participants were asked to list perceived barriers and facilitators towards implementing the competencies as an open comment at the end of the questionnaire. Conventional content analysis was used to code, categorise, and merge the textual content on perceived barriers and facilitators. These are presented in Table 6.3 below:

Table 6.3: Perceived barriers and facilitators to content analysis

Codes	**Categories**	**Themes**
• Lack of multidisciplinary incorporation in policymaking • Failure to involve all the stakeholders in training ICU Nurses, e.g., the Nursing Council of Kenya, Government and Private Institutions training nurses, and Government and Private Hospitals offering ICU Facilities. • Equal representation from both private and government sectors – most of the time, private institutions are left out, yet they are also needed in decision-making.	• Multidisciplinary team • NCK • Government • Public and private institutions • Training institutions	• Stakeholders' involvement
• Low ICU staff ratio • Inadequate resources and equipment/tools • Inadequate resources • Limited manpower • lack of resources • availability of resources • Variations between public and private health institutions in terms of resources available. There is a need to separate paediatric patients from adult patients; all hospitals should have PICUs • Work pressure, time • Nurse to patient ratio becomes a challenge, especially when expected to offer proper and timely care	• Human resource • Poor nurse-patient ratio • Lack of equipment and supplies • Disparity in resource allocation • Finances	• Resources

• Lack of critical care-trained doctors • Resources availability and allocation • Finances • Shortage of nurses • Human resources • Staff shortages, faulty equipment, high patient-to-nurse ratio • Staff shortage • My thinking is that the availability and maintenance of essential equipment would be a barrier • Workload in the ICU versus staffing, • lack of fundamental resources, e.g. syringe pumps, infusion pumps, oxygen delivery devices, etc. • Disparity in resources, workforce • shortage of ICU clinical nurses • Resources, including equipment as well as human		
• Political influence • Lack of support from the National Government or County Government to provide adequate resources • The willingness of government, private and faith-based institutions towards adopting a national ICU curriculum • Lack of representation in higher levels	• Lack of support from National government and county governments • Lack of government buy-in	• Political influence
• Ineffective communication through formal education structures Lack of standard curriculum and inadequate training infrastructure • Lack of harmonization on training institutions on contents covered in the ICU course. • Inequality in systems of care and management • Different levels of training	• Lack of standard curriculum • Different levels of training	• Lack of standardised training

• Physician insecurity • Lack of nursing empowerment • Some restrictive hospital guidelines that do not consider the scope of practice • Bureaucracy • Superiority	• Restrictive hospital guidelines • Lack of nurse empowerment	• Institutional bureaucracy
• Different levels of training and competency • Low level of education • Not all nurses working in our units are ICU-trained • Inadequate knowledge of the most recent updates in ICU competencies • Knowledge deficit	• Incompetence • Different levels of training • Knowledge deficit	• Knowledge gap
• Nurse managers who resist change	• Resistance to change	• Resistance to change
• Attitude of some nurses • The health worker attitudes towards the Nurses	• Nurse attitude • Attitude of multidisciplinary teams	• Attitude
• Lack of EBP mentors • Commercialisation of healthcare working with Nursing and medical students and residents • Shortage of competent ICU trainers that can ensure standards are upheld.	• Lack of mentors	Mentorship
• Current ongoing deconstruction of the role of the nurse. (split off all the aspects of the role that nurses traditionally performed; once separated from the whole, the role can be performed by lesser qualified, or equally qualified but cheaper, or unqualified staff)	• Policies from NCK. • Variations of operational policies in different counties • Variations of policies in different ICUs	• Policies and guidelines

• Adoption of different protocols in care management and county prevalence on choice of drugs procured • Employment of non-trained ICU staff to work in ICU • HR policies in different county government • Disparities in operational policies • Hospital policies and protocols • Conflict of interest among nurses and other cadres • Conflicting Policies and procedures • Different policies and protocols in different ICUs	• Hospital policies and protocols	
• A scope of practice that is not reviewed as per the current evidence	A reviewed scope of practice	• Scope of practice
• Open versus closed ICU, mixed vs adult only ICU • Some services may not be available across all the ICU setups in the country • Different managerial approaches in running ICU • Differences in ICU practices within different institutions.	• Differences in practice • Differences in management in ICU • Differences in services	• Disparities in service delivery
• Multidisciplinary incorporation • Multidisciplinary involvement • Public sensitization • Stakeholders' involvement. • Active involvement of the stakeholders across the country. e.g., the Nursing Council of Kenya, government and private institutions training nurses, and government and private hospitals offering ICU facilities. • NCK Ensuring all involved understand the importance of these core competencies • The government's medical stakeholders	• Multidisciplinary incorporation and involvement • Involvement of NCK, public and private institutions • The government • Involvement of training institutions • Ministry of Health • Hospital leaders' involvement • Stakeholders' forums	Stakeholders' involvement

• Meetings by stakeholders to include leaders from training schools (private and government, faith-based institutions), nursing council plus hospital leaders • Administration • Involving all the stakeholders and good representation • Unit and collaboration of both private and public institutions. Collaboration • Nurses' decision also counts – nurses' voices should be heard, not only taking instructions, and effecting them • Leadership involvement: Ministry, Nursing bodies, and Hospital leads • Stakeholders' forum		
• Avail resources Employment of trained ICU nurses • Adequate resources • Increase in number of Trained ICU Nurses	• Trained ICU nurses	• Resources
• Implementation of scientifically reviewed scope of practice • The nursing council of Kenya should review the scope of practice for critical care nurses.	• Review scope of practice • Evidence based scope of practice • The nursing council of Kenya should review the scope of practice for critical care nurses	• Scope of practice
• Continuous nursing education • Continuous medical education x2 • continuous education to ICU nurses • Regular CME and updates on possible changes • Prior trainings of staff • teachings and updates	• Continuous professional development • On job training • Orientation • Seminars, workshops to create awareness of the competencies	• Training

• Engagement of teams, training, and orientation • Training on job Frequent CME, workshops, seminars, and webinars, • Design continuing education courses to support implementation • Government to train more nurses in critical care, then ICUs to have only critical care trained staff nurses • there is a Critical care nurses' chapter, that can hold symposia, conferences and come up with national guidelines. initiation of critical care journals through the critical care chapter • Creating awareness of the essential competencies is critical from ICU training schools to ICU units. • Presentation of findings in stages in Kenya Critical care nurses conferences	• Design a course to help in implementation • Expand the number of trained ICU nurses	
• Integrating and emphasizing the changes in the curriculum • Review critical care nursing curriculum and bring it to national standards. • Come up with one National syllabus for ICU nurse training in Kenya • Include all these competencies in the training curriculum • Curriculum development teams buy in is important	• Integrate in the curriculum • Review curriculum and include the competencies • Curriculum review and standardisation	• Curriculum
• And incentives to the best performing staff. • Give recognition to this ICU nurse after training and gaining those competencies by providing proper remuneration. • Incentive • Motivated staff	• Recognition • Incentives • Remunerations	• Recognition and motivation
• Strengthening the EBP mentors to champion positive change versus how it will benefit the patient through seminar. Even CMEs	• strengthening the EBP mentors to champion positive change versus	• Mentorship

• Support from regulatory bodies	• NCK • Support from regulatory bodies • Active involvement of the stakeholders across the country. e.g. the Nursing council of Kenya,	• Regulatory body (NCK)
• Centralized management of ICU unit to adopt common policies & guidelines • Centralizing protocols and drug management policies • mutual policies that cut across.		• Standardised Policies and guidelines
• Collaboration between the training institutions, the clinical practice areas and the regulating body		• Collaboration between training and practice

The barriers and facilitators are envisioned to be a springboard towards implementing the competencies. Implementation science has progressed towards increased use of theoretical approaches to better understand and explain how an implementation can succeed (Nilsen, 2015). Many implementation efforts fail, even with highly developed plans for execution, because contextual factors can be powerful forces working against implementation in the real world; therefore, studying these factors beforehand is important (Damschroder et al., 2022). This was facilitated through an open-ended question at the end of the questionnaire. Many statements were generated, and deductive and inductive methods of thematic analysis were used to develop relevant themes. Thematic Analysis (TA) is a method for systematically identifying, organising, and offering insight into, patterns of meaning (themes) across a dataset (Braun & Clarke, 2012). Deductive TA is often critical in its orientation and constructionist in its theoretical framework, examining how the world is put together (i.e., constructed) and the ideas and assumptions that inform the data gathered (Braun & Clarke, 2012). Inductive TA is a 'bottom-up' approach and is driven by what is *in* the data; the codes and themes derive from the content of the data themselves – so that what is 'mapped' by the researcher during analysis closely matches the content of the data (Braun & Clarke, 2012). This aligns with the researcher's pragmatism philosophy, in which the belief lies in abductive reasoning.

The following key themes were identified as barriers and facilitators, as summarised in Table 6.4 below:

Table 6.48: Perceived barriers and facilitators towards implementation of the competencies

Barriers	**Facilitators**
Macro-level barriers and facilitators	
Lack of stakeholders' involvement	Stakeholders' involvement
Political influence (lack of political goodwill)	Availability of resources
Lack of resources	Provision of scope of practice by NCK
Lack of scope of practice for ICU nurses	
Meso-level barriers and facilitators	
Lack of standardized training and assessment of ICU nurses	Standardisation of training and assessment of ICU nurses
Institutional bureaucracies	Mentorship and preceptorship programs
Lack of ICU policies and guidelines	Availability of policies and guidelines
Disparities in service delivery in various facilities	Harmonised service delivery
Inadequately trained nurses	Training of ICU nurses
Micro-level barriers and facilitators	
Resistance to change	Recognition and motivation
Negative attitude	Professional development of nurses

6.3 Second Round Delphi results

This chapter presents findings from the second round of Delphi regarding rating the competencies by the study participants.

The purpose of the second round was to share individual and group ratings of the first-round competencies with the participants to gain consensus on the additional and already existing competencies. Round Two Delphi survey was sent to 56 participants: 55 who completed the first round and an additional participant from the NCK. In addition, individual ratings of round one and group ratings were sent to the participants. Fifty participants responded.

The competencies were arranged from the highest to the lowest score. All the competencies reached consensus by achieving a mean of ≥ 4. Of note is that the competencies that achieved the highest score are related to knowledge and skills in recognising and attending to life-threatening emergencies in the ICU.

The competencies that scored the lowest included competencies related to leadership and decision-making. The standard deviation for all the competencies was narrow at ≤ 1. This means the competencies were almost rated the same by the participants. The rating is shown in Table 6.5 below:

Table 6.5: Round two Delphi competencies rating

	Competencies rating from highest to lowest	**N**	**M**	**SD**
1.	The nurse recognizes early warning signs of potential deterioration or complications in their patient	48	4.92	0.28
2.	The nurse can demonstrate competence in Basic Life Support (BLS) techniques	48	4.92	0.28
3.	The nurse is able to assess the patient before, during, and after suctioning	47	4.91	0.28
4.	The nurse utilises current best practice guidelines in BLS and ACLS	48	4.90	0.31
5.	The nurse safely undertakes hygiene care (washing, eye care, oral care, urinary catheter care) for the critically ill patient	48	4.90	0.37
6.	The nurse ensures a safe environment for patients, families, and staff by identifying, minimizing, and eliminating risks	48	4.90	0.31
7.	The nurse can demonstrate competence in Advanced Cardiac Life Support (ACLS) techniques	47	4.89	0.31
8.	The nurse thinks critically and effectively and utilises a systematic approach to solve problems	48	4.88	0.33
9.	The nurse is able to safely prepare for and assist with the insertion of a central venous catheter in a critically ill patient	48	4.85	0.36
10.	The nurse is able to assess and manage the skin of a critically ill patient to prevent the development of pressure ulcers.	48	4.85	0.36
11.	The nurse has knowledge about the indications for both invasive and non-invasive hemodynamic monitoring of a critically ill patient	47	4.85	0.36
12.	The nurse can safely use the central venous line, monitor, and interpret central venous pressure readings	48	4.85	0.36
13.	The nurse can rapidly assess a patient in an emergency using a systematic approach	48	4.85	0.36
14.	The nurse maintains patient records and information in accordance with best practice and institutional guidelines	49	4.84	0.37
15.	The nurse understands indications, complications, and troubleshooting for underwater seal drainage	48	4.83	0.38
16.	The nurse is competent with the extubation of a patient and post-extubation management	48	4.83	0.43
17.	The nurse is able to prepare the equipment ready for insertion of the chest drain and can monitor the patient with underwater seal drainage in situ	48	4.83	0.38
18.	The nurse is able to administer oxygen therapy safely via a simple face mask, a venturi system, a nasal cannula, and a reservoir mask	47	4.83	0.43
19.	The nurse effectively manages the care of a critically ill patient with acute alterations/disorders in vital organs or body systems	48	4.83	0.38

20.	The nurse describes the importance of pain management for critically ill patients	48	4.83	0.38
21.	The nurse can safely administer commonly used medications in the ICU via a variety of routes (Intravenous, Nasogastric, Percutaneous Endoscopic Gastrostomy (PEG), Peripherally Inserted Central Catheter (PICC line), Central Venous Catheters (CVC0.	48	4.83	0.38
22.	The nurse can competently assess and document findings of the digestive system and identify any abnormalities	48	4.83	0.38
23.	The nurse adheres to clinical guidelines in the administration and management of medications in the ICU	48	4.83	0.38
24.	The nurse understands how safety processes can be maintained in an ICU	48	4.81	0.39
25.	The nurse performs regular and appropriate re-assessment of a critically ill patient	48	4.81	0.39
26.	The nurse demonstrates the ability to collaboratively manage a mechanically ventilated patient	48	4.81	0.45
27.	The nurse demonstrates a high level of competence in carrying out a range of procedures, treatments, and interventions within their scope of practice	48	4.81	0.39
28.	The nurse can competently assess and document findings of the respiratory system and identify any abnormalities	48	4.81	0.39
29.	The nurse demonstrates responsibility and accountability for nursing practice and complies with the profession's code of ethics and code of conduct	49	4.80	0.46
30.	The nurse understands different modes of invasive ventilation (pressure vs volume cycled).	48	4.79	0.41
31.	The nurse is able to care for, monitor and interpret arterial line blood pressure readings	48	4.79	0.41
32.	The nurse formulates a plan of care for the patient and evaluates the outcomes	48	4.79	0.41
33.	The nurse demonstrates understanding of invasive procedures performed in the care of patients within the ICU	48	4.79	0.41
34.	The nurse demonstrates knowledge of the safe inter-hospital and intra-hospital transfer of a critically ill patient.	48	4.79	0.41
35.	The nurse can safely care for a patient on NIV and take precautions to prevent iatrogenic problems (e.g. pressure ulcers)	48	4.79	0.41
36.	The nurse can identify signs of pneumothorax in a ventilated or non-ventilated patient	48	4.79	0.41
37.	The nurse can assess the sedation level in a patient using an appropriate and valid tool	48	4.79	0.41
38.	The nurse manages their time effectively and can prioritise patient care	49	4.78	0.47
39.	The nurse understands ventilator settings and can troubleshoot ventilator alarms	48	4.77	0.47

40.	The nurse understands the benefits of non-invasive ventilation over invasive ventilation (IV) where possible	48	4.77	0.42
41.	The nurse is able to prepare for and assist in the insertion of an arterial line	48	4.77	0.47
42.	The nurse is able to care for a critically ill patient requiring neurological monitoring	47	4.77	0.43
43.	The nurse demonstrates skills in the administration and monitoring of drugs they have prescribed to a critically ill patient within their scope of practice	48	4.77	0.42
44.	The nurse demonstrates skills in a critically ill patient's safe inter-hospital and intra-hospital transfer.	48	4.77	0.42
45.	The nurse can describe the preventive measures and management of these iatrogenic events	48	4.77	0.42
46.	The nurse can describe risk factors for iatrogenic events (pressure ulcers, falls, healthcare-associated infections, thromboembolism)	48	4.77	0.42
47.	The nurse can confidently explain the reasons for mechanical ventilation and the care of the ventilated patient to the family	48	4.77	0.47
48.	The nurse can competently assess and document findings of the renal system and identify any abnormalities	48	4.77	0.42
49.	The nurse can competently assess and document findings of the neuromuscular system and identify any abnormalities	48	4.77	0.42
50.	The nurse can competently assess and document findings of the endocrine system and identify any abnormalities	48	4.77	0.42
51.	The nurse can competently assess and document findings of the cardiovascular system and identify any abnormalities	48	4.77	0.42
52.	The nurse can accurately assess and manage pain in a critically ill patient using an appropriate pain assessment tool	48	4.77	0.42
53.	The nurse respects the rights of patients and their families (such as privacy, confidentiality, provision of appropriate information, and choice in health care).	49	4.76	0.43
54.	The nurse communicates effectively and in a timely manner to ICU patients and their families	49	4.76	0.43
55.	The nurse understands the risks in administering parenteral nutrition and takes precautions to avoid complications	48	4.75	0.44
56.	The nurse demonstrates skills in the care of a patient with intracranial devices, e.g. External Ventricular Drain (EVD)	48	4.75	0.48
57.	The nurse can describe the iatrogenic complications associated with medical devices such as arterial lines, urinary catheters, central venous catheters, etc.	48	4.75	0.44
58.	The nurse performs invasive procedures under their scope of practice, e.g. urinary catheterisation, intravenous canulation	48	4.73	0.45
59.	The nurse is aware of their scope of professional practice and acts autonomously within it.	49	4.73	0.49

60.	The nurse is able to obtain a blood sample for arterial blood gas from the arterial line and interpret the results	48	4.73	0.49
61.	The nurse incorporates evidence-based best evidence into their practice	48	4.73	0.45
62.	The nurse can work collaboratively with other team members to wean a patient from mechanical ventilation	48	4.73	0.45
63.	The nurse participates in the development of protocols and guidelines for the safe administration of medication within the ICU	48	4.71	0.46
64.	The nurse distinguishes enteral and parenteral nutrition and the indications and contraindications of each	48	4.71	0.46
65.	The nurse demonstrates knowledge of the institutional and national guidelines and standards of practice for procedures performed in the ICU	48	4.71	0.50
66.	The nurse can undertake a comprehensive assessment of the patient and explain this to the patient/family	48	4.71	0.46
67.	The nurse can recognise and describe signs of iatrogenic withdrawal from opiates/sedatives	48	4.71	0.46
68.	The nurse adheres to institutional and national guidelines and standards of practice for procedures performed in the ICU	48	4.71	0.50
69.	The nurse understands the importance of reporting errors and near-miss errors and reports them promptly	48	4.69	0.51
70.	The nurse demonstrates knowledge of the different dialysis modalities with a rationale for the use	48	4.69	0.47
71.	The nurse participates in quality improvement efforts to enhance quality and safety in an ICU environment	48	4.67	0.48
72.	The nurse effectively manages the technology that is related to the scope of their practice and experience in the care of critically ill patient	48	4.67	0.48
73.	The nurse delegates care where appropriate whilst maintaining patient safety	48	4.67	0.48
74.	The nurse values patient and family autonomy in end-of-life care decisions	48	4.65	0.48
75.	The nurse demonstrates knowledge of the drugs they are allowed to prescribe to a critically ill patient within their scope of practice	48	4.65	0.60
76.	The nurse can identify the need for suction and safely suction a patient via endotracheal tube, tracheostomy, or oropharyngeal route	48	4.65	0.48
77.	The nurse acts with assistance from an interprofessional team, on assessment findings of their patient to initiate, monitor, and manage interventions	48	4.65	0.56
78.	The nurse expresses both cultural and spiritual sensitivity while counselling patients and their families	49	4.63	0.49
79.	The nurse describes the importance of early initiation of nutrition in a critically ill patient	48	4.63	0.53

80.	The nurse demonstrates knowledge of the different neurological devices with rationale for use.	48	4.63	0.53
81.	The nurse contributes to ethical decision-making issues in the multidisciplinary team in their unit	49	4.61	0.53
82.	The nurse recognises delirium, understands the impact of delirium and takes steps to prevent it	48	4.6	0.49
83.	The nurse explains the importance of offering palliative and end-of-life care to patients with terminal illnesses	48	4.6	0.49
84.	The nurse distinguishes the procedures they can perform under their national professional scope of practice	48	4.6	0.54
85.	The nurse describes how to get up-to-date information for clinical practice	48	4.6	0.54
86.	The nurse can describe some quality improvement initiatives in the ICU	48	4.6	0.49
87.	The nurse is sensitive to the values, beliefs, lifestyles, and practices of the patient and identifies their own values, biases, and prejudices	49	4.59	0.57
88.	The nurse practices with cultural sensitivity and awareness of social factors to enhance patient and family well-being	48	4.58	0.68
89.	The nurse is able to care for a patient requiring continuous renal replacement therapy (CRRT)	48	4.58	0.68
90.	The nurse explains the indications and contraindications of common procedures performed in the ICU, e.g. intubation, central line insertion	48	4.58	0.61
91.	The nurse is adaptable and open to change	49	4.57	0.54
92.	The nurse can update the patients and their families with information concerning nursing care and the patient's clinical situation	49	4.57	0.68
93.	The nurse participates in multidisciplinary end-of-life discussions with patients and their families	48	4.56	0.50
94.	The nurse describes the relationship between comorbid conditions and their risks for deterioration in the ICU patient	48	4.56	0.62
95.	The nurse respects the patient's autonomy to refuse any procedures in ICU	48	4.52	0.74
96.	The nurse recognizes when to escalate to advanced modes of therapy when standard mechanical ventilation is unsuccessful (e.g., prone ventilation, Extracorporeal Membrane Oxygenation)	48	4.52	0.58
97.	The nurse makes complex and informed independent decisions within their own level of competence and scope of practice.	49	4.49	0.62
98.	The nurse understands the importance of careful prescribing of antimicrobial drugs to reduce antibiotic resistance	48	4.46	0.77
99.	The nurse includes patients and their families in pain management	48	4.46	0.77

100.	The nurse understands and can describe effective change management processes	49	4.39	0.67
101.	The nurse understands ethical principles and applies these to their patient's care	49	4.35	0.78
102.	The nurse actively participates in the change management process in their unit	49	4.35	0.78
103.	The nurse explains common complex conditions and their treatment plans	48	4.31	0.75

6.4 Chapter Summary

This chapter has projected the findings of the two rounds of Delphi. The following chapter will discuss outcome of the consensus meeting.

