An investigation into when and how to train Medical students for the most effective learning of non-technical skills: a qualitative study

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Running title: *When & How to effectively train for NTS*

Abstract: This study aimed to explore the undergraduate level at which the non-technical skills (NTS) should be taught. The objectives of the study were to explore teachers' perceptions of the effectiveness of simulation for NTS training and designing NTS simulation sessions to achieve student competence. A qualitative design was adopted, by interviewing 30 teachers and then using 5 focused group discussions for data triangulation and confirmation of responses. Thematic analysis was conducted to analyse the data by focusing on the ideas, experiences, opinions and meanings presented by the participants. Most of the participants strongly believed in the benefits of teaching NTS from pre-clinical years. Teachers' consensus was to train students in communication, situation awareness, teamwork and leadership skills from pre-clinical years. However decision-making and stress management were agreed to be trained from clinical years as they require clinical knowledge. The use of simulation was found to be most effective for training among other methods like didactic sessions, case-based discussions and video-assisted learning. Simulation sessions integrating technical and NTS, fewer learning outcomes and effective debriefing were considered advantageous for effective learning. Simulation-based education using a spiral curriculum approach, starting training from pre-clinical years and gradually increasing difficulty through intricate exercises in clinical years can be suggested to achieve the desired competence of NTS.

Keywords: communication; curriculum; medical students; non-technical skills; simulation training

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Introduction

Practising both technical skills (TS) and non-technical skills (NTS) together and being highly competent in them is essential for healthcare practitioners for high-quality patient care (Weinger, 2007; Prydz *et al.*, 2023). This is because similar to other well-defined and complex systems, healthcare organisations are subject to adverse events (Reason, 2004) and most of these events take place due to physicians' incompetence in NTS (Flin *et al.*, 2010). Undergraduate medical curricula (UMC), as well as postgraduate trainee programs, routinely and extensively focus on teaching TS, neglecting NTS (Moll-Khosrawi *et al.*, 2019). NTS, which are cognitive and personal skills, contribute to the efficient and safe performance of tasks in high-risk settings by complimenting TS (Flin, O'Connor and Crichton, 2017; Riaz and Naemi, 2023). As evidence proposes that poor NTS performance places patients at risk (Prydz *et al.*, 2023), several assertions have been made by healthcare regulatory bodies to include NTS in UMC (Walton *et al.*, 2011; Kiesewetter *et al.*, 2016). Research has proclaimed that NTS can be acquired like TS through practice and training over the years (Brunckhorst *et al.*, 2015). In addition, this has been found that multifaceted and integrated NTS training interventions are linked with better outcomes than single interventions (Shekhter *et al.*, 2012; Andrew Coggins *et al.*, 2017; Nicolaides *et al.*, 2018; Wevling *et al.*, 2023). Advancing this, it can be affirmed that integrated training in UMC is essential to develop good NTS (Moll-Khosrawi *et al.*, 2019) at all levels.

Some recent attempts were made to introduce teaching and assessing NTS in UMC (Weinger, 2007; Gordon *et al.*, 2015). The NTS behavioural marker systems for medical students and newly qualified doctors were also devised (Mellanby *et al.*, 2013; Hamilton *et al.*, 2019). However, an explicit implementation and teaching strategy or a detailed curriculum for integrating NTS training into UMC has not yet been proposed (Schulte-Uentrop *et al.*, 2020). Likewise, no explicit conclusion was provided which could advise how to integrate NTS

training into the curriculum (Flin *et al.*, 2010; Gordon, Baker, *et al.*, 2015; Kiesewetter *et al.*, 2016; Moll-Khosrawi *et al.*, 2019). Although simulation has been asserted as an effective method of training NTS (Vattanavanit, Kawla-Ied and Bhurayanontachai, 2017; Somasundram *et al.*, 2018), there is a paucity of literature on how to devise simulation sessions to achieve the intended learning outcomes.

Therefore, this study was planned and conducted with two main aims. The first aim was to explore at which undergraduate level or year each NTS should be taught to achieve students' competence in these skills. The second aim was to explore teachers' perceptions of the effectiveness of simulation for NTS training and designing NTS simulation sessions to achieve student competence.

Methods

The study was conducted at Arabian Gulf University (AGU) in Bahrain after getting ethical approval from AGU (Reference # E30-PI-4/20) and Staffordshire University, UK (as this study was part of the Doctoral degree). Before the present study, primary research was conducted (Riaz and Naemi, 2023) to build the groundwork and derive the aims of this study. The research aimed to investigate how NTS training level has influenced clinical year students' approach towards learning and practising these skills, and mainly concluded that most students showed to lack NTS, while a significantly high proportion specified that more importance is given to TS in the curriculum. Another finding was that insufficient motivation and training have resulted in undervaluing and hesitance in performing NTS by students.