CHAPTER SEVEN: CONSENSUS MEETING RESULTS

7.1 Introduction

This chapter presents the results of the virtual consensus meeting. Responses made by the participants were compiled into a dataset and thematically analysed. The responses focused on support from the participants on how to roll out the competencies, which led to the creation of seven themes: training and assessment, stakeholders' involvement, communication, phased approach, ongoing support, resources, and leadership. Each theme is discussed together with its subthemes in this chapter. See Appendix 8 for the meeting agenda and invitation made to the participants.

7.2 Demographic characteristics

A total of nine participants contributed to the discussion. Most of them had more than ten years of clinical experience. The participants played various roles in the field of ICU, with the majority working as ICU nurses and nurse educators. There was almost equal representation in terms of gender, with five females and four males. There was heterogeneity in education level, with most participants having attained specialised Diplomas and degrees in critical care. This is shown in Table 7.1 below.

Table 7.1: Demographic characteristics of the participants of virtual consensus meeting

Gender	**n**
Male	5
Female	4
Roles of the participants	
Bedside nurses working in the ICU	3
ICU nurse educator	3
ICU nurse manager	1
NCK (Policymakers)	1
ICU nurse working across all counties	1
Years of Clinical Experience	
1-5 years	2
6-10 years	2
Above 10 years	5
Highest level of qualification	
Specialised Diploma	3
Degree	3
Masters	1
PHD	2

7.3 Overview of the presentation

The researcher opened the meeting by presenting the overview of the Delphi results to the participants. The participants reported they were happy with the competencies from the two rounds of Delphi, and they all agreed that the competencies were important in all ICU setups across the country. This is just an example of the feedback from one of the participants:

"*Thank you so much, Beth. I think you really have been able to put together quite a bit of information that is relevant, and I like that in terms of rolling out……" (P2 nurse educator)*

The potential barriers and facilitators were presented to the participants, who agreed with them in the rollout of the competencies. They mentioned some of the strategies to overcome the barriers. These strategies are discussed below.

7.4 Strategies for rolling out the competencies

Seven major themes and sub-themes were derived from the discussions with the virtual focus group consensus participants. They included training and assessment, stakeholders' involvement, communication, a phased approach, ongoing support, resources, and leadership. Each theme is discussed together with its subthemes.

7.4.1 Training and Assessment

The first theme encompasses issues related to the training and assessment of ICU nurses. Participants felt that training and assessment on the new ICU nurses' competencies would play a key role in rolling out the competencies.

> *"It is. I think I probably don't know if it is the assessment on paper or on, like, who assessed, how they assessed? How do we standardize them? I think when we get these, we have what it takes here. Do we go to the Nursing Council? First of all, to make everything standard like everyone from the training should have these"* (P4- Company nurse).

This could be achieved by reviewing the current curriculum, developing standardised assessment tools, training files, and using simulation laboratories.

7.4.1.1 Standardised assessment

A nurse educator reported that the current assessment of the students is neither standard nor competency based. The assessment outcome is subjective, and the students' performance depends on the assessor. Their feedback included:

> *"And the Nursing Council exam, which is a written paper, does not really help us gauge their competence regarding their practicum. So, you often find the outcome is more based on who did their assessment rather than on competencies and specific standards that we are keeping"* (P2- nurse educator).

Similar feelings were echoed by two other participants who felt there should be standardised assessment tools from the NCK for the objectivity of assessment.

> *"First of all, just to make everything standard like everyone who is coming from the training should have these..."* (P4-Company nurse).

> *"Do we have the standardized tools to evaluate these competencies, number one? We need a universal standardisation of the competencies in the whole, maybe the whole country, or maybe we can start"* (P5- ICU nurse).

7.4.1.2 Training files

Inclusion of the competencies in the training file of ICU nurses would help in ensuring that none of the competencies are missed. The competencies should be introduced in the nursing schools. Two participants provided feedback on this:

> *"If you want to be able to incorporate these competencies within the training file…"* (P2-Nurse educator).

> *"So, I think competencies, making sure these competencies go back to school"* (P4-Company nurse).

It was felt it would also help standardise the training of ICU nurses nationwide.

> *"And have a sort of a standardized tool where we can assess through return demonstration and…* (P5-ICU nurse).

7.4.1.3 Use of Simulation Laboratories

One participant expressed the importance of simulation laboratories in training the competencies. This would give students standardised exposure since there were inconsistencies in the practice areas.

> *"So, I think if we were to go… many studies now are talking of when you have a student who's been 50% in a simulation lab, and they have been able to try most of these procedures, even the ones that will not see in their ICUs then they get the other 50% in the ICU. It gives you a better training outcome"* (P2- nurse educator).

"I don't know whether I'm throwing the spanner into the works. When you look at the developed nations, they're using a lot of simulation as part of what they used to standardize testing because of the differences in the training in our different ICUs.…even training the preceptors within that simulation. Then they can roll out those competencies" (P2-Nurse educator).

7.4.1.4 Curriculum review

The participants felt the competencies should be incorporated into the curriculum. The training period should be adjusted in the curriculum.

"We need to seriously review our curriculum……it should be a student school-based curriculum guided by Nairobi" (P3- ICU nurse).

"Our training period is inadequate after somebody graduates that they have achieved the relevant skills within the period of that one year… (P3- ICU nurse).

7.4.1.5 Benchmarking

Participant P3- An ICU Nurse felt Kenyan nurses should benchmark their curriculum with the developed countries. The specialisation period of one year is not enough to gain the necessary skills.

"…do much benchmarking from the Western countries and also our training period, is it inadequate..." (P3- ICU nurse).

7.4.1.6 Scope of Practice

The participants felt a scope of practice for ICU nurses should be developed to incorporate the competencies.

"I think uh, first we need to look at the competences so that uh, from a regulatory point of view. We can align these competences to the scope of practice" (P6-NCK).

7.4.2 Communication

Sensitisation of the competencies to the major stakeholders would be the first step in rolling out the competencies by creating a clear communication plan. The competencies should be made known through forums for ICU nurses and partnerships.

"It would be about the stakeholder's involvement. Here, I'm talking about the political class and the hospital administrations. I hope we've realized that it was only recently when COVID hit, that the government started taking the issue of critical care nursing seriously" (P3-ICU nurse).

7.4.2.1 Forums

Participant P2-Nurse educator felt the competencies should be presented in various nurse forums, e.g., workshops, seminars, etc.

> *"I think one of the things that we need to do a lot is the… is getting these competencies heard and beginning with workshops, conferences…." (*P2-Nurse educator).

7.4.2.2 Nursing rounds

One participant also acknowledged the role of the nursing rounds as a way of communicating competencies to others. The more experienced nurses could share knowledge and expertise with the less experienced nurses during the rounds.

> "*I think we may need to have the nursing rounds in most of the places that you find in Kenya, which are not well adopted*" (PI- Nurse educator).

> *"The mentors and the people who have the competencies and the professionals in this field doing the nursing rounds that that's, that's what we improve and mentor other critical nurses to do the competencies"* (PI- Nurse educator).

7.4.3 Key stakeholders' involvement

The participants recommended the involvement of the key stakeholders for their 'buy-in' of the competencies. These include the government, the Ministry of Health and the hospital administrators.

"...the stakeholders' involvement, I'm talking about the political class, the hospital administrations. I hope we've realized that it was until recently, when COVID hit, that the government started taking seriously the issue of critical care…." (P5- ICU nurse).

7.4.3.1 NCK for Regulation of Practice

An ICU nurse felt NCK, as the nursing regulatory body, should regulate the practice of nurses through frequent evaluation of practice. *"Frequent evaluation. Probably, we should look at what (KMPDU) Kenya Medical Practitioners and Dentist Union does. I'm sorry to have. I'm. I'm. I'm talking about KMPDU. But what KMPDU does is its assessment of facilities and maybe certifying them that they are competent enough to give this kind of care"* (P5- ICU nurse).

7.4.3.2 Government involvement

The government should be involved in buying in the competencies and consequently funding the rollout.

"*Associations should lobby the government for funding so that we may be able to attend the seminar, the CMEs and the workshops"* (P5- ICU nurse).

7.4.3.3 Training institutions

The training institutions should support the rollout of competencies by sharing knowledge with the clinical practice.

"So, I think there should be collaboration between the training institution and the hospitals so that there can be sharing of knowledge" (P1- Nurse educator).

7.4.4 Clustering the competencies and using the phased approach method

Participants noted that the competencies were lengthy, so it would be difficult to roll them out all at once. The third theme, therefore, reflects on ways of easing the process of rolling out the competencies as suggested by the participants. Clustering the competencies into themes would make it easy to roll them out. The clustering could be in levels, from simple to complex

competencies or systems. The nurses should be taken through the competencies from one level to the other.

> *"My idea, Beth, is to cluster the competencies to have thematic areas…. Then you reduce the bulk of them so somebody wanting to look at the cluster that has to do with the airway and breathing can look at the 13 competencies under that cluster" (*P2-Nurse educator).

> *"…but I think that too would be my idea because probably you cannot be able to do all of them. But if you have them levels like airway suctioning and whatever level one, we have to know it first, first thing and then from there we move to the next one" (*P2-Company nurse).

7.4.5 Ongoing support

The fifth theme revolves around strategies to ensure consistency in the practice of the competencies through the provision of support.

7.4.5.1 Mentorship/Preceptorship

The participants agreed that establishing mentorship and preceptorship programs would help roll out and sustain the competencies in institutions. The program would ensure that the nurses have gained the necessary competencies and can confidently practice them under the guidance of mentors and preceptors.

> *"Now mentorship and I think I like the point that came who our preceptors are? who are our mentors? Do we have? how do we choose who will be mentoring and critical care nurses there, the junior?"* (P4- Company nurse).

> *"….so, like now you see most of ICU in the county governments which are supported by Medical Equipment Service (MES) program, we have seen them doing much mentorship especially for our biomedical engineers to take up the programs…"* (P3- ICU nurse).

A lack of mentors and preceptors to guide novice nurses may lead to an unsuccessful rollout of the competencies.

> *"I believe when you come from school, you are usually very green, and then you need someone to hold your hand until you reach a certain point"* (P4- Company nurse).

The participants suggested modalities of training preceptors.

> *"Specific curriculum for preceptors' trainers of this program and clinical educators that are specifically critical care. It's going to help us speak the same language across the country"* (P2-Nurse educator).

> *"We can develop a standardized way of training a preceptor who will be able to train, and when I say preceptors, I'm talking about teachers who teach critical care, clinical instructors and also preceptors who help the students."* (P2-Nurse educator).

> *"Having had the competencies, now mentorship, and I think I like the point that came, who are our preceptors? who are our mentors? Do we have a way to choose who will be mentoring and who will be mentors, or do we even have them? Do we have people who can mentor the critical care nurses there? the junior"* (P4- Company Nurse).

> *"…. having the right mentors and preceptors at the levels at the, you know, at the ICU, I think would be very helpful… So, I think if preceptors and people train ICU, our competencies, people who are competent and I and I want actually wanted to say when you're giving a certificate probably we give a competency certificate and not a completion" (P4)"* (P4- Company Nurse).

7.4.5.2 Continuous professional development

The participants suggested that continuous professional development would help keep nurses updated with the latest developments in the ICU regarding new procedures and technology.

> *"We should lobby the government for funding so that we may be able to attend the seminar, the Continuous Medical Education (CMEs) and the workshops. Which should be done… It's not like the way we go to Mombasa. We go to Eldoret once a year, and then you know. I think these are the things we should like to do quarterly"* (P5-ICU Nurse).

7.4.5.3 Champions

One participant, a P3-ICU nurse, expressed the need to have champions in each ICU who would steer others towards the achievement and sustainability of the competencies.

"We develop ICU champions in every county. This person should take the lead of ensuring and trainings the already qualified staff and the new staff who are coming to give them the to help them to achieve the bar of the standardisation of the care of the patient" (P3-ICU nurse).

"Sometimes you see an ICU has been opened and all of them are the newly employed staff, So everybody is learning from the other. If some people might be learning mistakes from the other" (P3-ICU nurse).

7.4.5.4 Partnerships

The partnership between the practice and academia would also help sensitise nurses to the competencies. The competencies should be included in the curriculum, and then the clinical areas should be able to evaluate nurses often on compliance. The training institutions should play a part in training the nurses on the competencies in the hospital.

"So, I think so, there should be collaboration between the training institution and the hospitals so that there can be sharing of knowledge" (P1-Nurse educator).

Participant P1- A nurse educator felt that when students are sent to the clinical areas for their practical, no one follows them up. The training institutions leave them for the clinical sites and are lost in between. This leads to a theory-practice gap.

".... some of the trainers are not visiting their people, or there is no maintenance of the competencies" (P1-nurse educator).

7.4.6 Resources

7.4.6.1 Prioritising resources

The participants felt that curative care in the country had been neglected at the expense of preventive care. Most of the resources are channelled towards supporting preventive care.

"But my question is that we have seen many stakeholders in our current health system. They are involving themselves so much in preventive health medicine that many clinical areas have been neglected, and this is seen when you see a lot of programs have been moved towards the preventive area" (P3-ICU Nurse).

7.4.6.2 Financial resources

The participants felt the government should be able to allocate money for professional development for nurses. This would help in the rollout of the competencies by holding workshops for nurses.

> *"Now how do we bring now a lot of trainings in the clinical part of it and this need requires now involvement with a lot of with the partners and then and the Ministry and also the county government for allocation of budgeting so that we can really train our nurses in the clinical areas"* (P3-ICU nurse).

7.4.6.3 Human Resource Capacity Building

The participants felt that nurses cannot translate what they have learned in class in the clinical areas. Therefore, they require refresher training to help them keep abreast with the skills.

> *"Uh, I think I have the advantage of having gone to the critical care units around the country and something that worries my mind, worries me when I go there, is the competencies. I mean, we have the training that is already done. Someone has graduated with critical care, but then on the ground, what you have is very different"* (P4- Company Nurse).

> *"I agree with the previous speaker that you need to have a lot of trainings"* (P3-ICU Nurse).

7.4.6.5 Lobbying

The participants felt the NCK, the NNAK, and the ICU chapter should be able to use their positions to lobby the government to support ICU nurses across the country.

> *"...here the Nursing Council, the critical care chapters and the associations should lobby the government for funding so that we may be able to attend the seminar, the CMEs and the workshops"* (P5- ICU nurse).

7.4.7 Leadership and Management

Participants felt there must be changes to assist in the rollout of the competencies. There must be a paradigm shift in the nurses, training institutions, and clinical sites in their way of doing things to roll out the competencies effectively.

7.4.7.1 Change of attitude

Participant P4, a company nurse, felt the nurses' attitude could hinder the successful rollout of the competencies.

> *"Umm, and I was trying to think, is our attitude a problem? (*P2-Company nurse).

She felt the greatest motivation for the nurses during continuous professional development workshops is the monetary allowance. Below is an excerpt of her experience:

> *"Like I want to do a conference, and then the interest of the people on the ground is not really the material, not the content of the conference. Am I going to get allowances?... It's very discouraging when you have put all the resources together, and then you're like you don't even see people coming up for it"* (P4- Company nurse).

The attitude issue was supported by Participant P1, a nurse educator in the context of nurses not practising what was being taught.

"Maybe they have the wrong attitude or are not practising what the other guys are being taught" (P1-Nurse educator).

The participants felt the change of attitude by the ICU nurses would go a long way in the effective rollout of competencies.

7.4.7.2 Retention mechanisms

According to the participants, the turnover in ICU is high compared with other departments. This creates a huge gap in practice and, consequently, quality of care. The novice nurses have no one to hold their hands. Below is an excerpt from one of the participants.

> *"…as nurses progress upwards, as they acquire higher education, the tendency is for them to get away from the clinical area and as such the knowledge and the competences they acquire in their higher training that is not used for direct care to the patient and at the*

same time since they are away from the clinical area then there is little room also for them also to be able to provide mentorship" (P6- NCK).

7.4.7.3 Recognition and Awards

The participants considered recognition through awards to motivate nurses to stick in the clinical areas. The suggestion was to issue certificates of completion of the competencies.

> *"Maybe also we need to come up with a sort of a certificate after completion of a cluster or a level. Someone is awarded a certificate of completion. Which would go a long way in motivating them"* (P5 ICU nurse).
>
> *"…after training we give a certificate of completion"* (P4- Company nurse).
>
> *"…the Council has also developed regulatory tools for the advanced practice in nursing and advanced practice in midwifery. Uh, and we hope that this will be a mechanism for us to retain nurses and midwives at the bedside"* (P6-NCK).

7.5 Support in the roll-out of competencies

The participants were asked how they would support the rollout of competencies in their own ways. Two major themes were derived from this discussion: training and clinical support.

7.5.1 Participate in training

Three participants reported how everyone had a role to play in training ICU nurses in the new competencies, which ranged from personal responsibilities to support in the training of preceptors.

> *"If you ask me, Beth, I think we all have a role to play…. from my perspective where I can be able to organize for, for conferences I heard I can be able to organize for CME"* (P4 company nurse).
>
> *"As for me, Beth, the support would be if we had a program for preceptor training, I would be happy to champion that…. And I would be happy to be involved if we ruled out a preceptor capacity building program" (*P2- nurse educator).
>
> *"Yes, I also can participate in the issues of the preceptors training"* (P1- nurse educator).

7.5.2 Clinical support

One of the participants working in the clinical areas felt she could support the rollout of the competencies by offering mentorship to the young nurses and enforcing the practice of the competencies.

> *"I just wanted to let you know that. Uh, for the support of the clinical training for the young nurses.* (P7- ICU manager). *"So, as we try and roll out this program, my part will be to ensure that I enforce the nursing practice in a safe way that will benefit the Community and the patient"* (P5- ICU nurse).

7.6 Chapter Summary

This chapter has discussed the outcomes of the virtual focus group consensus meeting. These include the strategies for rolling out the competencies and the support of the participants in the rollout. The next chapter discusses the study results in relation to the literature.

CHAPTER EIGHT: DISCUSSION OF THE RESULTS

8.1 Introduction

The previous chapter presented the outcome of the virtual focus group consensus meeting. This chapter will discuss the study findings in relation to the literature. This includes the two rounds of Delphi findings and the consensus meeting outcome.

Many developed countries across the world have developed critical care competency frameworks for their registered nurses that focus on the needs of a critically ill patient and include practice competencies underpinned by knowledge and behaviours and ethos of critical care as its key components (Bench et al., 2003; Hadjibalassi et al., 2012).

Although competency and competency frameworks in nursing have been developed extensively, there is a paucity of studies where researchers went ahead to explore the potential barriers and facilitators as well as strategies towards implementing the competencies. This study is one of a kind that has developed competencies as well as identified the potential barriers and facilitators and has suggested strategies towards their implementation in the Kenya context.

8.2 Delphi rounds

All the competencies in the two rounds achieved consensus. Consensus was determined by the competencies achieving a mean of ≥ 4. The competencies were not arranged in any order, although they captured knowledge, skills, attitudes domains, and professional, clinical, cultural, and technical competencies. All the competencies achieved a priori consensus of ≥ 4, arranged from the highest to lowest rated. The highest-rated competencies achieved a mean of 4.88 (0.32), and the lowest lowest-rated competency achieved a mean of 4.19 (SD 1.0). All the competencies had a small standard deviation of ≤ 1, meaning there was not much variation in rating between the participants.