Advancing this, the present study was conducted based on the constructivist paradigm (Guba and Lincoln, 1994; Merriam, 2009) and using qualitative research methods; semi-structured interviews and focus group discussions (FGD). The principal investigator and interviewer is a medical educator and clinician. Participants (n=30) were selected from AGU using critical case sampling which allows selecting the experienced enough participants who can effectively provide the most meaningful information (Onwuegbuzie and Leech, 2007). All the participants were healthcare practitioners and had experiences of teaching, supervising and observing undergraduate medical students and junior doctors in clinical, academic and simulation-based education settings (details in Table 1). An interview schedule was developed as a guide for data collection (Figure 1) after a comprehensive literature review (McCulloch, Rathbone and Catchpole, 2011; Gordon, Darbyshire and Baker, 2012; Nicolaides *et al.*, 2018) and conclusions from the primary research (Riaz and Naemi, 2023). *[Place Table 1 and Figure 1 about here]*

Teachers who agreed to participate were sent a consent form, an information sheet and pre-interview information about NTS (NTS competency framework (Gordon, Baker, *et al.*, 2015) and the behavioural marker system for NTS of medical students in acute care (Hamilton *et al.*, 2019)). Data was collected from Feb-May 2021. Interviews (n=30) and then FGD (5 FGD, with 5 participants each, remaining 5 participants excused due to unavailability) were audio-recorded with participants' permission, transcribed verbatim, kept on a secure hard drive and compared iteratively with recordings for accuracy as participants were not contacted back for confirmation to ensure anonymity.

Data from both stages was coded, analysed using a thematic analysis (Merriam, 2009) and integrated for confirmation and trustworthiness. A coding scheme was derived both from the research questions and issues that emerged during data collection and analysis. Triangulation

of interview and FGD data allowed for widening the in-depth information and comparing the responses of participants. Firstly, interviews and FGD were coded, and then themes were created following the six-phased method of Braun and Clarke (2006). This was an iterative process where data from both methods was constantly compared to conceive robust recommendations which could be used to devise effective NTS training sessions.

The trustworthiness and consistency of the research were ensured by keeping methods of data collection and analysis coherent with the theoretical underpinnings and philosophical assumptions. Similar responses from interviews and FGDs assured the validity of this research (Merriam, 2009). As a practising academician, the researcher was aware of the importance of being objective and setting personal experiences aside while conducting qualitative research. All possible measures were taken to keep the researcher's own views and beliefs aside while data collection and analysis to minimise the bias.

Results

Six themes emerged during the analysis which are as follows, quotations from the themes are given in the Appendix.

Theme 1: Starting NTS training from pre-clinical years

Participants (25 out of 30) strongly believed in starting NTS training from pre-clinical years as recognising the link to students' TS competencies during the later stages of their education and clinical practice. Moreover, as AGU follows a problem-based curriculum, training NTS from pre-clinical years will be beneficial. Only a few teachers (5 out of 30) suggested teaching NTS from clinical years. These participants had an opinion that as students do not get a chance to

have hands-on practice in real environments until their clinical years, they will not realise the importance of NTS.

Theme 2: Determining the year to teach NTS

All the teachers agreed with the NTS suggested in the healthcare competency framework by Gordon *et al.* (2015) to be included in the UMC. **Table 2** shows the summary of findings under this theme and later themes (Theme 3 & 5) and proposes the skills to be taught at the level of pre-clinical and clinical years.

Skills to be taught from pre-clinical years

Teachers emphasised starting communication skills training in the first or second year to accentuate the importance of effective communication in clinical practice. However, training on breaking bad news and advanced technical communication, like using SBAR, was suggested for clinical years.

Teachers also recommended training for teamwork (25 out of 30), leadership skills (22 out of 30) and situation awareness (27 out of 30) from pre-clinical years. They believed that even in pre-clinical years, students have to work in teams and they can be easily trained on teamwork, with clinical elements added in later years to enhance existing skills.

For situation awareness, teachers pointed out that students starting their foundation year lack familiarity with clinical settings, seeking information from a patient through clinical assessment, and the importance of effective management plans. Teachers suggested training situation awareness basics, such as recognising and gathering timely information, can substantially enhance students' skills by the time they reach clinical years. Suggested situation

awareness training for students in the clinical year included improving planning and anticipation, managing distractions and handling patients in deterioration stages.

Skills to be taught from clinical years

Participants (25 out of 30) recommended introducing decision-making training in clinical years due to its reliance on clinical knowledge. Teachers emphasised that this will allow students to contemplate potential consequences before making clinical decisions. Observing senior doctors during patient ward rounds was seen as advantageous for enhancing students' decision-making skills. The suggested skills for training included understanding the nature of the problem, situational decision-making, and reviewing the consequences or results of the chosen decision.