8.2.1 The ten highest-rated competencies in Round one of Delphi

The competencies that were rated high in the two rounds were related to knowledge and skills in recognising and attending to life-threatening emergencies in the ICU. These included recognition of early warning signs of potential deterioration and complications, competencies in BLS and ACLS and being able to apply the latest guidelines of cardiopulmonary resuscitation (CPR). These findings are in line with other studies. Education of nurses in recognition of early warning signs is supported as it enhances their confidence, competence, and knowledge in dealing with critically ill patients (Saab et al., 2017). Competencies in BLS and ACLS as a priority for ICU nurses are supported by a study by Serafin et al. (2021) on identifying the most needed competencies by novice nurses to work in ICU. This is also supported by Alfieri, Mori, et al. (2017) in their study to map ICU competencies in Lebanon and Italy, where skills in BLS and ACLS were listed as essential competencies. In most studies, recognition of early warning signs is seen as a competency for the ward nurses to prevent the deterioration of patients and subsequently landing in the ICU (Jensen et al., 2018; Saab et al., 2017). Early warning signs are designed to facilitate early detection and communication of clinical deterioration by categorising the severity of illness and promoting timely expert review (Mitchell et al., 2010).

Nurses are the first to identify the need for and initiate CPR and are required to respond quickly and effectively (Rajeswaran et al., 2018). The outcome of CPR is hence determined majorly by their competence (Kumar et al., 2022). A study conducted on nurses working in ICUs in three different hospitals in Botswana revealed a huge gap in the knowledge of BLS and CPR (Rajeswaran et al., 2018). The need for nurses to be able to apply the latest guidelines is in keeping with AHA recommendations of maintaining currency with guidelines as they keep changing every five years (Panchal et al., 2020). Retention of CPR skills, however, is reported to be poor, and rolling refresher skills training has been shown to help retain skills (Niles, 2009).

Other competencies rated high included respiratory system management, e.g., managing a mechanically ventilated patient, safe administration of oxygen therapy via a simple face mask, a venturi system, nasal cannula, and reservoir mask, and patient assessment before, during, and after suctioning. Medication administration using different routes and adhering to the medication administration guidelines were also rated high at means of Effective management of a critically ill

patient with acute alteration/disorders in body systems, competence in carrying out a range of procedures, treatments, and interventions within their scope of practice were also rated high. All these competencies that were rated high are competencies related to direct patient care. According to Lakanmaa et al. (2015), direct patient care competencies are termed clinical competencies, while competencies related to ethical activities, decision making, collaboration and professional development are called professional competencies. Similar to these findings, ICU nurses in Finland rated clinical competencies higher than professional competencies (Lakanmaa et al., 2015).

8.2.2 The ten lowest-rated competencies in Round one of Delphi

On the other hand, there were items that were notably scored low even though they achieved consensus. These included, palliative and end-of-life care (EOLC) competencies, e.g., the importance of offering palliative and EOLC to patients with terminal illnesses and participation in multidisciplinary end-of-life discussions with patients and their families. EOLC in ICU setup is strongly supported by literature as it improves the quality of death, shortens the length of stay and reduces the cost of hospitalisation (Xu et al., 2022). These competencies, however, were not scored high despite their importance in ICU. This is consistent with a Brazilian study on ICU nurses' communication with dying patients, where the nurses expressed reluctance to address issues of the dying as they felt ill-prepared to do so (Beckstrand et al., 2021; Trovo de Araujo & Paes da Silva, 2004). This could also be explained by the fact that Africans do not like facing the reality of death; it is viewed as taboo to discuss matters of death or even contemplate it (Ekore & Lanre-Abass, 2016). Advance care directives are considered too individualistic for a communitarian society such as Africa (Ekore & Lanre-Abass, 2016). In this vein, patients and relatives put ‘a wall up’ towards discussion of end-of-life issues.

Nurses are the best placed to understand critical care patients and their families' needs and issues as they spend more time with them than other healthcare providers. Therefore, they should take advantage of initiating end-of-life discussions. The lack of nurses’ involvement in EOLC discussions could also have influenced the participants' prioritisation of competence. This is consistent with a South African study on views on end-of-life decision-making among critical care nurses, which revealed a lack of involvement in EOLC discussions and decisions, thereby

recommending improved multidisciplinary communication (Langley et al., 2014). Further, a study conducted in Kenya on self-perceived attitudes towards EOLC among nurses working in an acute care hospital revealed negative attitudes attributed to nurses' lack of educational preparation on EOLC (Machira, 2020). Conversely, a study conducted on neonatal ICU nurses on barriers' towards participating in the provision of EOLC to infants and families revealed psychological stress and mental discomfort (Sadeghi et al., 2021). Therefore, free counselling services were recommended to accompany EOLC programs for nurses (Sadeghi et al., 2021). Developing competencies on EOLC has been reported to have positive outcomes for nurses through improved communication, collaboration, and decision-making skills (Sacco et al., 2023). Additionally, interprofessional education on EOLC has shown positive outcomes, such as improved communication and collaboration among healthcare professionals (Graham et al., 2018).

The item on inclusion of patients and their families in pain management also scored low. Pain is common in ICU patients, either related to procedures or the disease process. Its management poses a great challenge, especially to patients who are not able to self-report (Richard-Lalonde et al., 2018). Generally, the attitude of nurses on pain management has been reported to be very low, especially in LMIC, contributing to their not seeing any need for family inclusion (Sweity et al., 2022). Involvement of family members in the pain management of their patients has shown positive outcomes, especially for patients who are not able to self-report their pain (Richard-Lalonde et al., 2018). Sociocultural factors influence patients' expression of pain, especially in SSA, and including family members may help assess pain in such situations (Henrietta et al., 2022).

Items on cultural sensitivity and awareness of social factors to enhance patient and family wellbeing and expression of cultural and spiritual sensitivity while counselling patients and their families were also rated low. Culturally competent care pertains to specific, dynamic and personal patient-provider interactions within a particular healthcare context (Garrett et al., 2008). Care for culturally diverse patients can be challenging due to linguistic, cultural, and ethnic differences; therefore, education to improve cultural competence for ICU nurses is highly recommended and supported by literature (Listerfelt et al., 2019).

On the other hand, lack of cultural competence can negatively affect the family, e.g., cause moral distress and lead to prejudice, discrimination, and communication barriers (Ozga et al., 2018).

Conversely, participants in this study did not view it as among the priority competencies for ICU nurses. This could be because Kenya is, to a larger extent, a culturally homogenous nation, especially in the rural areas. Nevertheless, the country has 42 ethnic groups with specific cultural beliefs and values. This aligns with Garrett et al. (2008) views that cultural competence is not a static set of attributes or skills, nor is knowledge of a list of ethnicity-based traits, but a template that can only be filled through ongoing collaboration between patients and healthcare providers.

Further, Sharifi et al. (2019) view cultural competence as a gradual process of delivering effective, safe and quality care to patients by considering their different cultural aspects. Identification of family needs in relation to the influence of cultural values and religion held by the family members, and the organisational climate and culture should be paid attention to (Al-Mutair et al., 2013). Therefore, nurses should be allowed to develop their knowledge and attitudes about cultural issues in basic training and in-service programs (Sharifi et al., 2019). One of the methods that could be used to train cultural competence is exposure to a culturally diverse environment during clinical placement (Ozga et al., 2018). Additionally, competencies in effective change management processes and making complex decisions at one's level of competence and scope of practice scored low. Complex decision-making and change management are professional competencies; perhaps the nurses prioritised clinical competencies over professional ones. This aligns with a study on ICU nurses' self-assessed basic competencies in Finland, where clinical competencies were rated higher than professional competencies (Lakanmaa et al., 2015). Nurses in Kenya do not perceive themselves as agents of change.

8.2.3 Other competencies suggested by the participants in Round one of Delphi

Participants in round one were asked to list any other competencies they deemed important in the open statement at the end of the questionnaire. The qualitative statements were clustered into thematic domains according to the content and similarity in meaning. Twelve more competencies were derived from this thematic analysis and tailored to the language of the other statements. The additional competencies were added at the end of the list to make 103 competencies for the second round. They were averagely rated and achieved consensus. However, none of these competencies was in the top and bottom ten. They were scored between a mean of 4.81(0.39) and 4.58 (0.68).

These competencies cut across cognitive and psychomotor domains only. There was no competency in the affective domain. This could be because the Kenyan nursing curricula emphasise knowledge and skills development, and less attention is paid to the affective domain. Further, all the additional competencies were clinically oriented and not professional competencies. This could be because most of the participants were bed side nurses with clinical experience of not more than five years; hence, clinical competencies were more of a priority to them than professional competencies.

***Competency 1*:** The nurse performs regular and appropriate re-assessment of a critically ill patient. This competency was omitted since the assessment was included in the competency items 28-34. However, the participants felt the need to include re-assessment separately. This is supported by literature on the re-assessment of patients with correct frequency in relation to the clinical situation (Alfieri, et al., 2017).

Competencies 2 & 3: The nurse demonstrates knowledge of the different dialysis modalities and rationale for use. The nurse can care for a patient requiring continuous renal replacement therapy (CRRT). These competencies are important for critical care nurses, which had been omitted from the competency list since most ICUs don't have CRRT and other dialysis modalities are offered in the renal units. However, these competencies are supported in the literature since most ICU nurses reported having technical skills in connecting patients on dialysis but had deficient knowledge (Andrade et al., 2019). Further studies performed around haemodialysis have reported a high prevalence of adverse events in patients subjected to the haemodialysis process and have been reported to have a high correlation with the professionals' training (Andrade et al., 2019). Knowledge and skills in haemodialysis were also listed among the basic competencies of an ICU nurse in a study of mapping ICU nurses' competencies in two ICUs in Lebanon and Italy (Alfieri, et al., 2017).

Competencies 4 & 5: The nurse demonstrates an understanding of invasive procedures performed in the care of patients within the ICU. The nurse performs invasive procedures in their scope of practice, e.g., urinary catheterisation or intravenous cannulation. These competencies had been listed as knowledge and understanding of general procedures performed in the ICU *(see Table 6.1, Items 37 & 38).* The need to specify invasive procedures that an ICU nurse is allowed to perform within her scope of practice could have been triggered by the emergence of the ICU scope of

practice in Kenya, launched in September 2022. See Appendix. XIII. Most invasive procedures are performed in the ICU to monitor and support critically ill patients. These procedures predispose patients to life-threatening complications, which justifies the enhancement of competencies among nurses and other healthcare providers. Studies have supported the competencies of ICU nurses in knowledge and skills in managing invasive procedures (Kamel, et al., 2022).

Competencies 6 - 8: The nurse demonstrates knowledge of the different neurological devices with rationale for use, can care for a critically ill patient requiring neurological monitoring and demonstrates skills in caring for a patient with intracranial devices, e.g., external ventricular drain. The competencies on neurological disorders had been captured in competency items 26 and 39 in Table 5. These competencies are, however, only specific to the assessment of sedation levels and general neuromuscular assessment and documentation of a critically ill patient.

In the UK National Competency Framework for Adult critical care nurses, neurological competencies are included as additional competencies to cover critical care nurses working in specialist neurological centres (Deacon et al., 2017). These additional neurological competencies could have been triggered by the current state of traumatic and neurological injuries in Kenyan setup related to road traffic accidents. This notion is consistent with outcomes of studies on the burden of neurological disorders, which have revealed that neurological disorders are six times higher in low- and middle-income countries, especially those in sub-Saharan Africa (SSA) and South Asia (Kinyanjui, 2016; von Gaudecker et al., 2020). Another study on early management of traumatic brain injury in Kenya revealed poor quality of care, leading to increased mortality rates (Mwita et al., 2016).

Competencies 9 & 10: The nurse demonstrates knowledge of the drugs they can prescribe to a critically ill patient within their scope of practice. The nurse demonstrates skills in administering and monitoring drugs they have prescribed to a critically ill patient within their scope of practice. The scope of practice for critical care nurses in Kenya allows ICU-trained nurses to prescribe some drugs, e.g., anticonvulsants, antidysrhythmic, antibiotics, electrolytes, etc. This could have triggered the suggestion to include these competencies. However, this scope of practice was launched in 2022, and therefore, these competencies need to be aligned with the critical care curriculum. The expanding role of ICU nurses in prescribing drugs is a historic move globally, and it is gaining acceptance in many healthcare systems. However, medication prescription is

surrounded by many legal and safety issues, e.g., medication errors, and hence, nurses should be well prepared for this role (Naderi et al., 2022).

Competencies 11 & 12: The nurse demonstrates knowledge of the safe inter-hospital and intra-hospital transfer of a critically ill patient. The nurse demonstrates skills in a critically ill patient's safe inter-hospital and intra-hospital transfer. These competencies are consistent with the UK's Registered Nurses' competencies (Deacon et al., 2017).

8.2.4 The ten highest-rated competencies in Round two Delphi

Like in the first round of Delphi, the competencies that achieved the highest score were related to knowledge and skills in recognising and attending to life-threatening emergencies in the ICU. These included recognition of early warning signs of potential deterioration and complications, competencies in BLS and ACLS and being able to apply the latest guidelines of cardiopulmonary resuscitation (CPR). Other than these competencies, some were not highly rated in round one but found their way into the top ten competencies in the second round. These included a nurse being able to assess a patient before, during and after suctioning. This is consistent with literature that recommends high skills in suctioning for nurses as the most common intervention for patients with respiratory disorders and potentially harmful procedures associated with complications such as vasoconstriction and barotrauma (Heidari & Shahbazi, 2017; Pinto et al., 2020).

A systematic review reported nurses' non-adherence to guidelines for safe suctioning and recommended competency-based in-service education for nurses to enhance their knowledge and skills (Pinto et al., 2020). This is also consistent with the UK's National Critical Care Framework, where this is one of the competencies of ICU nurses (Price, 2013). The other competence that gained scores is a nurse's ability to safely undertake hygiene care for a critically ill patient (4.90; 0.37). According to WHO, hygiene is practices that help maintain health, prevent disease spread, and preserve health (Mohamed et al., 2022). A study to evaluate factors affecting nurses' performance regarding hygienic care in a critically ill patient revealed a deficiency in knowledge and, therefore, highly recommended competence in the ICU (Mohamed et al., 2022). The nurse ensures a safe environment for patients, families, and staff by identifying and eliminating risks.

The work environment in the ICU comprises physical, ergonomic, working conditions, biological, chemical and psychosocial factors (Melek & Nihal ,2017). Poor environments are associated with

health risks to ICU workers, families, patients and also leads to negative patient outcomes in ICU (Melek & Nihal ,2017). Nurses are the major workforce in ICU and are mostly involved with the complex task of organizing the ICU environment and this calls for professional competency in this area (Shimizu et al., 2010). The nurse's competence in thinking critically and effectively utilising a systematic approach to solve problems was also among the top scores. Critical thinking and clinical decision-making are among the skills an ICU nurse should possess to provide safe and competent care in the 21st century (İlaslan et al., 2023). The nurse knows the indications and invasive and non-invasive hemodynamic monitoring.

Invasive procedures are a daily occurrence in ICU, and the most common include chest tubes, endotracheal tubes, arterial lines, central lines, and nasogastric tubes. They are majorly used to deliver medication and for hemodynamic monitoring e.g. central venous pressures (CVP), arterial blood pressure and endotracheal cuff monitoring (Maina, 2017). These devices are potentially life-threatening to patients and require high skill and expertise (Kamel et al., 2022). The nurse can safely prepare and assist with inserting CVC (4.85; 0.36). CVC is one of the major devices used in the ICU for administering medication, fluids, nutrition, and monitoring CVP. However, it is associated with the risk of central line-associated bloodstream infections (CLABSI), which are preventable with evidence-based insertion and maintenance guidelines (Mohamed et al., 2021). A study to assess ICU nurses' knowledge and practices in the care of CVCs revealed gaps despite their major role in managing CVCs, and continuous in-service education is recommended (Mohamed et al., 2021). CVC care and management is also supported in other studies as a competency of ICU nurses (Aloush, 2018; Price, 2013).

8.2.5 The 10 lowest-rated competencies in Round two Delphi

Like in round one Delphi, the following competencies scored lowest. Nurse participation in end-of-life discussions with patients and their families. The nurse explains the relationship between comorbid conditions and their risks for deterioration. The nurse makes complex and informed decisions at their level of competence. The nurse includes patients and their families in pain management. The nurse can describe an effective change management process and can actively participate in the change process. The nurse explains common complex conditions and their treatment plans. Competencies that found their way into this list and were not rated low in the first

round included the nurse respecting the patient's autonomy to refuse any procedures in the ICU. This competence was rated at 80 out of 91 in the first round. In the ICU, patients may face decisions about life-sustaining treatments, such as mechanical ventilation, dialysis, and blood transfusions, among others.

ICU nurses must respect and support patients' autonomy even if it may conflict with their beliefs or medical recommendations. American Association of Critical Care Nurses supports this competency as a transition competence for ICU nurses (Kopf et al., 2018). The nurse recognises when to escalate to advanced modes of therapy when standard management is unsuccessful. In ICU, patients may require advanced therapy when the standard management is unsuccessful, including ECMO CRRT, among many others. Hence it is part of the nurses' role to monitor patients' response to standard management and recommend escalation to advanced therapy as they are the primary caregivers and have direct contact with the patient. This recognition calls for a strong understanding of underlying medical conditions and signs of positive or negative responses to standard treatment. This can be imparted through sensitisation on Modified Early Warning Signs (MEWS) (Warren et al., 2021). The nurse understands the importance of carefully prescribing antimicrobial drugs. ICU nurses play a crucial role in preventing antimicrobial resistance as they are involved in preparing and administering antibiotics as well as monitoring their effects on patients. Therefore, incorporating education, assessment and reinforcement of nurse competence associated with antimicrobial therapy is required (Fawaz et al., 2020). A study on nurses' knowledge, attitudes and beliefs on antibiotic use and prevention of antimicrobial resistance revealed knowledge gaps (Lalithabai et al., 2022). The nurse understands ethical principles and applies these to their patients. Clinical and complex decision-making and change management are leadership skills that were not rated highly. This contrasts with literature supporting nurses' leadership skills at all levels as they may be tasked with team leading and supervising others, regardless of the level of experience (Øvrebø et al., 2022).

8.3 Barriers and facilitators towards implementation of the competencies

Successful implementation of competencies requires a strategic approach that addresses the barriers and leverages the facilitators. In cognisant of this, I went ahead to explore the perceived potential barriers and facilitators towards implementing the ICU competencies from the participants. Participants were also asked to list the potential barriers and facilitators towards the implementation of the competencies in Kenya. These were two open questions (one on barriers and the other on facilitators), generating much literature. Conventional content analysis was used to code, categorise, and merge the textual content on perceived barriers and facilitators and summarise it, as shown in Chapter 6, Table 6.3. After discussing with my supervisors, we agreed I would search for a suitable framework to present the barriers and facilitators.

The barriers and facilitators were classified in line with the multi-level, socio-institutional lens of macro, meso, and micro-framework (Serpa & Ferreira, 2019). This is a unique contribution to this study. This framework was chosen to recognise how the regulatory, institutional, and normative factors kept recurring in the themes. There is also a paucity of literature on how political, social, and institutional factors affect implementation of nursing competencies. So, this is a new contribution to this study.

Several other models were considered to discuss the barriers and facilitators but dropped due to their unsuitability. These included the Consolidated Framework for Implementation Research (CFIR), which was dropped because of its complexity. CFIR is a comprehensive meta-framework widely applied to implementation-related studies (Liang et al., 2015). It has five domains and 37 constructs within the five domains. This model is useful when formulating a priori barriers and facilitators' questions, and they are situated around the five domains and the constructs.

An example is a study by Muddu et al. (2020) on exploring barriers and facilitators to integrated hypertension HIV management in Ugandan HIV clinics. The semi-structured questionnaire to explore the barriers and facilitators was guided by the CFIR domains and constructs (Muddu et al., 2020). Other theoretical frameworks have been utilised in implementation research, for example, Reach, Efficacy, Adoption, Implementation, and Maintenance (RE-AIM), the Promoting Action on Research Implementation in Health Services (PARiHS) framework, and the Technology

Acceptance Model (Varsi et al., 2015). The RE-AIM framework is suitable for evaluating an intervention's impact. Its central tenet is that an intervention is due to the combined effects of its five evaluative dimensions (Glasgow et al., 1999). The RE-AIM framework focuses only on individual and organisational level factors that affect interventions; therefore, it was dropped as it does not address national or societal factors. The framework can be used to guide qualitative research where the five dimensions can be used to focus the inquiry (Glasgow et al., 1999).

The PARiHS is a determinant framework that specifies the determinants that act as barriers and enablers that influence implementation outcomes (Bergström et al., 2020). It can be used to guide the formulation of an interview guide in qualitative research on the translation of evidence to practice studies (Rycroft-Malone et al., 2004). For example, Rycroft-Malone et al. (2004) used the PARiHS framework to explore the factors that influence the implementation of evidence into practice. They utilised the framework to develop a semi-structured interview guide.

The multi-level, socio-institutional lens of macro, meso, and micro framework and how the barriers and facilitators were situated around it is shown in figure 8.1 below.

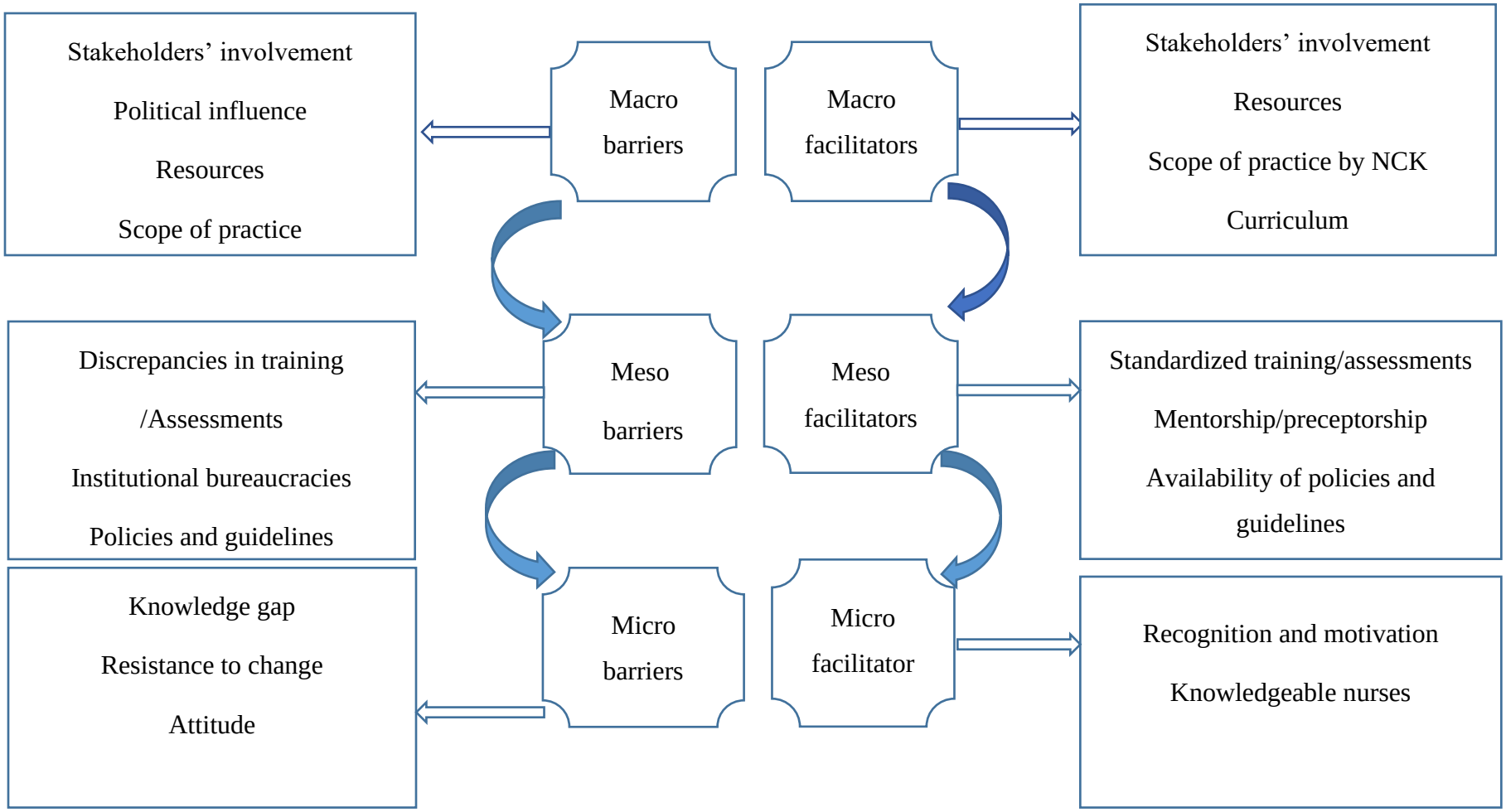

Figure 8.1: Thematic framework of barriers and facilitators

Most of these barriers and facilitators are similar to those identified in other settings, such as stakeholder involvement, communication and assessment (Caverzagie et al., 2017; Lavoie et al., 2023; Pasternack et al., 2016). However, some barriers and perceptions were unique to the Kenyan context of being an LMIC, like the limited scope of practice for ICU nurses, lack of resources, and political influence.

The key barriers and facilitators perceived to hinder the implementation of the ICU competencies in Kenya were foreseen at all levels: government/community, institutional and individual. The key themes yielded on stakeholders' involvement, resources, scope of practice, curriculum, political influence, policies and guidelines, training, institutional bureaucracies, multidisciplinary collaboration, resistance to change, recognition and motivation. This bears similarities to the challenges encountered in other settings in implementing competencies (Dragoo & Barrows, 2016; Jippes et al., 2012; Pasternack et al., 2016). There is a paucity of literature on barriers and facilitators towards implementing ICU competencies and nursing competencies in general (Lavoie et al., 2022). Therefore, general barriers and facilitators towards implementing interventions in healthcare have been referred to in this discussion.

8.3.1 Macro level barriers and facilitators

Barriers and facilitators at the macro level revolved around the lack of stakeholders' involvement, political influence, lack of resources and a lack of scope of practice for ICU nurses.

Stakeholders: Stakeholders' involvement is key as it helps to successfully adopt and sustain evidence-based interventions and policies (Jippes et al., 2012; Lavoie et al., 2023). Stake holders' involvement can take many forms, including engaging them in the research process. In this case, the major stakeholders were the government, the nursing council of Kenya, the ICUs across the country, the multidisciplinary team and training institutions. This ensures that the interventions are relevant to the needs of the target population. Stakeholders can also be engaged in identifying barriers and facilitators to the implementation of interventions. This helps in the development of more successful implementation strategies. Dissemination of research findings to the stakeholders helps to build support for the adoption and sustainability of interventions and policies. Providing training and support to stakeholders helps implement the interventions effectively.

Political influence: Political decisions have a key influence on healthcare policies. Sometimes, decisions may not align with healthcare needs and be a barrier, e.g., decisions resulting from healthcare education and training programs funding cuts. On the other hand, political buy-in of healthcare interventions can create opportunities for implementation. It is, therefore, important to engage with political decision-makers early in implementing the competencies. This calls for collaboration and communication with the policy makers and other key stakeholders. The participants felt that the national and county governments do not prioritise the professional development of health workers in allocating resources. Further, there was a lack of representation of nurses in government who could influence decisions. This is consistent with a study on barriers and facilitators towards integrating oral healthcare of older adults in basic care, which revealed low political attention to be a barrier towards its implementation (Niesten et al., 2021).

In Kenya, the nurses felt there was no strong good will by the government to support the professional development of nurses. The following statement came from a participant who is an ICU nurse working in the clinical areas in the virtual focus group consensus meeting:

> *"We need, eeh, to lobby the government and stakeholder other stakeholders, here the Nursing Council, the critical care chapters and the associations should lobby the government for funding so that we may be, we may be able to attend the seminar, the CMEs and the workshop".*

Resources: Resource availability determines success in the implementation of interventions. Resources can include financial, human, and material resources. Hence, it is important to identify and address resource gaps to ensure successful implementation and sustainability of the competencies. The participants cited a lack of adequate resources as well as poor allocation of available resources from the national and county levels, which trickled down to the institutions. These resources are in the form of staffing, finance, and equipment. This is confirmed by studies that reported inadequate resources as a major gap in the Kenyan ICUs (Barasa et al., 2020; Wachira & Mwai, 2021; Waweru-Siika et al., 2020). This is consistent with other studies, particularly in LMICs, where a lack of resources has been cited as a barrier to successfully implementing new guidelines and competencies in healthcare (Baradaran-Seyed et al., 2013; McArthur et al., 2021). In LMICs, the inequitable distribution of resources is also a recognised barrier towards implementing evidence-based guidelines and protocols in healthcare (Correa et al., 2020). In the

virtual focus group meeting, nurses felt resources were only available during the COVID-19 pandemic period

> *"We know that most of the ICUs, especially in the counties, opened during the COVID period. But after that, no follow-up was made about it. So we have to, maybe, advocate for training and resources for these ICUs."*

Scope of Practice: The scope of practice determines the boundaries within which a professional can practice their skills and competencies and their roles and responsibilities. Regulations and ethical standards usually define this scope of practice. This notion of the scope of practice as a hindrance towards the implementation of new interventions in nursing is also supported by literature where nurses are restricted from taking up their roles in primary healthcare (Busca et al., 2021).

A study on the current state of critical care nursing worldwide revealed a huge difference in the roles and responsibilities of ICU nurses between HIC and LMIC (Ndirangu-Mugo et al., 2022). In HIC, the roles and responsibilities of ICU nurses were clear and defined depending on their qualifications and experience levels (Ndirangu-Mugo et al., 2022). This aligns with Benner's theory, which postulates that a nurse can move from novice to expert through transformational experience and that experience is strongly related to competence development (Benner, 1982). On the other hand, in LMIC, the roles and responsibilities of an ICU nurse are not clearly defined. ICU nurses juggle between healthcare assistants, technical or ancillary staff, and clinical educators, managing medication and ventilated patients and providing care to deteriorating patients (Ndirangu-Mugo et al., 2022). In the case of Kenya, the nursing scope of practice is defined by the NCK. The participants felt the current scope of practice for nurses in Kenya is narrow and rigid, which could be a barrier to implementing the competencies. The nurses are not autonomous, e.g., they are not allowed to perform invasive procedures and prescription drugs in the ICU. They felt that NCK should develop a scope of practice to accommodate the new evidence-based competencies. It was not until recently that NCK developed scopes of practice for speciality nurses. Critical care nurses' scope of practice came into existence in May 2022, way after the inception of this study.

Curriculum: The curriculum can play both a barrier and enabler role in implementing new competencies. A rigid and inflexible curriculum that is slow to adapt to changes can create barriers

to accommodating and implementing competencies. On the other hand, a curriculum designed to be flexible can serve as a facilitator towards implementing new competencies. The participants felt that the current ICU curriculum required a review to accommodate the new competencies and that there was a need to standardise the curricula across the country for consistency in the training of nurses. These findings are further supported by literature where rigidity in the curriculum was reported to be a barrier to implementing competency-based nursing education (Busca et al., 2021). The review should factor in the three domains of knowledge: cognitive, psychomotor, and affective and situate the competencies around these domains (Bloom, 1956).

8.3.2 Meso-level barriers and facilitators

The following were identified as barriers and facilitators that would hinder the implementation of the competencies at the organisational level. The key themes yielded from the content analysis included training, institutional bureaucracies, policies and guidelines, disparities in service delivery, mentorship, and multidisciplinary collaboration.

Training: The participants felt that preparing stakeholders for professional development would help implement the competencies. This could be in basic orientation, job training and continuous nursing education. Providing adequate training and education to nurses and other stakeholders can help them understand and implement the competencies. This is consistent with literature where training was considered key in rolling out a new curriculum (Nguyen et al., 2022). Further, training was also considered a facilitator in implementing healthcare innovation and competencies (Lavoie et al., 2022; Parmar et al., 2022).

Institutional bureaucracies: Bureaucracies are typically characterised by formal rules and hierarchical structures, which can be advantageous and disadvantageous. For example, established formal structures are important for the success of any new intervention. However, on the other hand, bureaucratic rules can be inflexible and slow to change to accommodate new interventions. It is therefore important to understand the institutional bureaucracies, leverage their advantages, and create collaborations. This kind of hierarchical relations between healthcare providers working at different organisational levels was cited to slow the implementation of oral healthcare intervention (Niesten et al., 2021; Parmar et al., 2022).

Policies and guidelines: Existing policies and guidelines may hinder the accommodation of the new interventions, especially if they do not align with the institutional goals. It is therefore necessary to create policies and guidelines to guide the implementation of the competencies and for ease of progress monitoring. This calls for working collaboratively with the key stakeholders. The participants in this study felt that developing standardised policies and guidelines would help guide the effective implementation of the competencies.

Disparities in service delivery: Institutional disparities can be in resources, organisational culture, training, and education, among many others. Some institutions may have ample resources and funding compared to others, and implementing new interventions becomes easy. On the other hand, some institutions may have a culture of embracing change and innovation, which may determine how well new interventions are embraced. Institutions with more resources may be able to offer training and education to their staff, leading to better implementation of interventions. In this case, the participants felt disparities in service delivery in managing the ICU, services offered and the practice.

Multidisciplinary collaboration: Multidisciplinary collaboration can act as a facilitator towards implementing the new competencies where every team member is made to understand their role and work together towards effective and successful implementation. The participants felt multidisciplinary buy-in should be sought to implement the competencies successfully. In this case, the doctors, intensivists, and all the teams work closely with the nurses. This is confirmed in the literature, where multidisciplinary involvement contributed to implementing the nurse practitioner role (Torrens et al., 2020).

Mentorship/Preceptorship: Mentorship and preceptorship can play important roles in successfully implementing the competencies. More experienced nurses should work with the less experienced to provide guidance and support as they navigate the complexities of implementing the competencies. Mentorship helps build a continuous improvement culture, resulting in a more skilled workforce. The participants in this study felt that establishing mentors would help implement and sustain the competencies. The role of mentorship in support of health systems in SSA is strongly supported in the literature (Feyissa et al., 2019; Manzi et al., 2017).

8.3.3 Micro-level barriers and facilitators

The following key themes were derived at the micro level. They include knowledge gap, resistance to change, attitude, recognition, and motivation.

Knowledge gap: The knowledge gap renders nurses with a lack of understanding of the requirements and consequently lack motivation and confidence to implement them. This is congruent with the findings in a study to determine the barriers and facilitators in implementing a competency-based curriculum in Vietnam (Nguyen et al., 2022). Training and education are, therefore, key in preparing the nurses to implement the competencies.

Resistance to change: Nurses may resist new competencies if they perceive them as unnecessary or are comfortable with their current practices. In this study, resistance was foreseen more by nursing leadership. Similar findings are reported in the literature (Busca et al., 2021; Nguyen et al., 2022; Tappen et al., 2017).

Attitude: refers to a person's feelings and beliefs about a particular subject or situation and can influence their behaviour and decision-making. Attitude is strongly related to resistance to change. Interventions towards a change of attitude need to be instituted to successfully implement the competencies. Participants in this study felt the attitude of ICU nurses and those of multidisciplinary team would impact the implementation of the competencies. This is supported by literature (Fischer et al., 2016; Karrer et al., 2020; Seckler et al., 2020). Therefore, one of the suggested implementation strategies should be geared towards a change of attitude (Fischer et al., 2016).

Recognition and motivation: Recognizing and rewarding nurses who demonstrate the competencies can motivate them to continue striving and motivate others to adopt them. In this study, participants felt motivation could be given to the nurses who completed the competencies by remunerating them or through incentives. This finding is consistent with a study on facilitators and barriers to implementing a multicentre nursing competency framework where incentives were felt to be a facilitator towards the implementation (Lavoie et al., 2022). Low motivation was also cited as a barrier in a study exploring facilitators and barriers towards implementing multidisciplinary care pathways in primary care and implementing evidence-based clinical guidelines, respectively (Correa et al., 2020; Seckler et al., 2020).

8.4 Strategies for rolling out the competencies

The discussion around strategies of rolling out the competencies yielded seven themes that bear some similarities to facilitators' implementation of the competencies and strategies towards overcoming the barriers.

Communication was seen as one of the key strategies in the roll out of the competencies. This involves creating awareness and informing key stake holders of their requirements and roles in the new competencies (Dragoo & Barrows, 2016). This would increase buy-in and decrease opposition to the rollout of the competencies. This could be performed through training, forums such as workshops, conferences, and publications.

The findings in this study indicated a need for standardised assessment and assessment tools to assess the nurse's achievement of the competencies and reveal any knowledge gaps. This would help provide consistency and objectivity in the assessment (Cormican et al., 2023). The findings are consistent with a study on perceptions and barriers to competency-based education in postgraduate medical education where inconsistencies of assessment tools and faculty's lack of knowledge on the use of assessment tools were indicated as barriers and recommendations for review of the tools suggested (Crawford et al., 2020). Various assessment methods recommended in the literature include Objective Structured Clinical Examinations (OSCE), self-assessment, scenario simulation, role play, observation, and mentor evaluation (Fukada, 2018; Øvrebø et al., 2022). For example, the UK's competency framework for ICU nurses uses observation methods against the checklist for competencies as the assessment method (Deacon et al., 2017). However, the assessors can combine with other methods like probing questions, simulation, reflective practice, and portfolio (Deacon et al., 2017). Several assessment tool development methods have been suggested in the literature to include consensus methods and collaboration between clinical sites and education institutions (Gill et al., 2017; Øvrebø et al., 2022). Nevertheless, the most important thing is to have a tool that reflects the competencies (Øvrebø et al., 2022).

According to the participants in this study, simulation-based learning was one of the methods considered to teach competencies to nurses. This is consistent with literature where simulation is preferred in competency-based education (Fukada, 2018; Serafin et al., 2021). Simulation-based education involves imitating real patient cases and scenarios where students can practice safely

without fear of harm (Moabi & Mtshali, 2022). However, this may be a challenge in a resource-constrained country like Kenya as it calls for resources like well-equipped clinical simulation laboratories and competent facilitators (Moabi & Mtshali, 2022). Nevertheless, low-fidelity manikins and standardised patients could still serve the purpose.

Ongoing support in the clinical areas for the nurses was also a key finding in this study. This would help in the effective practice and sustainability of the competencies. The support could be raising mentors and preceptors, electing people passionate about the competencies as champions, providing CPD and partnering with educational institutions. In this study, the terms preceptorship and mentorship were used interchangeably to mean individuals with experience and expertise to offer guidance and support to other professionals. This is supported in the literature where the two terms have been used to describe nurses responsible for coaching student nurses or newly graduated nurses in clinical settings (Pohjamies et al., 2022). The experienced nurses may be unwilling to take up the role of preceptorship and mentorship because they feel ill-prepared, unsupported and lack confidence (Ward & McComb, 2017). Hence, establishing and preparing preceptors and mentors should be key strategies for rolling out the competencies. The students in the clinical placement have appreciated the role of preceptor and mentors but recommend including discussions and reflections during preceptorship (Øvrebø et al., 2022).

Several studies have supported the role of champions in the positive influence and success of implementing new interventions (Hendy & Barlow, 2012; Miech et al., 2018). CPD is central to nurses' lifelong learning and plays a major role in keeping nurses abreast with knowledge and skills in their practice (Mlambo et al., 2021). In resource-constrained countries, there have been documented barriers towards CPD, including lack of funding, time, workload, and staff replacement while in training (Simkhada et al., 2023). Institutions should be able to provide ongoing CPD support to their nurses through time and resource allocation (Mlambo et al., 2021). Another modality that could work is holding inhouse CPD that does not require nurses to leave the workstation. In Kenya, nurses and midwives must complete 20 hours of CPD every year to maintain their registration. Completion of the competencies by ICU nurses could be structured to reflect CPD points, and this could serve as a motivation to pursue the competencies.

One of the study's findings was the importance of stakeholders' involvement and collaboration as a strategy to help implement competencies. These stakeholders include the ICU nurses, the NCK,

the government through the Ministry of Health, the NNAK, the ICU Chapter and training institutions. Creating awareness of the competencies among the stakeholders would help in their buy-in and consecutively provide educational support in the roll out (Jippes et al., 2012; Rosa et al., 2020). The move towards competency-based education is one of the governments of Kenya's agenda, which could lead to their buy-in into the competency framework (National Curriculum Policy, 2018).

Strong leadership is required to champion the successful implementation of the competencies. It is not unusual for competencies to be opposed by the stakeholders, and therefore, leaders should be well prepared for any eventuality and create a culture of change (Cormican et al., 2023; Dragoo & Barrows, 2016). The risk of opposition may be reduced by the implementers creating awareness among all the key stakeholders and seeking to clarify any questions and uncertainties (Dragoo & Barrows, 2016). The importance of leadership in implementing competencies is also highlighted by Stoffman (2022) in his study on overcoming barriers to implementing competency-based medical education. The implementation team should be able to champion and promote the implementation process (Correa et al., 2020). This team would help coordinate processes, provide training, and engage stakeholders (Rosa et al., 2020). However, certain leadership skills, such as communication and teamwork, are highly recommended in such a team (Rosa et al., 2020).

Clustering the competencies into themes and using a phased approach to roll out the competencies was another strategy suggested by the participants. This strategy is consistent with other settings like the UK, where the ICU nurses' competencies have been put into three levels, whereby the nurse must complete one level before moving to the next level (Deacon et al., 2017). Lakanmaa et al. (2012), in their effort to solicit competency requirements for ICU nurses, came up with four domains: skill base, knowledge base, attitude and value base.

8.5 Involvement in the roll-out of the competencies

The participants were asked how they would support the roll out of the competencies. Two major themes were derived from this, including support in the novice nurse's clinical areas and participation in mentorship/ preceptorship training programs. Those who worked in the clinical areas pledged their support of novices and nurses transitioning into their ICUs once they had completed the competencies. The participants who worked in the training institutions stated that

they would be glad to participate in the training of preceptors. The NCK representative advocated for disseminating the competencies across the country and pointed out that the competencies would help revise the ICU training guidelines.

8.6 New contributions

This study made original contributions to the body of knowledge in several ways. These are discussed below:

Firstly, an integrative review of ICU nurses' competencies/ competency frameworks globally revealed that no studies of this kind have been conducted in Kenya. This is the first study of a kind in Kenya.

Secondly, according to the reviewed studies, competencies/ competency framework development is terminated at the point where competencies are identified. To the best of my knowledge, this is the first study that has gone further to investigate the potential barriers and facilitators towards implementing the identified competencies from the key stakeholders and suggest strategies for implementation. The findings could help inform effective and sustainable implementation strategies.

Thirdly, using the macro, meso and micro levels implementation framework to explain the barriers and facilitators is a unique contribution of this study to the body of knowledge. This would help various healthcare stakeholders address these barriers at their specific levels. In most studies, implementation frameworks have been used to inform the research process and develop the data collection tools (Muddu et al., 2020; Safaeinili et al., 2020).

Fourthly, while modification of Delphi has continued to evolve, none of the studies evaluated relied on a predetermined set of competencies derived from the literature to inform the first round of Delphi. Additionally, the participants were asked to add any other competence they deemed important, which was added in the second round of Delphi. This consideration was made based on the research context; the concept of competence was unfamiliar, and therefore, a baseline of the competencies was necessary. This methodology could be replicated by researchers from similar contexts. A final consensus meeting was also held with a heterogeneous group of participants, including representation from clinical practice, education, and the country's nursing regulatory

body (NCK). This representation is foreseen to propel the implementation of the recommendations.

Finally, crowdsourcing as a recruitment method has gained popularity in other fields, but there is a dearth of literature on its utilisation in nursing. To my knowledge, no study has utilised crowdsourcing in developing ICU competencies.

8.7 Summary of the chapter

This chapter has discussed the study findings to include the two rounds of the Delphi and the virtual consensus meeting. All the competencies in the two rounds achieved consensus, including the 12 additional competencies suggested by the participants. However, some competencies were notably rated higher than others, and others were unexpectedly low, which could be Kenyan context related. The key potential barriers and facilitators highlighted included political influence, stakeholders' involvement, communication, lack of resources, restrictive scope of practice, curriculum review and training of nurses. Further attitude of nurses and resistance to change would impede the roll out of the competencies. In this vein, the following key strategies would help in the roll out if instituted; creating awareness of the competencies to the key stakeholders, establishing champions in the clinical areas, establishment of standardised tools for assessment which are aligned to the competencies, establishment of preceptorship/ mentorship programs, and widening the scope of practice for ICU nurses. The participants pledged their support to the rolling out of the competencies through mentorship of nurses in the clinical areas and participation in the preceptorship training program if called upon. This study has brought about new contributions in the nursing field, and this has been discussed in the chapter. The next chapter concludes the study by discussing the study's recommendations, limitations, and dissemination plan.

CHAPTER NINE: CONCLUSION, RECOMMENDATIONS, LIMITATIONS AND DISSEMINATION PLAN

9.1 Introduction

This chapter concludes by summarising the key findings in line with the study's aims and objectives. The study's main contributions to the existing body of knowledge will also be discussed. The limitations of this study will be highlighted, and recommendations will be provided. Opportunities for future research will also be proposed. Finally, the researcher will briefly reflect on the research experience and lessons learnt.

9.2 Summary of the key findings

This study aimed to identify and establish consensus among nurses on competencies required by registered nurses in Kenyan ICUs. The specific objectives of this study were to 1) Describe the competencies of RNs working in ICU through an integrative literature review; 2) Compile a preliminary set of competencies based on the obtained data; 3) Gain consensus on a set of competencies for nurses working in ICUs in Kenya; 4) Elicit potential barriers and facilitators towards the implementation of the competencies 5) Agree on implementation plan within which to apply or use these competencies.

The results indicate that most ICU nurses' competencies are universal and apply to many cultural contexts, including Kenya. These include general knowledge, assessment, and management of systemic disorders competencies, competencies surrounding life-threatening emergencies in the ICU, technological competencies, and evidenced-based practice competencies. The structuring and choice of competencies were informed by the three domains of Bloom's Taxonomy and partly by Benner's Domains of Practice. This study, however, highlights competencies that cannot be blindly applied from one country to another as they are culturally specific and, therefore, may require contextual tweaking. These include competencies in palliative and end-of-life care, including patients and their families in pain management, nurses as change agents, and cultural/spiritual sensitivity in the care of patients and families. Further findings show that Kenyan

ICU nurses yearn for autonomous practice like in developed countries and hence suggested the inclusion of competencies on the performance of invasive procedures, prescription of medications, and inter /intra hospital transfers.

Exploring the potential key barriers and facilitators towards implementing the competencies from the macro, meso and micro levels was also important. This would help in coming up with an effective implementation plan and strategies. While most of the barriers and facilitators were like those cited in other studies, the key barriers in this study were a lack of resources, political influence, lack of stakeholders' involvement, resistance to change, and a lack of recognition and motivation for the nurses.

In the final stage of this study, the participants agreed on an implementation strategy through a consensus meeting. The key strategies suggested included communication to all the key stakeholders and their involvement in the rollout, having standardised assessment tools, ongoing support of nurses in the clinical areas through CPD, mentorship and preceptorship, strong leadership that would champion change, recognise, and reward efforts, and clustering of the competencies into levels. Again, these were like strategies used in the rollout of new guidelines and evidence-based practice in healthcare. However, what stood out was the issue of electing champions in the clinical areas who would propagate the competencies, cluster the competencies, and recognise and award the key supporters.

In conclusion, this study has provided competencies for ICU nurses and factors that may enable or hinder the implementation of these competencies. Further, it has provided strategies that could be undertaken to ensure the effective implementation of these competencies.

9.3 Recommendations for clinical practice, education, policy, and research

9.3.1 Clinical practice

Based on the findings of this study, the following recommendations are made for clinical practice:

Institute standardized competency framework for ICU nurses in Kenya based on the consensus achieved in this study. The competencies should cover general knowledge, assessment,

management of systemic disorders, life-threatening emergencies, technological skills, and evidenced-based practices. The competencies should guide the orientation programs, transition programs for the ICU nurses. Evaluation and assessment tools for ICU nurses should be informed by the competency framework. There is need for professional development modules of the competencies for the ongoing nurses. A preceptorship program should be established to strengthen the competencies implementation and evaluation initiative. In addition, strong leadership support, recognizing and rewarding efforts of ICU nurses in acquiring and applying competencies should be advocated for. Establishment of a system for electing champions in clinical areas who will lead the implementation of competencies and recognize, and reward key supporters would help in smooth implementation.

9.3.2 Education

Based on the findings of this study, the following recommendations are made for education:

Training institutions should integrate the identified competencies into nursing education curricula at both undergraduate and postgraduate levels, emphasizing the need for cultural adaptation and awareness. Training on cultural sensitivity among ICU nurses, addressing competencies specific to palliative and end-of-life care, pain management involving patients and families, and the importance of cultural/spiritual sensitivity in patient and family care should be emphasized in the ICU curriculum and in the professional development modules. There is need to establish ongoing CPD programs that focus on reinforcing and updating ICU nurses' competencies. Use of simulation-based learning to augment skills training owing to limited clinical sites in the research context should be enhanced in the training institutions. The training guidelines for ICU nurses and curriculum as well as the assessment tools should be reviewed to reflect the competencies.

9.3.3 Policy

Based on the research findings, the following recommendations are made to the policymakers:

The government should increase resource allocation in the ministry of health to address identified barriers such as the lack of resources. The resources would help in training, equipment, and infrastructure improvement in ICUs. The NCK, should formulate policies that promote stakeholder engagement, involving nurses, healthcare administrators, policymakers, and other relevant

stakeholders in the planning, implementation, and evaluation of competency-based programs for nurses.

9.3.4 Research

Based on the research findings, the following recommendations are made for future research:

More studies should be carried out to assess the long-term impact of the implemented competencies on patient outcomes, nurse satisfaction, and healthcare system effectiveness. Follow-up research could be carried out to develop ICU settings-specific competencies, e.g., neonatal ICU competencies. A study to explore patients' and families' perceptions of competence requirements for ICU nurses would strengthen the current study by injecting the voice of the patient and their families. The researcher's post-doctoral work could include a study to determine the implementation of the competencies across the country and their impact on the quality of care and patients' outcomes. In SSA, there is a dearth of studies on competencies for ICU nurses, and therefore, the findings of this study could be replicated in similar contexts, such as Kenya.

9.4 Limitations

This study had a few limitations, which are outlined below:

- This study did not include ICU patients and their families as key ICU stakeholders, which could have a bias on the competencies. Nevertheless, a study where patient and their families were part of the stakeholders was included in the literature review (Henriksen et al., 2021)
- Only articles published in English were considered in this study, and relevant studies published in other languages may have been missed. However, articles that might have been published in Kiswahili, the Kenyan main language, were searched for to make sure this work had not been done before.
- A convenience sample of participants was used, which may not be representative of the ICU nursing workforce in the country. Traditionally, Delphi uses nonprobability sampling (Hasson et al., 2000). However, heterogeneity of the sample was considered to minimise the risk of bias.

- The identification of barriers and facilitators might have been context-specific to the time of the study and could change over time due to evolving healthcare systems or socio-political factors.

9.5 Dissemination plan

The findings of this study will be disseminated to various ICU stakeholders abiding by the ethical considerations of anonymity and confidentiality.

- The study findings will be presented at the upcoming University of Salford SPARC conference.
- The study findings will be disseminated to the Aga Khan University faculty during Faculty Academic Rounds held weekly.
- Key findings and recommendations will also be shared with the NCK and ICUs nationwide through ICU forums, workshops, and conferences.
- The abstract for the poster presentation at the ICN Congress 2023 to be held in Montreal on 1^{st}-5^{th} July 2023 has been accepted. See Appendix 15 for the ICN correspondence.
- The findings will be presented in national and international nursing conferences.
- Several manuscripts will be developed from this study and shared in peer-reviewed journals for publication, e.g., Nurse Education Today, Nursing in Critical Care, Journal of Clinical Nursing, and Journal of Intensive Care, among many others.

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APPENDIX 1: REFLECTION OF THE PHD EXPERIENCE

In this section, I reflect on my PhD experience. I will reflect on the different aspects of my PhD journey and learning points.

My PhD journey started in 2019, hardly a year after completing my master's in nursing education degree. A sponsorship opportunity came knocking, and I embraced it without hesitation. As a lecturer in a nursing school, it has always been my dream to achieve the highest qualification in academia. I had worked in an ICU for nearly ten years before transitioning to university teaching. I am passionate about critical care nursing and wanted to pursue a project impacting critical care nursing education in Kenya.

After much consultation with my supervisors and a lot of literature review, I settled on *"Constructing and validating a national Kenyan competency framework to ease the role transition of registered nurses into adult intensive care units using a modified Delphi study*." This was driven by my experience when I started working in the ICU. I was an NGRN with no specialisation. I was not taken through any formal orientation; instead, the unit used a buddying system, where nurses worked in temporary buddies during a shift. It was a frustrating experience. When I joined the academy, I realised that the training curricula focused more on content than competencies, focused towards covering the content rather than the end product, the nurse. Kenya is also transitioning from an-examination-oriented education system to a competency-based one.

Putting together a proposal was a bit of a challenge. I remember occasional comments from my supervisors to stop using colloquial language. My writing skills have improved through the years with the guidance of my supervisors, coupled with the University of Salford sessions on writing skills.

I completed my internal assessment at the end of one year of my study. My supervisors were very supportive, and the examiners gave me constructive feedback. My topic changed to *"Construction and validation of national Kenyan ICU competencies for registered nurses working in adult intensive care units: a modified Delphi study*." There was also a suggestion to include literature beyond ten years.

I completed my Internal Examination successfully in my second year of study. However, my topic had to change slightly after receiving feedback from my examiners. There was a feeling that

validating the competencies within the given time for a PhD was impossible. I changed the topic to *"Identifying and establishing consensus with the competencies required by ICU nurses in Kenya."* I also stopped focusing on adult ICUs only since most ICUs in Kenya are mixed.

I have learned a lot in my search for literature. Initially, I conducted a scoping review since the concept of competencies was not well understood in Kenya. However, my examiners advised that I change to integrative review as it allows the inclusion of diverse methodologies. Integrative review also uses diverse data sources by employing theoretical and empirical research. A scoping review, however, is best placed for mapping and clarifying concepts. Initially, it was a setback to me not knowing how to approach it and trying to understand the difference. My supervisors helped me to navigate through it.

I boldly took the step of utilising the Modified Delphi technique in my study. I had not had anyone within my circles use Delphi; most of them had no idea what it was all about. I was very lucky to have one of the examiners in my internal examination who couples as a critical care expert and a Delphi expert. She kindly guided me through and shared resources even after the internal examination. As luck would have it, she became my second supervisor after my main supervisor left the University of Salford. I was able to work through the Delphi questionnaire with her. However, she only lasted two months at the University before leaving, and I had to be given another equally supportive supervisor. Another bold step I took was using crowdsourcing as a recruitment method for the experts. This, however, did not work out well, and I had to augment it with a snowballing technique.

Including a focused group virtual consensus meeting at the end of my data collection was a game-changer, too. This helped to build my communication, organisation skills and my confidence. I was supposed to maintain anonymity during the virtual meeting by giving pseudonyms to the participants, but alas! This couldn't work. The participants included ICU nurses working in hospital settings and companies, NCK representatives and ICU nurse educators. Surprisingly, they knew each other by voice and were super excited to interact. They referred to each other by name and socialised a bit before the meeting began. This was advantageous as they interacted freely with each other and brought up great ideas. They kept on building their arguments from each other's ideas. This contrasts the notion that when participants in a focus group are at different levels, the chances of intimidation of the juniors are high.

Data collection was difficult, and the first round's attrition rate was not as expected. Automated weekly email reminders were made, which did not help much. The participants who completed the first round were given airtime bungles worth 10 USD, which was a great motivation for participation in the second round. Attrition in the second round of Delphi was negligible. This was a learning point: extrinsic motivation is preferred to intrinsic motivation.

I have also learned to push my participants through frequent and shorter reminders of four days to respond to the questionnaire, which has paid off. The second round response rate timeliness was better than the first round.

I conducted a thorough literature review and developed a set of competencies. I converted the competencies to a five-point Likert scale survey monkey questionnaire ranging from “not important” to “essential”. There was a very slow response, necessitating me to devise a supplementary recruitment method, which was snowballing. One of the participants also pointed out to me that the questionnaire was long and sometimes accessibility due to lack of network connectivity could be an issue. I have also considered giving the participants bundles worth a thousand shillings. This will be covered by a small dean’s fund grant that I won to support my study.

Things went well because I had an outline of the timeline, which helped me realise I was behind. I also hold monthly meetings with my supervisors, and they were able to pick this, too. One of the participants gave me a heads-up of what could be a barrier to participation, and this has helped me devise a way of supporting the participants. The supplementary recruitment method has also helped me get more participants. I should have initially thought of different recruitment strategies and supported the participants in accessing the network.

This PhD journey started at the height of COVID-19. I missed going to the UK for my IA and IE and had to defend online via Microsoft Teams. This was not easy, but I managed. It was very hard to work from home and balance between work, family, and studies.

My PhD journey has taught me many skills, among them time management. Initially, I was constantly behind schedule regarding my set timelines. Over time, I have learned to re-adjust the time plan for the study and follow the set plan. For example, the response rate for the first round was taking longer than projected, and I had to decide to stop it. This decision was guided by the timelines (the Gantt chart) and the fact that there was heterogeneity among the participants and the

regions in the country. I learned how to strike a balance between work, family, and my PhD. I learnt to say no and decline some tasks and invitations, which has made me lose some friends along the way. People have different ways of maintaining sanity through the PhD journey. There is a slang saying that PhD means "*Permanent Head Damage*". Occasionally, I used to experience imposter syndrome, and not once or twice I felt like quitting.

I learnt to share my PhD project with whoever was ready to listen to me, even my children. I felt I was on the right track if they understood my work. Learning to cope with the pace of a Doctorate can be daunting, and I had to discover strategies that would keep me sane through the journey. For me, hiking, trekking, and going to the gym worked. I enrolled in the gym and at least made sure I visited there at least twice, if not thrice a week. I also ensured I hiked at least quarterly a year, which always refreshed my mind. Initially, I used to feel guilty when I was away from my screen, not focusing on my PhD. Out in the gym, you should be writing! Out hiking, you should be writing! I learned to ignore all those voices.

I learned to trek for long distances. I could listen to YouTube podcasts related to my PhD. It was during my PhD that I hiked the second highest mountain in Africa, Mount Kenya, up to Point Lenana peak, which is 4985 metres above sea level. I felt accomplished and knew I could accomplish anything in this world with a positive mindset. I also did the longest trek in a day, 50 kilometres (31.07 miles); it was mind-blowing for me.

Having great supervisors also counts a lot for a PhD student. I must say I was very lucky to have great, supportive, understanding, and non-judgemental supervisors. Apart from wanting to know my PhD progress in our meetings, they also wanted to know how I was coping at work and with family responsibilities.

My fellow PhD colleagues were also a source of support. We could meet and laugh over silly issues and happenings in our lives. We also celebrated each other's milestones, shared resources, and checked on each other. We became a tight community over time. I recount one day my colleague and friend shared with me how she was trying to open the lift with her car key and was stuck there for minutes wondering why it was not opening. She later realised she was supposed to press the lift button.

Conclusion

Each person's journey is unique, and I must acknowledge that my PHD journey has been a rollercoaster ride. A fall is not a sign of intellectual weakness but an occasion to rise and take another step forward. This journey has taught me a lot about research, critique, written and verbal communication, time management, contributing to the body of knowledge and making a difference in nursing education and practice in Kenya. It was a tough yet memorable journey. Given a chance, I would pursue my postdoc immediately before the momentum goes down.

APPENDIX 2: PARTICIPANT INFORMATION SHEET

Title of study: Identification and validation of competencies for nurses working in Kenyan Adult Intensive Care Units: A modified Delphi study

Name of Researcher: Beth Waithiegeni Waweru

1. Invitation paragraph: My name is Beth Waweru. I am a doctoral student at the University of Salford, Manchester, UK, reading a PhD in Nursing Studies. I would like to invite you to participate in this project being conducted in Kenya under the supervision of Professor Jacqueline Leigh and Dr. Stephens Melanie, with Dr. Eunice Ndirangu as my local advisor.

It is important for you to understand why the research is being done and what it will involve, and this information sheet provides that information. Please take time to read the information carefully before you decide whether or not you wish to take part. You are welcome to discuss this project with others if you wish before you make your decision. Please contact us at Beth.waweru@edu.salford.ac.uk) or telephone +254721926819 if there is anything that is not clear or if you would like more information.

2. What is the purpose of the study? The purpose of this study is to identify and validate competencies that registered nurses working in adult Intensive Care Units (ICU) in Kenya need to possess in order to provide safe and quality health care. The researcher, therefore, wishes to seek consensus from ICU experts and stakeholders on identified competencies collected from an in-depth scoping review. This study is envisioned to benefit the nursing profession in general by providing a foundation for competency-based curriculum development, training, and assessment of the practice of the nurses working in the ICU, with an overall outcome of safe and quality care.

You may be aware that in Kenya, our nursing curricula describe the content to be covered by the learners more than the expected competencies from the learners on completion of the program. This is thought to have led to disparities in the training and practice of nurses.

To this end, the researcher has developed a preliminary set of ICU competencies informed by the literature and will be seeking your opinion on each of the listed competencies as to whether they can apply to our ICU nurses. There is a provision for you too to suggest any other competencies you deem important.

3. Why have I been invited to take part? You have been invited because of your expertise in ICU practice, ICU education, and regulation of ICU training or because you work closely with nurses in the ICU as an intensivist or doctor.

4. Do I have to take part? Taking part in this study is voluntary, and refusal to agree to participate will involve no penalty. It is up to you to decide whether or not to take part. If you decide to participate, you should keep this information sheet for reference. In addition, you will be asked to provide consent to actively participate in the study. If you consent, this will be sent via a Survey Monkey link with an agree button.

5. What will happen to me if I take part? After you agree to participate in this study, you will be sent a Survey Monkey link with a questionnaire where you will be asked to rate items in the knowledge, skills, and attitudes on a 5-point Likert scale and submit. This may take an estimated ten minutes to complete. The researcher will analyse the data and modify the tool, then send it to you again after two weeks via a link for rating, and then you submit it again. The researcher will again analyse the data and refine the tool for the third round. The third round, the final round, will involve several virtual focus group meetings with various participants from the previous rounds to try to reach a consensus. The groups will have no more than 12 participants who will engage in a virtual discussion about the competencies via a Zoom meeting as directed by the researcher. The meeting is envisioned to take a maximum of two hours. This will be a recorded meeting, but the participants will not be identified by names but by unique codes. All the participants from the previous rounds are eligible to participate in this final round if they consent. However, participation is voluntary.

6. Expenses and payments? The only form of compensation for participating in this study will be data bundles worth a thousand Kenyan shillings to enable you to participate in the Zoom meeting.

7. What are the possible disadvantages and risks of taking part? There are no risks or disadvantages to taking part in this study.

8. What are the possible benefits of taking part? There are no direct benefits to participating in this study. However, it is envisioned that this study will assist in providing a national Kenyan agreed set of competencies that registered nurses working in ICU need. These competencies can also be used to develop a national competency framework for ICU nurses' education and practice. This may help ensure standardized, safe, and quality care in our ICUs. Your participation in this research will help us to achieve that.

9. What if there is a problem? If you have a concern about any aspect of this study, you should ask to speak to the researcher by email (B.Waweru @edu.salford.ac.uk), who will do their best to answer your questions.

Following this, if you have any issues or complaints, you may contact the research supervisor, Professor Jacqueline Leigh, by email (j.a.leigh4@salford.ac.uk)

If the matter is unresolved, please forward your concerns to Professor Andrew Clark, Chair of the Health Research Ethical Approval Panel, Allerton Building, Frederick Road Campus, University of Salford, Salford, M6 6PU. Tel: 0161 295 4109. Email: a.clark@salford.ac.uk

10. Will my taking part in the study be kept confidential? All information which is collected from you during the research will be anonymous.

Further to this:

- Your data will be stored safely, specifically:
    a. Hard paper/audio data will be stored in a locked cabinet within a locked office, accessed only by the researcher.
    b. Electronic data will be stored on a password-protected computer known only by the researcher.

- Your data will be used solely for this study only.

- Your data will be accessible only by authorized persons such as researchers within the team, supervisors, and regulatory authorities (Kenya Ethics committees and the Kenya National Commission of Science and Technology (NACOSTI).

- Your data will be retained for a maximum of 5 years (after the hand-in date) before being safely disposed of.

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11. What will happen if I don't continue with the study? Taking part in this study is voluntary, and refusal to agree to participate will involve no penalty. You can also withdraw at any time without giving a reason and without affecting any benefits you are entitled to.

If you withdraw, you should note that the University will continue to process the information you have already provided for up to three years. It will only do this for research purposes and in an anonymized way so that you cannot be identified.

12. What will happen to the results of the research study? The results are part of the PhD program of study for the researcher. The results will also be disseminated through peer-reviewed journals and conferences; however, you will not be identified in any report/publication.

The University may keep the data and use it in future studies. If we do this, it will only be in a completely anonymized fashion.

13. Who is organising or sponsoring the research? Any organization does not sponsor this research.

14. Further information and contact details: Professor Jacqueline Leigh
Professor of Nurse Education Practice, School Health & Society
Executive Coach, Leadership Developer, Deputy Chair Healthwatch Salford
Room MS1-43MarySeacloeBuilding University of Salford M6 6PU
T:0161 2956475

Email: j.a.leigh4@salford.ac.uk

National Commission for Science, Technology, and Innovation

Telephone: 0713 788 787 / 0735 404 245

E-mail: dg@nacosti.go.ke / registry@nacosti.go.ke, **Website:** www.nacosti.go.ke

You may save or print a copy of this participant's information sheet for your records.

Thank you for taking the time to read the information sheet.

Beth Waweru
PIS 21/09/2021 v3

APPENDIX 3: LITERATURE DATABASES SEARCHED

MeSH, Thesaurus, and Search Terms

Databases	Thesaurus or MeSH Headings & other search terms
Academic Search Complete	Critical Care Nursing Professional Competence
CINHAL Complete	Critical Care Nursing Professional Competence
Health Source: Nurse Academic Edition	Intensive Care Nursing Competence Professional
MEDLINE with Full Text EbscoHost & Full Text Ovid	Critical Care Nurs* Professional Competence
PubMed	Intensive Care Nursing Competence Professional
Science Direct	Critical Care Nurs* Intensive Care Nurs* Professional Competence
Scopus	Critical Care Nursing Intensive Care Nurs* Professional Competence

APPENDIX 4: DOMAIN-BASED ARTICLES

Authors	Design	Purpose/Question	Domains of Professional Competence
Ääri et al. (2008)	Literature Review	To define and describe the concept of competence To determine the domains of competence that have been investigated	Two Main Domains Clinical competence: Knowledge base Skill base Subdomains: nursing, clinical guidelines, and nursing interventions Professional competence: Attitude and value base Knowledge base Subdomains: ethical activity, decision-making, developmental work and collaboration
Camelo (2012)	Literature Review	To identify and analyse professional competencies in ICUs	Organisation and planning of care Complexity of care Decision-making Leadership in a situational context (teamwork) Communication (teamwork) Continuing education Human management Material management
Camelo and Chaves (2013)	Qualitative	To determine how ICU nurses perceive teamwork as a professional competency	Teamwork as a managerial tool (as in the management of patient care) Communication Interpersonal relations

Copnell (2008)	Qualitative post-structural inquiry	To understand nurse perceptions of 'knowledgeable practice' in ICU and how this relates to being a 'good nurse'	Two entities: Knowing reasons for interventions Knowing how to perform activities
Hadjibalassi et al. (2012)	Instrument Development Qualitative and Quantitative	To develop and test an instrument to determine the competencies of ICU nurses in Cyprus	Leadership/management Decision-making and management of emergencies Provision of care and professional practice Ethical practice
Kamel et al. (2011)	Instrument Development Qualitative and Quantitative	To develop and test an instrument for ICU nurses to self-assess their competence in Egypt	Personal and professional Professional and ethical Safety and injury prevention Comprehensive nursing care Interpersonal relationships Managing technical equipment Critical thinking and research utilisation. Teaching and coaching Work management
Lakanmaa et al. (2012)	Delphi method - based on Ääri et al. (2008)	To identify competence requirements for ICU nursing	Knowledge base Skill base Attitudes and values base Experience base Subdomains: nursing care, clinical guidelines, nursing interventions, ethical activity, decision-making, development work, collaboration Personal base

			Subdomains: humanity and ethicality, way of working and work motivation
Lakanmaa et al. (2014)	Instrument Development- Quantitative and Qualitative	To develop and test a scale to assess basic competence in ICU nursing competence in this sense is preliminary competence to practice in an ICU	Clinical competence Nursing care Clinical guidelines Nursing interventions Professional competence Ethical and Legal activity Decision-making Development work Collaboration
Lindberg (2006)	Qualitative	To understand competence from a staff point of view	Five ways of understanding: Ability to cooperate Being able to perceive situations correctly Being aware of limitations and abilities Being able to act accordingly Being able to disregard technology when necessary to see the patient Two ways of development: Personal traits Organisational climate

Pietro et al. (2014).	Quantitative	To identify and describe the socio-demographic and academic profile of ICU nurses, but also asked about professional skills needed to work in ICU	Knowledge Leadership teamwork Managing Caring Cognitive Decision-making	situations Skills

APPENDIX 5: DELPHI ROUNDS QUESTIONNAIRES

ROUND ONE DELPHI SURVEY LINK

https://www.surveymonkey.com/r/H2TFKSK

ROUND TWO DELPHI SURVEY LINK

https://www.surveymonkey.com/r/Y5VF727

APPENDIX 6: POSTER FOR CALL FOR PARTICIPATION IN THE STUDY

APPENDIX 7: SAMPLE EMAIL TO PARTICIPANTS

Dear Rachel,

Thank you for agreeing to participate in my study.

Attached, please find the participants' Information sheet for your reference.

Please access the survey through the link below:

https://www.surveymonkey.com/r/YJMXT2B

Best regards

Beth

APPENDIX 8: CONSENSUS MEETING AGENDA

Dear Participant,

Thank you for your support through the journey of development of the ICU competencies for Kenyan nurses. Your participation in the Delphi rounds is appreciated. I have been able to come up with a set of ICU competencies. This virtual consensus meeting is the final stage of this study, and your participation will be highly appreciated.

Date 30th December 2022, 0800hrs seems to favour many people as per the doodle invite. I am requesting you to make yourself available for the meeting. A Microsoft Teams link will be sent to you upon confirmation of attendance.

MEETING AGENDA

- To present the competencies
- To discuss the barriers and facilitators towards implementation
- To discuss rollout modalities.
- Looking forward to seeing you there

Merry Christmas
Beth Waweru

APPENDIX 9: DELPHI ROUND ONE CONTENT ANALYSIS

Other competencies deemed important by the participants.

STATEMENT	CODE	COVERED IN QUESTIONNAIRE
Intubation	1. Invasive procedures	
Nurse participation in morbidity and mortality meetings and RCAs	2. Quality improvement/ Patient safety	Q78,91,92,93,96 ,102,103
Competencies and skills in traumatic life support Competencies and skills in renal replacement therapies such as haemodialysis, PD and CRRT	3. Advanced Trauma/life support 4. Dialysis	Q30&31 Q34
Infection prevention measures	5. Infection prevention	Q77,93,94,95
Competencies and skills in transporting critically ill patients and care in transit	6. Transportation of a critically ill patient	
Ensure Patient Safety: Correct patient identification, Improve the effectiveness of communication and handover Improve the safety of high-alert/high-risk medications Ensuring procedure, correct patient, surgery correct site, Reduce the risk of healthcare-associated infections Reduce the risk of patient harm resulting from falls Infection prevention and control Skills	Quality improvement/ Patient safety (2)	
The nurse needs to know about proper patient handover	Patient safety (2)	
Re-evaluation of a critically ill patient	7. Patient Re-assessment	Q40 (add reassessment)
Knowledge of types and benefits of various physiotherapy techniques performed on ICU patients	8. Physiotherapy	Q65,66
Basics of sign language in case of relatives/patients with challenges.	Communication (7)	Q13,16,17
Insertion of CVC line, intraosseous line	Invasive procedures (1)	

Catheter-associated UTI, Interpretation of lab values Universal precautions Ventilator-associated pneumonia	Infection prevention (5)	Q77,93,94,95
Career progressions on specialized care Mental care for nurses working in ICU	Ambiguous	
Concept of holism in ICU,	Infection control (5) 9. Neuro care and monitoring	
Procedures related to acute increase in intracranial pressures, like monitoring and draining		
Sepsis care in ICU		
When it comes to safety in ICU. The team should have knowledge of infection control	Infection control (5)	
Leadership	10. Leadership	Q20,23,25,26,27 ,36
The nurses possess skills in emergency intubation, but it's not in their scope of practice	Invasive procedures (1)	
Intubation and insertion of central venous catheter	Invasive procedures (1)	
The nurse will be able to team lead a cardiopulmonary resuscitation, The nurse will be able to prescribe emergency drugs	Advanced trauma/ life support (3) Prescription	Q29/30,31
Importance of thermoregulation in NICU. Use of CPAP in NICU/ PICU	11. Thermoregulation 12. Mechanical ventilation	Q56,57,58,59,60 ,62,63,64
Renal replacement therapies like CRRT	Dialysis (4)	
Nurses should be able to make decisions or should have a "say' concerning a patient's care and management	13. Decision making	Q23
It is critical for ICU nurses to learn how to intubate to perform emergency intubations when anaesthetists are unavailable.	Invasive procedures (1)	

In the neonatal ICU, the nurse must demonstrate an understanding of the importance of thermoregulation. In Paediatric and neonatal ICU, the nurse must be able to calculate micro dosages that are weight dependent and use syringe pump solu-drops to administer medications	Thermoregulation (12) 14. Drug administration	Q39
Hyperthermia /hypothermia management	Thermoregulation (12)	
Improvisation of care in recourse-constrained facilities	Ambiguous	
Last office	15. Last office	
Neuro critical care issue troubleshooting	Neuro care and monitoring (10)	
Adjusting mechanical ventilators	Mechanical ventilation (13)	Q63
Placement of PICC lines and midlines	Invasive procedures (1)	
Nurse is able to care for a patient with acute renal failure and is able to perform dialysis and CRRT	Dialysis (4)	

ADDITIONAL COMPETENCIES

CATEGORIES AND FREQUENCIES

- Invasive procedures- Insertion of PICC Lines, CVC lines, midlines and intra-osseous lines
- Intubation (6)
- Competencies and skills in renal replacement therapies such as haemodialysis, PD and CRRT (3)
- Competencies on transportation of critically ill patients (1)
- Management of patients on external Ventricular drain (1)
- Thermoregulation –Management of hypo/hyperthermia (2)
- Management of sepsis (1)
- Leadership (1)

Most significant barriers to agreeing and implementing the national ICU competencies

STATEMENT	CODE	COVERED IN QUESTIONNAIRE
Lack of multidisciplinary incorporation in policymaking	Stakeholders' involvement (1)	
Inadequate resources, Limited manpower	Resources (2)	
Resistance to change	Resistance to change (3)	
Lack of resources	(2)	
Attitude of some nurses	Attitude to change (3)	
Different levels of training and competency	Incompetence (5)	
Availability of resources continuous	(2)	
Political influence	(1)	
Different policies and protocols in different ICUs, open versus closed ICUs, mixed vs adult only ICUs		
Traditional institutional practices,	Variation in teaching and practice (6)	
Lack of EBP mentors	Mentorship (7)	
Work pressure	(2)	
Some services may not be available across all the ICU setups in the country	(2)	
Lack of support from the National Government or County Government to provide adequate resources to implement the National ICU Nursing Competencies across the country.	(2)	
Failure to involve all the stakeholders in training ICU Nurses, e.g., the Nursing Council of Kenya, Government and Private Institutions training nurses, and Government and Private Hospitals offering ICU Facilities.	(1)	

Lack of critical care trained doctors Physician insecurity	**(2)**	
Lack of nursing empowerment	Autonomy (8)	
Time	(2)	
Conflict of interest	AMBIGUOUS	
Nurse to patient ratio becomes a challenge, especially when expected to offer proper and timely care	(2)	
Resistance to change	(3)	
Different managerial approaches in running ICU	Governance (R. L. Lakanmaa et al.)	
Differences in ICU practices within different institutions	**(6)**	
Resource availability and allocation	(2)	
Lack of harmonization on training institutions on contents covered in the ICU course.	Variation practice and teaching (6)	
The willingness of government, private and faith-based institutions towards adopting a national ICU curriculum	(1)	
Commercialisation of healthcare working with Nursing and medical students and residents	AMBIGUOUS	
Current ongoing deconstruction of the role of the nurse (split off all the aspects of the role that nurses traditionally performed, once separated from the whole, the role can be performed by lesser qualified, or equally qualified but cheaper, or unqualified staff)	scope of practice (11)	
Lack of policies to support nursing competencies from the regulatory bodies	(11)	
Finances	(2)	
Inequality in systems of care and management	**(6)**	

Resistance to change	(3)	
Low level of education	(5)	
Resistance to change	(3)	
Lack of policies to support nursing competencies from the regulatory bodies	(11)	
Shortage of nurses	(2)	
Human resources	(2)	
Staff shortages, faulty equipment, high patient-to-nurse ratio	(2)	
Adoption of different protocols in care management and county prevalence on choice of drugs procured	(6)	
Employment of non-trained ICU staff to work in ICU	(2)	
HR policies in different county government	(R. L. Lakanmaa et al.)	
Lack of representation in higher levels	(1)	
Ineffective communication through formal education structures	(10)	
Lack of standard curriculum and inadequate training infrastructure	(6)	
Staff shortage	(2)	
My thinking is that the availability and maintenance of essential equipment would be a barrier	(2)	
Equal representation from both private and government sectors. Most of the time, private institutions are left out, yet they are also needed in decision-making	(1)	
Conflict of interest among nurses and other cadres	(11)	
Workload in the ICU versus staffing,	(2)	

Not all nurses working in our units are ICU-trained	5	
The health worker attitudes towards the Nurses	(1)	
Some restrictive hospital guidelines that do not consider the scope of practice	(11)	
A scope of practice that is not reviewed as per the current evidence	(11)	
Nurse managers who resist change	(3)	
Variations between public and private health institutions in terms of resources available	(2)	
Need to separate paediatric patients from adult patients; all hospitals should have PICUs	(12)	
Bureaucracy	Beurocracy(12)	
Hospital policies and protocols.	(12)	
Superiority Racism	12	
Inadequate knowledge of the most recent updates in ICU competencies	(5)	
Lack of fundamental resources, e.g. syringe pumps, infusion pumps, oxygen delivery devices, etc.	(2)	
Knowledge deficit	(5)	
Conflicting Policies and procedures		
Resources including equipment as well as humans, different levels of training	(2)	
Disparity in resources, workforce and operational policies	(2)	
Shortage of competent ICU trainers that can ensure standards are upheld. shortage of ICU clinical nurses	(2)	

CATEGORIES, SUBCATEGORIES, AND FREQUENCIES

Stakeholders: Lack of stakeholder involvement

Lack of multidisciplinary incorporation in policymaking

Political influence

The health worker attitudes towards the Nurses
Failure to involve all the stakeholders in training ICU Nurses, e.g., the NCK

The willingness of government, private and faith-based institutions towards adopting a national ICU curriculum

Equal representation from both private and government sectors in decision-making

Resources: Limited manpower

- Inadequate resources
- availability of resources continuous
- Resource availability and allocation
- Lack of critical care-trained doctors
- Work pressure
- Some services may not be available across all the ICU setups in the country
- Workload in the ICU versus staffing
- Shortage of nurses
- Finances
- Time
- Variations between public and private health institutions in terms of resources available.
- Lack of fundamental resources, e.g. syringe pumps, infusion pumps, oxygen delivery devices, etc.
- Resources including equipment as well as humans, different levels of training
- Disparity in resources, workforce and operational policies
- Shortage of competent ICU trainers that can ensure standards are upheld. shortage of ICU clinical nurses

Resistance to change

- Resistance to change
- Managers who resist change
- Attitude

Incompetence

- different levels of training and competency

- Low level of education
- Not all nurses working in our units are ICU-trained
- Inadequate knowledge of the most recent updates in ICU competencies
- Knowledge deficit

Variations in teaching and practice

- traditional institutional practices,
- Inequality in systems of care and management
- Adoption of different protocols in care management and county prevalence on choice of drugs procured
- Variations in Curriculum
- Lack of standard curriculum and inadequate training infrastructure

Mentorship: Lack of EBP mentors
Autonomy: Lack of nursing empowerment
Governance: Different Managerial approach in running ICU
HR policies in different county government
Scope of practice: Deconstruction of the role of the nurse (split off all the aspects of the role that nurses traditionally performed, once separated from the whole, the role can be performed by lesser qualified, or equally qualified but cheaper, or unqualified staff)

- Lack of policies to support nursing competencies from the regulatory bodies
- A scope of practice that is not reviewed as per the current evidence
- Some restrictive hospital guidelines do not consider the scope of practice.
- Conflict of interest among nurses and other cadres
- Lack of policies from regulatory bodies to support nursing competencies.

Beurrocracy:

- Hospital policies and protocols
- Need to separate paediatric patients from adult patients; all hospitals should have PICUs

Most significant facilitators towards agreeing and implementing the national icu competencies

STATEMENT	CODE	COVERED IN QUESTIONNAIRE
Continuous nursing education.	Continuous professional development (1)	
Continuous medical education.	(1)	
And incentives to the best-performing staff.	Recognition (8)	
Multidisciplinary incorporation	Stakeholder involvement (2)	
Multidisciplinary involvement	(2)	
Continuous medical education	(1)	
Continuous education for ICU nurses	(1)	
Public sensitisation.	(2)	
Stakeholders' involvement.	(2)	
Strengthening the EBP mentors to champion positive change versus how it will benefit the patient	Mentorship (5)	
Regular CME and updates on possible changes	(1)	
Through seminar. Even CMEs	(1)	
Active involvement of the stakeholders across the country, e.g., the Nursing Council of Kenya, government and private institutions' training nurses, and government and private hospitals offering ICU facilities.	(1)	
Continuous nursing education.	(1)	
Review critical care nursing curriculum and bring it to national standards.	Curriculum review and standardisation (3)	
Teachings and updates	(1)	
NCK	Regulatory body (7)	
Embrace enough staffing	Resources (6)	
Prior trainings of staff	(1)	
Ensure resources availability		

The government's medical stakeholders	(2)	
Meetings by stakeholders to include leaders from training schools (private and government, faith-based institutions), nursing council plus hospital leaders	(2)	
Support from regulatory bodies	(7)	
Administration	Leadership and governance (R. L. Lakanmaa et al.)	
Engagement of teams	(2)	
training and orientation	(1)	
Training on job	(1)	
Come up with one National syllabus for ICU nurse training in Kenya	**(3)**	
Give recognition to this ICU nurse after training and gaining those competencies by providing proper remuneration.	(8)	
Incentive	(8)	
Have the correct nurse-patient ratio	(6)	
Avail resources	(6)	
Employment of trained ICU nurses	(6)	
Frequent CME workshops, seminars, and webinars,	(1)	
Centralised management of ICU unit to adopt common policies & guidelines	(3)	
Centralising protocols and drug management policies		
Involving all the stakeholders and good representation	(2)	
Include all these competencies in the training curriculum	(3)	
Design continuing education courses to support implementation	1	
Motivated staff	(8)	
I would suggest that stakeholders from both private and government institutions, in	(2)	

collaboration with the Nursing Council, have a deliberate discussion about it		
Unit and collaboration of both private and public institutions. Collaboration BTW adults and paediatric ICUs	(R. L. Lakanmaa et al.)	
The Nursing Council of Kenya should review the scope of practice for critical care nurses.	(7)	
Government to train more nurses in critical care, and then ICUs to have only critical care-trained staff nurses	(6)	
Implementation of scientifically reviewed scope of practice Involvement of the stakeholders	(7)	
Collaboration between the training institutions, the clinical practice areas and the regulating body	Multidisciplinary collaboration (10)	
There is a Critical Care Nurses Chapter that can hold symposia and conferences and come up with national guidelines. initiation of critical care journals through the critical care chapter	(1)	
Ensuring all involved understand the importance of these core competencies	(1)	
Mutual policies that cut across.	(7)	
Nurses' decisions also count - "Nurses' voices should be heard," not only taking instructions affecting them.	(2)	
Creating awareness of the essential competencies is critical from ICU training schools to ICU units.	(1)	
Regular national critical care conferences, symposiums,	(1)	
Publishing in peer-reviewed nursing critical care journals at least yearly.	(1)	
Collaborating/ benchmarking with critical care doctors and nurses from within the African region and internationally.		
Leadership involvement. Ministry Nursing bodies. Hospital leads	(2)	

Adequate resources		
Stakeholders' forum Presentation of findings in stages in Kenya Critical care nurses' conferences	(2)	
Curriculum development teams' buy-in is important	(3)	
Increase in number of Trained ICU Nurses	(6)	

FACILITATORS AGREE AND IMPLEMENT THE COMPETENCIES

Continuous Professional Development (CPD): Continuous nursing education.

Continuous medical education.

Continuous education for ICU nurses
Regular CME and updates on possible changes
Seminars
teachings and updates
Frequent CME workshops, seminars, and webinars,
Prior trainings of staff
there is a Critical Care Nurses Chapter that can hold symposia and conferences and come up with national guidelines
Initiation of critical care journals through the critical care chapter
Ensuring all involved understand the importance of these core competencies
Creating awareness of the essential competencies is critical from ICU training schools to ICU units.
Regular national critical care conferences, symposiums,
Publishing peer-reviewed nursing critical care journals at least yearly
Design continuing education courses to support implementation

Stakeholders' involvement: Stakeholders forum
Presentation of findings in stages in Kenya Critical Care Nurses conferences
Leadership involvement. Ministry, Nursing bodies, Hospital leads
I would suggest that stakeholders from both private and government institutions, in collaboration with the Nursing Council, have a deliberate discussion about it
Nurses' decision also counts - "nurses' voice should be heard" not only taking instructions affecting them
Involving all the stakeholders and good representation
Engagement of teams
The government
Medical stakeholders
Multidisciplinary involvement

Curriculum review and standardization: Curriculum development teams' buy-in is important
Include all these competencies in the training curriculum
Centralized management of ICU unit to adopt common policies & guidelines
Come up with one National syllabus for ICU nurse training in Kenya
Review critical care nursing curriculum and bring it to national standards.

Mentorship
Availability of resources: Embrace enough staffing
Government to train more nurses in critical care, and then ICUs to have only critical care-trained staff nurses
Have the correct nurse-patient ratio

Regulatory body: mutual policies that cut across.
Implementation of scientifically reviewed scope of practice
The Nursing Council of Kenya should review the scope of practice for critical care nurses.
Support from regulatory bodies
NCK

Recognition
Motivated staff
Incentive
Give recognition to this ICU nurse after training and gaining those competencies by providing proper remuneration.

Leadership and Governance
Collaborating/ benchmarking with critical care doctors and nurses from within the African region and internationally

Multidisciplinary collaboration: Collaboration between the training institutions, the clinical practice areas and the regulating body
Increase in number of Trained ICU Nurses

ARE THE COMPETENCIES APPLICABLE TO ALL ICUS IN KENYA- 45 AGREED

Yes
Yes, they are very important
All ICUs
Yes
yes, though customization should be considered for every unit
yes
yes
they should
Yes. It helps
Yes, since the aim is to standardize the quality of care the nurses give to patients to achieve better outcomes.
Yes - my experience is in adult Critical Care
Yes
Yes
Yes
Yes
Yes
Yes
Yes to harmonize the training requirements of ICU RNs. End result offering Same standard of ICU nursing practice by trained ICU RNs.
Yes
Yes they are applicable to ICUs in Kenya
Yes
Yes
Yes

Yes, they should apply to all ICUs in Kenya.
Yes
Yes
Absolutely yes
Yes
Yes
Yes
Yes
Yes I do
Yes
It should be specific for adults, paediatric and neonates because their needs are diverse.
Yes... to enhance uniformity in care
Yes
Yes
Yes, core competencies, e.g. comprehensive health assessment, use of specialized equipment, e.g. mechanical ventilator, cardiac monitor, infusion/ syringe pumps, should cut across, then sub-competencies for speciality ICUs apply.
Yes
Yes, it should...
Yes, they must be applied to all ICU units.
Yes, most competencies cut across critical care environments with minimal variation, e.g., the significance of thermoregulation in NICU and family involvement (family-centred care) in care delivery in NICU and PICU.
Yes, with few specifications per speciality
Yes
Yes
yes

How to roll out the competencies

Theme 1: Training
Category 1.1: Participate in training
Exemplar: *"If you ask me, Beth, I think we all have a role to play…. from my perspective where I can organise for, for conferences I heard I can be able to organize for CME. (P4)"*
Category 1.2: Preceptorship
Exemplars: *"As for me, Beth, the support would be if if if if we had a program for preceptor training, I would be happy to champion that…. And I would be happy to be involved if we ruled out a preceptor capacity-building program. (P2)"* *"Yes, I also can participate in the issues of the preceptors' training. (P1)"*
Theme 2: Clinical support
Category 1.4: Support clinical support of novice nurses
Exemplar: "I just wanted to let you know that. Uh, for the support of the clinical training for the young nurses. (P7)"
Category 1.2: Enforce the practice
Exemplar: *"So, as we try and roll out this program, my part will be to ensure that I enforce the nursing practice in a safe way that will benefit the Community and the and the patient. (P5)"*

Question 1: How do you think we should roll out the competencies?		
Codes	**Categories**	**Themes**
We don't have a curriculum. There is a lot of rush to meet curriculum. It is totally different because the environment is not the same. Lack of standardized competency assessment They are all at different levels. It's unfortunate. Few clinical sites Gap of training and practice	Curriculum Training files Simulation labs	Standardised training and assessment
The competencies... are very low. They do not know where to start, they do not know what to do No follow-up in CMEs Curriculum for training critical care preceptors Nursing rounds are not well-adapted Mentor the clinical areas Special training for preceptors with certification Competency certificate Champions in each county Having the right mentors and preceptors We develop ICU champions in every county You make sure in the clinical areas, mentorship is done	Continuous Professional development Nursing rounds Champions	Mentorship/ preceptorship

Sensitise the competencies through workshops, conferences Collaboration between hospitals and training institutions to share knowledge Have CMEs on the current guidelines Clustering competencies Put competencies into themes	Forums Partnerships Cluster competencies	Sensitisation
Is our attitude a problem? People only get to prepare when the Nursing Council is coming around There is no maintenance in the clinical area	Lack of support in the clinical areas Attitude	Change of attitude
It should be a student-based school curriculum Review curriculum and do a lot of benchmarking Inadequate training period	Curriculum review Benchmarking	Curriculum
Allocation of budgeting so that we can train our nurses Lobby for government funding Advocate for training and resources for ICU nurses Involve NCK, county government, Ministry of Health More funds go to preventive care	Training Resources Stakeholders' involvement Lobbying	Budgeting
Development of regulatory tools to help retain nurses Encourage nurses even as they progress to stick to clinical areas	Recognition and awards Scope of practice	Retention mechanisms

Recognise and award nurses in the clinical areas		
Align the competencies to the scope of practice Include them in the training guidelines Regulatory tools Develop Standard Operating Procedures from these competencies	Training Regulation of practice	NCK
Question 2: How do you think you can support the rollout of these competencies?		
Enforce the nursing practice in a safe way I can be able to organize for CME I would be happy to champion preceptor training I also can participate in the issues of the preceptors' training. For the support of the clinical training for the young nurses	Participate in training Enforce the practice Support clinical support of novice nurses Preceptorship	Training

APPENDIX 10: ATTRITION TABLE FOR DELPHI ROUND ONE

Participant ID	Point of drop-off	Region	Type of ICU	Qualifications	Role in ICU	Years of experience
118101735774.00	After consent	–	–	–	–	–
118012437957.00	After consent	–	–	–	–	–
118011413796.00	After consent	–	–	–	–	–
118011413796.00	After consent	–	–	–	–	–
118083695637.00	After demographic data	Nairobi	Mixed ICU	Degree	ICU nurse	18 years
118082807526.00	After demographic data	Nairobi	Mixed ICU	Masters	ICU trained nurse	22 years
118062601872.00	After demographic data	Nairobi	Adult ICU	Degree	ICU trained nurse	3 years
118015416142.00	After demographic data	Eastern	Adult ICU	Specialised Diploma	ICU trained nurse	5 years
118083129472.00	After question 5	Rift Valley	Mixed ICU	Masters	ICU nurse	12 years
118078240976.00	Missed questions 14 &16	Nairobi	Adult ICU	Specialised Diploma	ICU nurse	3yrs
118047904780.00	After question 100-103	Central	Mixed ICU	Specialised Diploma	ICU nurse	4 years
118085375525.00	Dropped after question 29	Eastern	Mixed ICU	Specialised	ICU nurse	2 years
118085434294.00	Missed question 30	Central	Adult ICU	Specialised	ICU nurse	1 year
118096654233.00	Dropped after question 49	Nairobi	Mixed ICU	Degree	ICU nurse	2 years

118085362488.00	Missed questions75, 77	Central	Adult ICU	Specialised Diploma	ICU nurse	1 year
118055304514.00	Dropped after question 29	Nairobi	Mixed patients	Specialised Diploma	Air ambulance/ prehospital nurse	10 years
118047870918.00	Dropped after question 40	Eastern	Mixed ICU	Specialised diploma	ICU nurse	1 year
118041130705.00	Missed question 46	Nairobi	Mixed ICU	Specialised diploma	ICU nurse	2 years
118042567407.00	Missed question 75	Nairobi	–	Degree	ICU nurse	9 years
118011428609.00	Missed question 55	Central	Adult ICU	Specialised diploma	ICU nurse	5 years
118011374411.00	Missed question 56	Western	Mixed ICU	PHD	ICU nurse	15 years

APPENDIX 11: ETHICAL APPROVALS

University of Salford Approval email

From: ethics <ethics@salford.ac.uk>

Sent: Thursday, 23 September 2021 14:35

To: Beth Waweru <B.Waweru@edu.salford.ac.uk>

Cc: Jacqueline Leigh <J.A.Leigh4@salford.ac.uk>

Subject: Ethics Application: Panel Decision

The Ethics Panel has reviewed your application: Identification and validation of competencies for nurses working in Kenyan Adult Intensive Care Units: A modified Delphi study

Application ID: 1950

The decision is: Application Approved.

Dr Jacqueline Leigh
Professor Nurse Education Practice
University of Salford
School of Health & Society
Room 2.76 Mary Seacole Building
Frederick Road Campus
Salford
Manchester
United Kingdom
Email: j.a.leigh4@salford.ac.uk

15th November 2021

Dear National Commission for Science, Technology, and Innovation (NACOSTI)

I am Professor of Nurse Education Practice in the School of Health & Society, University of Salford. I am writing to confirm that Ms Beth Waweru is a current student on a full-time PhD programme seconded from Aga Kahn University. She is a second-year student about to embark on her data collection in Kenya.

Her study is titled: ***IDENTIFICATION AND VALIDATION OF COMPETENCIES REQUIRED BY KENYAN REGISTERED NURSES IN ADULT INTENSIVE CARE UNITS: A MODIFIED DELPHI STUDY***
She has just received ethical approval from the University Research Ethics Committee and is now applying for local and country specific ethical approval to allow her to progress her research.
If you require any further information, please do not hesitate to contact me. Sincerely

Dr Jacqueline Leigh
Professor Nurse Education Practice
School of Health & Society

THE AGA KHAN UNIVERSITY

Faculty of Health Sciences
Medical College

Ref: 2021/IERC-132 (v2)
November 25, 2021

Dr. Beth Waweru – Principle Investigator
Faculty, SONAM, Aga Khan University- Nairobi

Dear Dr. Waweru and team,

Re: Identification and validation of competencies required by Kenyan registered nurses in order to deliver safe and quality healthcare in adult intensive care units: A modified Delphi study

The Aga Khan University, Nairobi Institutional Ethics Review Committee (IERC), is in receipt of your protocol resubmitted to the Research Office (RO) on November 01, 2021. With reference to the IERC R Ref: 2021/IERC-132 (v1) dated October 26, 2021, the IERC reviewed and approved this project *{as per attached official stamped protocol and attachments - version Ref: Ref: 2021/IERC-132 (v2).* You are authorized to conduct this study from **November 25, 2021**. This approval is valid until **November 24, 2022** and is subject to compliance with the following requirements;

1. The conduct of the study shall be governed at all times by all applicable national and international laws, rules and regulations. IERC guidelines and Aga Khan University Hospital policies shall also apply, and you should notify the committee of any changes that may affect your research project (amendments, deviations and violations)
2. Researchers desiring to initiate research activities during COVID-19 pandemic must comply with the COVID-19 SOPs for Research as well as submit to the Research Office a Request Form to Initiate, Reinstate or Continue Research During COVID-19 Pandemic.
3. **Prior** to human subjects enrolment you must obtain a research license from the National Commission for Science, Technology and Innovation (NACOSTI), *where applicable*, site approvals from the targeted external site(s) and file the copies with the RO.
4. *As applicable*, **prior** to export of biological specimens/data, ensure a Material Transfer Agreement (MTA)/Data Transfer Agreement (DTA), is in place as well as seek shipment authority/permit from the relevant government ministry. Copies of these approvals, should be submitted to the RO for records purpose.
5. All Serious Adverse Events and the interventions undertaken must be reported to the IERC as soon as they occur but not later than 48 hours. The SAE shall also be reported through the AKUHN quality monitoring mechanism(s) at Client Relations Department of the Chief of Staff's Office.
6. All consent forms must be filed in the study binder and where applicable, patient hospital record.
7. Further, you must provide an interim Progress Report Form **60 days before expiration** of the validity of this approval and request extension if additional time is required for study completion; as well as submit the completed Self-Assessment Tool -Monitoring Ethical Compliance in Research. You must advise the IERC when this study is complete or discontinued and a final report submitted to the Research Office for record purposes.
8. The hospital management should be notified of manuscripts emanating from this work.

If you have any questions, please contact Research Office at AKUKenya.ResearchOffice@aku.edu or 020-366 2148/1136.

With best wishes,

Dr. Christopher Opio,
Chair - Institutional Ethics Review Committee (IERC)
Aga Khan University, (Kenya)

Copy: Co-Investigators
AK 963

3rd Parklands Avenue, off Limuru Road, P. O. Box 30270, GPO 00100, Nairobi, Kenya
Telephone: +254 20 366 2107/2109; Fax: +254 20 374 4035

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **551529**

Date of Issue: **29/November/2021**

RESEARCH LICENSE

This is to Certify that Ms.. Beth Waithiegeni Waweru of University of Salford, has been licensed to conduct research in Nairobi on the topic: Identification and validation of competencies required by Kenyan registered nurses in order to deliver safe and quality healthcare in adult intensive care units: A modified Delphi study for the period ending : 29/November/2022.

License No: **NACOSTI/P/21/14668**

551529

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

University of Salford MANCHESTER

Amendment Notification Form

Title of Project:		
Identifying and establishing consensus on competencies required by registered nurses working in Kenyan Intensive Care Units: A modified Delphi study		
Name of Lead Applicant:	**School:**	
Beth Waweru	Health & Society	
Are you the original Principal Investigator (PI) for this study?		Yes
If you have selected 'NO', please explain why you are applying for the amendment:		
Date original approval obtained:	**Reference No:1950**	**Externally funded project?**
23/09/2021		Yes

Please outline the proposed changes to the project. *NB. If the changes require any amendments to the PIS, Consent Form(s) or recruitment material, then please submit these with this form highlighting where the changes have been made:*

The following changes were recommended during my Internal Examination (IE) by the examiners to improve the study

Topic: The topic was re-worded to: Identifying and establishing consensus on competencies required by registered nurses working in Kenyan Intensive Care Units: A modified Delphi study

Initial topic was Identification and validation of competencies required by registered nurses working in Kenyan adult Intensive Care Units: A modified Delphi study

Participant Information Sheet (Bateman et al.): Compensation to the participants with provision of data bundles to be able to access and complete the online survey. The survey has 104 elements to complete, and dropout was foreseen. See the attached amended PIS. Change of supervisor

Questionnaire: Restructuring of the questions was done; in terms of language and Likert scale; from "strongly agree-strongly disagree" to "Not important- Essential."

The initial stage of the study started with scoping review; the examiners suggested an integrative review. Hence, change of objective 1.

1. To describe the competencies of RNs working in ICU through an integrative literature review

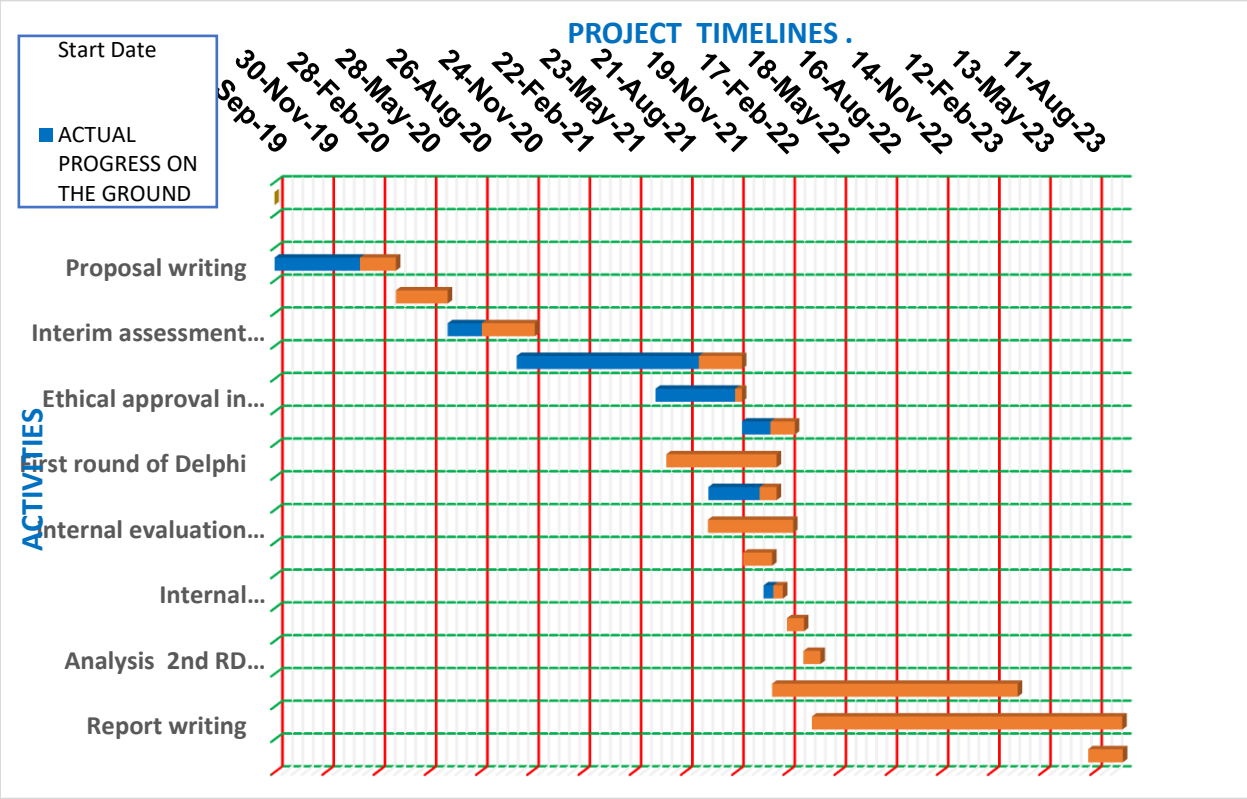
Please say whether the proposed changes present any new ethical issues or changes to ethical issues that were identified in the original ethics review, and provide details of how these will be addressed:

There are no foreseen ethical implications with the changes made

Amendment Approved:	**YES**	***Date of Approval:***	**30/08/2022**

Chair's Signature:

APPENDIX 12: RESEARCH TIMELINES



APPENDIX 13: RESEARCH SUPERVISION RECORD

Number	Date	Number	Date	Number	Date
1.	12/11/2019	15.	07/06/2021	29.	23/02/2023
2.	19/11/2019	16.	29/07/2021	30.	30/03/2023
3.	17/12/2019	17.	15/09/2021	31.	05/05/2023
4.	29/01/2020	18.	16/11/2021	32.	25/05/2023
5.	23/03/2020	19.	15/12/2021	33.	29/06/2023
6.	27/04/2020	20.	28/02/2022		
7.	12/06/20/20	21.	28/03/2022		
8.	20/07/2020	22.	28/04/2023		
9.	17/09/2020	23.	20/07/2023		
10.	07/12/2020	24.	18/08/2023		
11.	25/01/2021	25.	07/09/2023		
12.	24/02/2021	26.	22/11/2023		
13.	25/03/2021	27.	12/12/2023		
14.	05/05/2021	28.	26/01/2023		

APPENDIX 14: TRAINING RECORD

DATE	PRESENTER	SESSION
28/10/2019	Prof. Paula Ormandy	Welcome
	Dr. Michelle Howarth	Celebrating research
	Dr. Michelle Howarth	Project management for PGRs
29/10/2019	Dr. Roy Vickers	Library resources
	Dr. Alison Brettle	Doing a literature review
30/10/2019	Dr. Tom Laws	Introduction to Qualitative research
	Dr. Debs Robertson	Thinking, reading, and writing skills
31/10/2019	Dr. Dilla Davies	ABC's of PhD
01/11/2019	Dr. Alex Clarke-Cornwell	Quantitative research
03/11/2019	Online tutorial	uniskills-
05/11/2019	Dr. Ellaine Ball	Writing thesis
12/11/2019		Giving a good presentation
13/11/2019		Statistical analysis for research
18/11/2019		Searching for evidence
20/11/2019		Ethics in research, Preparation for IA
31/11/2019		Evidence-Based Practice
11/2/2020		Online research methods
27/03/ 2020		Narrative
15/04/2020		How to continue doctoral research during an international crisis
14/04/2020		How to design your PhD with Idea Puzzle software
21/04/2020		Research design for qualitative research- key principles
04/05/2020		Staying well during PhD
13/05/2020		Communication skills. Giving confident presentations
17/06/2020	Steve Preece	Fundamental ideas of Quantitative methodology
25/06/2020	Dr. Tom Laws	How to set up your thesis
30/06/2020	Kirsty	Methodological challenges

08/07/2020	Russel Delnderfield	Writing a research proposal for doctoral researchers
	Russel Delnderfield	Writing for doctoral research; crafting sections, chapters, and thesis
09/07/2020		A PDP portfolio for researchers
14/07/2020	Susan Mc Andrew	Reflexivity
15/07/2020		Ethical doctoral research
21/07/2020	Tracy Breheny	Avoiding plagiarism in your work
04/05/2020		Staying well during PhD
13/05/2020		Communication skills. Giving confident presentations
27/05/2020	PGR student- Candace	Methodological challenges
12/06/2020	Prof. Paula Ormandy	Preparing for Interim Assessment
25/06/2020	Dr. Tom Raws	How to set up your thesis
17/06/2020	Dr. Steve Preece	Fundamental ideas in Quantitative methodology
30/06/2020	Kirsty	Methodology challenges
01/07/2020	Maggie Costello	Word formatting
8/07/2020	Russel Delnderfiled	Writing a research proposal
14/07/2020	Susan McAndrew	Reflexivity in Qualitative research
21/07/2020	Davina Whitnall	Preparing for IA
22/08/2020		Avoiding plagiarism
22/7/2020	Sybille Thies	Quantitative measurements
23/7/2020	Ebba Brooks	Critical thinking

05/08/2020	Dilla Davis	Reflexivity
10/08/2020	Tracy Breheny	Making the most of Library search
07/10/2020		Advanced qualitative research
12/10/2020	Dr. Lyvonne Tume	Survey and Delphi
02/02/2021	Maggie Hardman	Philosophical stance-Understanding ontology
09/02/2021	Maggie Hardman	Philosophical stance-Understanding Epistemology
10/02/2021	Ricardo Morais	Idea puzzle
16/02/2021	Maggie Hardman	Philosophical stance-Understanding Axiology
23/02/2021	Maggie Hardman	Philosophical stance-Understanding methodology
12/04/2021	Dr. Lyvonne Tume	Descriptive statistics
27/04/2021	Maggie Hardman	Writing introductions and conclusions
27/04/2021	Maggie Hardman	Reading critically to form coherent writing
05/05/2021	Lakimini Kanangara	How to prepare for Viva
13/05/2021	Davina Whitnall	Lay abstract writing
21/09/2021	Dr. Lyvonne Tume	How to create a robust survey
07/12/2021	Prof.Jacqueline Leigh	Researching educational interventions
12/05/2023	Hellen Carruthers	Interpretive Phenomenology
14/02/2023	Simon Watts	Qualitative Interviewing
22/02/2023	Simon Watts	Preparing for viva

APPENDIX 15: AGA KHAN UNIVERSITY DEAN'S FUND

THE AGA KHAN UNIVERSITY

Faculty of Health Sciences
School of Nursing and Midwifery

June 22, 2022

Beth Waweru
Faculty
School of Nursing and Midwifery,
Aga Khan University
Kenya

Dear Beth,

Re: Dean's Fund

I am pleased to inform you that your application for the Dean's Fund titled ***Identification and validation of competencies required by Kenyan registered nurses in adult in-tensive care units: A modified Delphi study*** has been successful, and the review committee has approved your proposal has been awarded **USD 3540** only.

Kindly note the following:

1. Financial expenses should be accounted for in line with AKU processes and procedures.
2. Project duration is one year.
3. Endeavour to secure ethics within three (3) months of the receipt of this letter.
4. Submit progress reports at six (6) months and during completion of the project. The reports should be submitted to the Dean's Office through Juliet Njuguna (juliet.njuguna@aku.edu).
5. At least one peer-reviewed publication or evidence of submission of a manuscript to a peer-reviewed journal within three (3) months of the completion of your project.
6. Disseminate your findings to AKUSONAM EA and your local entity through the research symposium platforms.

In case of any clarification, please consult your local Research Lead or me. The details are as follows Dr. Tumbwene Mwansisya (Tanzania, email: tumbwene.mwansisya@aku.edu), Dr. Wesley Too (Kenya, email: wesley.too@aku.edu) .

Once again, congratulations on behalf of the Dean AKUSONAM EA and best of luck!

Yours Sincerely,

Ahmed M. Sarki, MPH, PhD, AFHEA, FRSPH
Research Coordinator SONAM EA
For: Dean SONAM EA

P.O. Box 39340 - 00623, Parklands, Nairobi, Kenya
2nd Floor Sunny Plaza Building, Wangapala Road, 4th Parklands Avenue
Telephone: +254 20 374 7483, 374 5808
Email: sonam.ke@aku.edu; Website: www.aku.edu/sonamea

APPENDIX 16: EVIDENCE OF ICN PRESENTATION

Abstract(s): DEVELOPMENT OF COMPETENCIES FOR INTENSIVE CARE UNIT NURSES IN KENYA THROUGH MODIFIED DELPHI TECHNIQUE

Dear Ms. Beth Waweru,

We hope you are getting ready to be part of the **ICN 2023 Congress** taking place in **Montreal, Canada,** from **1-5 July 2023**.

We are pleased to inform you that your abstract has been accepted for an E-Poster Viewing.

You should prepare a 1-page pdf E-Poster and upload it to the dedicated link, as per the below.

This E-Poster will be displayed on the Congress app and in the E-Poster Viewing Stations in the Congress venue. **Click here** to read instructions about how to create your E-Poster.

Upload your E-Poster:

We are delighted to invite you to upload your 1-page pdf E-Poster via our online system.

Click Here to access the e-Poster upload area.

Token: 94fb548a60

Deadline to upload your E-Poster: **Wednesday, 7 June 2023 - 23:59 (GMT-4)**

*Please note that the system works only by using the most recent login token you receive.

Please make sure to notify us immediately if there is any change in presenting author or if you are not the presenting author of the specified abstract above. The same person may serve as presenting author on up to 5 abstracts maximum.

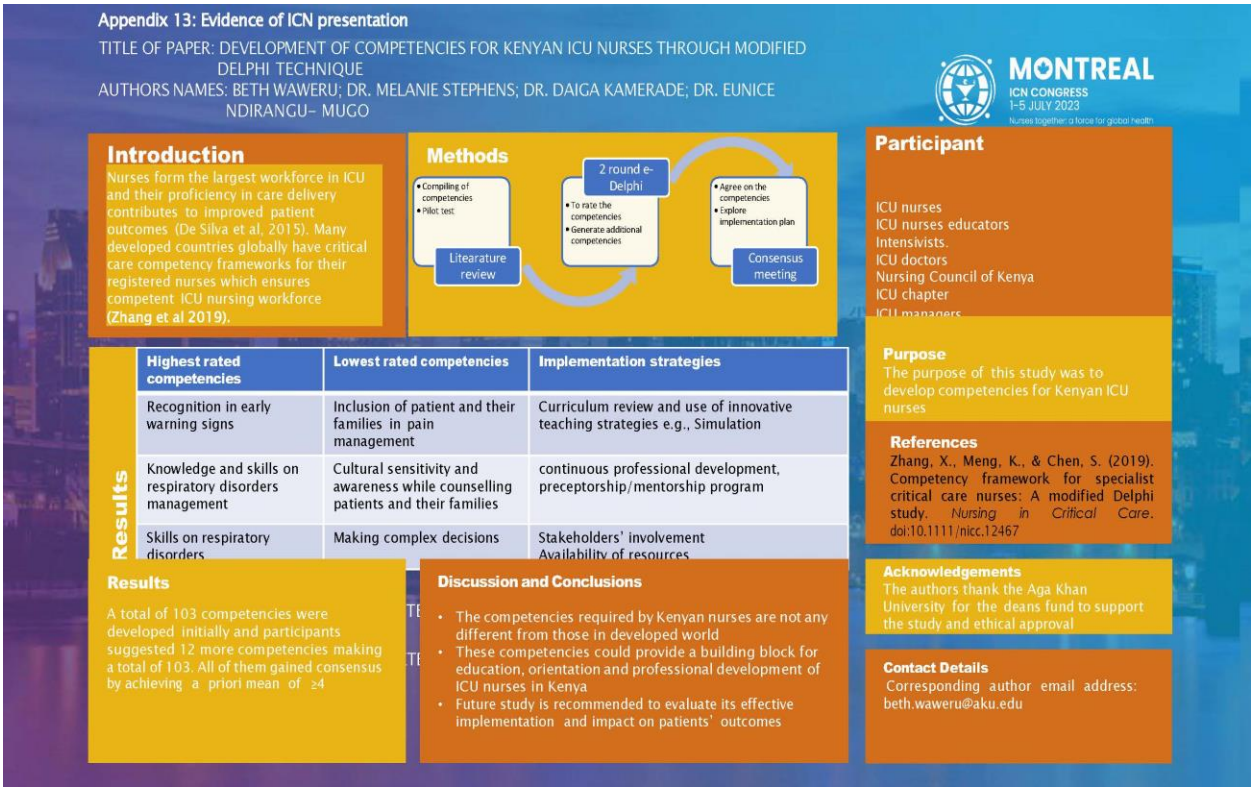
For any questions, please contact icn_abstracts@kenes.com.

Many thanks and we look forward to welcoming you to Montreal in July!

Kind regards,

ICN 2023 Scientific Secretariat

POSTER PRESENTATION FOR THE ICN CONGRESS 2023



CME/CPD Certificate

This is to certify that

Beth Waithiegeni Waweru

MScN

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participated in the

International Council of Nurses Congress 2023 Montreal, Canada 1-5 July 2023 and received 20 credits

Howard Catton

Chief Executive Officer International Council of Nurses

The International Continuing Nursing Education Credits (ICNECs)

APPENDIX 17: LIST OF PARTICIPANTS FOR THE FOCUS GROUP

#	DESIGNATION	REGION	REMARKS
1.	Intensivist	Nairobi	Did not attend
2.	NCK	Nairobi	Attended
3.	NNAK	Nairobi	Did not attend
4	Educator	Nairobi	Attended
5	Nurse educator	Nairobi	Attended
6.	Clinical nurse	Eastern Region:	Attended
7.	Clinical nurse manager	Central Region	Did not attend
8.	Clinical nurse	Northeastern Region	Attended
9.	Clinical nurse	Nyanza Region	Did not attend
10.	Clinical nurse	Rift Valley Region	Did not attend
11.	Clinical nurse	Coast region	Attended
12.	Clinical nurse	Western Region	Did not attend
13.	ICU manager	Nairobi Region	Attended
14	Clinical nurse	Mobile- works across counties (training of ICU nurses)	Attended
15.	Nurse educator	Central Region	Attended

APPENDIX 18: RESEARCH PARADIGMS

Research paradigm	Ontological assumption	Epistemological assumptions	Axiological assumption	Limitations	Reasons for rejection
Positivist	Realism There is one single reality that can be observed through science (Brown & Dueñas, 2019)	Objectivism Knowledge is obtained through use of reliable and valid measurement tools (Brown & Dueñas, 2019) The researcher and the researched are independent entities (Scotland, 2012)	Value free The researchers ought not to allow their values influence the research process (Oppong, 2014)	Only phenomena confirmed by the senses can be genuinely regarded as knowledge (Al-Saadi, 2014)	Does not fit in modified Delphi that has mixed methods
Post positivist	Realism There is a single objective reality; however, scientific observations involve error hence can only be known imperfectly (Brown & Dueñas, 2019)	Obtaining knowledge is subject to human error; hence, human knowledge is imperfect, and only probable truth can be obtained (Brown & Dueñas, 2019)	Value free		Does not fit in Delphi study

Critical social theory	Historical realism There are multiple subjective realities influenced by power relations in society. Reality is shaped by social, political, cultural, economic, ethnic and gender values (Brown & Dueñas, 2019)	Subjectivism Knowledge is subjective and is created and negotiated between individuals and within groups (Brown & Dueñas, 2019)			Does not fit in Delphi study
Constructivist/ interpretive	Relativism Multiple socially constructed realities, as there are a few people constructing them (Kawulich, 2012)	Subjectivism Knowledge is subjective as it is socially constructed and mind dependent (Kawulich, 2012)	balanced	Social reality cannot be portrayed accurately because there are varying perceptions and understandings of reality (Al-Saadi, 2014). It also abandons the scientific procedures of verification; hence, results	Does not fit in mixed methodology Lack of generalizability of results

				cannot be generalised (Oppong, 2014)	
Grounded theory					

APPENDIX 19: CODEBOOK FOR QUALITATIVE DATA

Identifying and establishing consensus on competencies required by registered nurses working in Kenyan ICU

Codes

Name	Description	Files	References
BARRIERS		**0**	**0**
Curriculum		0	0
There is a lot of rush to meet curriculum		1	1
We don't have a curriculum		1	1
Focus is on preventive care		0	0
Clinical areas have been neglected		1	1
In preventive care that is where we have a lot of involvement		1	1
Most of the funding is channelled on the preventive areas		1	1
Resources in the country are channelled towards preventive care		1	1
Incompetence		0	0

Name	Description	Files	References
Lack of standardised competency assessment		0	0
They are all at different levels. It's unfortunate		1	1
The competencies...are very low		1	3
Sub-system failures		**0**	**0**
Lack of retention mechanisms		0	0
People run away from clinical areas		1	2
Practice is not paid well		1	1
The tendency is for them to get away from the clinical area		1	1
Lack of support for training		0	0
They do not know where to start, they do not know what to do		1	2
Nursing rounds are not well-adopted		1	1
We have very few clinical sites		1	2
Gap of training and practice		1	3
There is no maintenance in the clinical area		1	2
Is our attitude a problem?		1	2

Name	Description	Files	References
It is totally different because the environment is not the same		1	1
Lack of mentors and preceptors		1	1
No follow-up in CMEs		1	1
People only get to prepare when the nursing Council is coming around		1	1
FACILITATORS		0	0
Advocacy		0	0
Advocate for training and resources for ICUs		1	2
Advocated for simulation labs		1	2
Budgeting		0	0
Allocation of budgeting so that we can train our nurses		1	1
Lobby the government for funding		1	1
Competencies		0	0
Aligning competencies to scope of practice		1	1
Cluster the competencies		1	6
Incorporate these competencies within training files		1	1
Recognition		0	0

Name	Description	Files	References
They are given a certificate of completion		1	2
We give a competency certificate		1	2
Curriculums		0	0
It should be a student-centred, school-based curriculum		1	1
Review of curriculum and do a lot of benchmarking		1	1
Specific curriculum for preceptors, trainers and clinical educators		1	1
Retention mechanisms		0	0
APN practice is going to facilitate the retention of nurses and midwives		1	1
Develop regulatory tools		1	1
Encourage nurses even as they progress		1	1
Encourage them to stick to clinical area		1	1
Sharing of information		0	0
Collaboration between the training institution and hospitals		1	4
Mentorship		0	0
Having the right mentors and preceptors		1	1

Name	Description	Files	References
I was thinking about the mentorship... in every county		1	2
We develop ICU champions in every county		1	2
You make sure in the clinical areas, mentorship is done		1	1
You need someone to hold your hand		1	1
Sensitisations		0	0
Enforce nursing practice		1	1
Facilitate the retention of nurses and midwives in the clinical area		1	1
Have CMEs on the current guidelines		1	2
Sensitisation in terms of conferences		1	2
Through publication		1	1
These are the workshops that we really need to be having		1	3
Stakeholders involvement		0	0
Cluster the competencies... share them with the stakeholders		1	1
We need to have a lot of involvement with stakeholders		1	3
Standardisation		0	0

Name	Description	Files	References
We have the standardized tools to be able to evaluate these competencies		1	3
Standardization of testing		1	1
Standardized way of training a preceptor		1	2
We can develop SOPs from these competencies		1	1
Training		0	0
Maybe more preceptors attending the training event		1	2
Training guidelines		1	2
We can come up with a standardized way of training a preceptor		1	1
You need to have a lot of training		1	13
We change our attitude and take advantage of resources		1	1
We may need to have... nursing rounds		1	1
Frequent evaluation		1	1
I think we need to upgrade our ICUs		1	1
WAYS OF ROLLING OUT COMPETENCIES		0	0

Name	Description	Files	References
Enforce the the nursing practice in a safe way		1	1
Enforcing the nursing practice		1	2
I can be able to organize for CME		1	1
If we had a program for preceptor training		1	4

IDENTIFYING AND ESTABLISHING CONSENSUS ON COMPETENCIES REQUIRED BY REGISTERED NURSES WORKING IN KENYAN ICU: A MODIFIED DELPHI STUDY

CODES	CATEGORIES	THEMES
It is totally different because the environment is not the same Is our attitude a problem? People only get to prepare when the Nursing Council comes around.	Attitude	**BARRIERS**
Lack of mentors and preceptors No follow-up in CMEs.	Lack of mentorship	
We don't have a curriculum. There is a lot of rush to meet curriculum.	Curriculum	
The competencies... are very low. **Lack of standardized competency assessment** They are all at different levels. It's unfortunate.	Incompetence	
Clinical areas have been neglected. Most of the funding is channelled to the preventive areas. Resources in the country are channelled towards preventive care. In preventive care that is where we have a lot of involvement Focus is on preventive care	Lack of resources	

Subsystem failures We have very few clinical sites. Gap of training and practice. There is no maintenance in the clinical area. Nursing rounds are not well adopted. **Lack of retention mechanisms** People run away from clinical areas. The tendency is for them to get away from the clinical area. Practice is not paid well. **Lack of support for training** They do not know where to start, they do not know what to do.	Sub-system failures	
We may need to have... nursing rounds. Frequent evaluation. I think we need to upgrade our ICUs. We change our attitude and take advantage of resources.		**FACILITATORS**
Sharing of information Collaboration between the training institution and hospitals These are the workshops that we really need to be having.	Sharing of information	

Mentorship We develop ICU champions in every county. I was thinking about the mentorship...in every county. You need someone to hold your hand. Having the right mentors and preceptors You make sure mentorship is done in the clinical areas. **Sensitizations** Sensitization in terms of conferences. Through publications Have CMEs on the current guidelines. Enforce nursing practice Facilitate the retention of nurses and midwives in the clinical area.		
Standardized way of training a preceptor We have the standardized tools to be able to evaluate these competencies. Standardization of testing We can develop SOPs from these competencies	Standardization	

Review of curriculum and do a lot of benchmarking. It should be a student-centred, school-based curriculum. Specific curriculum for preceptors, trainers of trainers, and clinical educators	Curriculums	
Allocation of budgeting so that we can train our nurses Lobby the government for funding.	Resources	
Advocate for training and resources for ICUs. Advocated for simulation labs.	Advocacy	
Competencies Cluster the competencies. Aligning competencies to scope of practice. Incorporate these competencies within training files **Recognition** They are given a certificate of completion. We give a competency certificate.	Competencies	
Encourage nurses even as they progress. Encourage them to stick to clinical area. APN practice is going to facilitate the retention of nurses and midwives. Develop regulatory tools.	Retention mechanisms	

You need to have a lot of training. Training guidelines. We can come up with a standardized way of training a preceptor. Maybe more preceptors will attend the training event.	Training	
I can be able to organize for CME. If we had a program for preceptor training Enforcing the nursing practice. Enforce the nursing practice in a safe way.	Training	**WAYS OF ROLLING OUT COMPETENCIES**
We need to have a lot of involvement with stakeholders. Cluster the competencies... share them with the stakeholders.	Stakeholders' involvement	
Ensure that I enforce the nursing practice in a safe way that will benefit the Community and the patient. Support young nurses on the ground	Support in clinical practice	
I don't think you would be able to do it on your own but at least from each one perspective from my perspective where I can be able to organize for, conferences I heard I can be able to organize for CME.	Support in training	

As for me, Beth, the support would be if we had a program for preceptor training, I would be happy to champion that. I also can participate in the issues of the preceptors training.		