A majority (24 out of 30) proposed teaching stress management in clinical years as frequent visits to patient wards enable students to experience the demands of clinical work and understand stress and fatigue associated with real clinical settings. Teachers mentioned that exposure to clinical environments provides insights into the impact of stress and fatigue on performance. Training students in stress management during clinical years was deemed beneficial, allowing them to comprehend the practicalities of a real workplace, time constraints, and the escalating stress associated with pending tasks. *[Place Table 2 about here]*

Theme 3: Using Simulation to teach NTS

Using simulation for NTS training was highly recommended by participants. Teachers specified that students learn skills in a simulation environment without fear of errors or patient endangerment, and this contributes to minimising the stress of working in real hospital settings. Successful knowledge-to-skills transfer in simulation sessions was considered as a key advantage, boosting confidence, and allowing practice without fear of mistakes. For this reason, simulation was considered effective in training students for situation awareness, role awareness, patient engagement and stress management. It was emphasised that simulating possible difficult cases helps students develop decision-making skills under stress and adopt the same behaviour to their clinical practice. Teachers also highlighted the effectiveness of using standardised patients for practising communication skills, providing a realistic experience for history taking, breaking bad news and addressing patient concerns.

Theme 4: Devising effective simulation sessions for training NTS

Integrated training with TS

The majority favoured integrating NTS and TS, considering that both sets of skills are supported by each other in clinical practice. Integration was seen as beneficial, preventing additional burdens on students in an already packed curriculum. A minority of participants suggested separate NTS training in pre-clinical years, later integrating with TS in clinical years.

Providing pre-simulation sessions knowledge of NTS

Over half of the participants (22 out of 30) suggested incorporating didactic sessions or scheduled lectures in pre-clinical years for all NTS. Participants believed that after providing knowledge in the early years, skills competence and proficiency can be improved by adding practical implementation through simulation sessions and gradually increasing the complexity

of sessions. Some teachers argued that regular NTS teaching throughout the academic year eliminates the need for prior knowledge before each simulation session. Others felt that pre-simulation knowledge delivered through reading materials, tutorials, videos, formative assignments or pre-tests positively impacts student learning.

Considerations to develop scenarios for simulation sessions

Writing clear learning outcomes to integrate NTS with TS was stressed as important by 22 teachers, aiding facilitators in planning simulation sessions and adapting teaching strategies. The significance of using standardised patients, either alone or with high-fidelity simulators was highlighted by 20 participants, to enhance communication and leadership skills. Additionally, 16 participants emphasised the need for simple and realistic scenarios to prevent concentration issues and facilitate mastery of concepts.

Most effective part of simulation session

Debriefing was found most effective by 24 participants, while 6 preferred clinical immersion. Teachers favouring debriefing believed it fosters NTS acquisition through guided discussions, reflective analysis, and feedback on performance. Structured debriefing, especially after clinical immersion, was seen as vital for supporting self-reflection. In integrated NTs and TS sessions, effective debriefing was considered crucial for students to understand the importance of both skills in health practice. Instructor-led and video-assisted debriefing were considered the most beneficial technique in NTS training. Teachers supporting clinical immersion believe it allows students to practice skills effectively and learn the intended concepts.

Theme – 5: Other methods of teaching NTS

Over half of the participants favoured didactic lectures as an alternative method to train NHS, emphasising regular teaching throughout the curriculum and subsequent simulation practice for skills and attitude development before medical practice. Additional proposed methods included video-assisted learning, case-based discussions, reflection exercises, regular ward rounds for NTS observation, hospital visits for observing doctors in real settings and reflection exercises after bedside teaching.

Teachers suggested various methods for teaching different skills. Didactic lectures, using role-play and simulated patients were suggested to teach communication skills. Video-assisted learning was suggested for training leadership and teamwork skills. They emphasised using simulation as the primary method for NTS training but recommended incorporating other methods during different years to enhance student learning and competence. None of these methods was suggested as a stand-alone and was considered useful when used in conjunction with simulation-based learning,

Theme – 6: Challenges/barriers in training NTS using simulation

Teachers mentioned that integrating NTS into the curriculum might be time-consuming and require convincing curriculum planners and policymakers. Slow and gradual assimilation of skills was suggested as a possible solution. Resistance from faculty members with an old-school mindset towards NTS training at the undergraduate level was identified as a barrier, representing a paradigm shift in teaching methods and styles. It was expected that faculty members might perceive this integration as overwhelming, involving changes in teaching practices, materials and assessment methods.

Discussion

Results advocate for the early integration of NTS into medical education and extending it throughout undergraduate years. Participants' responses strongly endorse a longitudinal and continuous approach to teaching NTS, highlighting concerns that short-term or one-off sessions may not sufficiently ensure skill retention. This finding aligns with previous studies of Shekhter et al. (2012) and Coggins, Desai, Nguyen, & More (2017), asserting that short-term NTS training may limit students' opportunities for skill practice, thus compromising effectiveness. A possible explanation for this can be the correlation between retention power and competency of skills. As skills retention can degrade with time, initiating NTS training in the first ear and revisiting it regularly during undergraduate years appears important (Nicolaides *et al.*, 2018). This implication aligns with the transformative learning theory (Mezirow, 2000) that students uncover knowledge through a process of doing and experimenting. Advancing this, continuous exposure to NTS learning will provoke critical reflection, fostering thoughtful changes in perspectives, behaviours, and beliefs regarding these skills. As a result, this transformative process will enable students to achieve competence in both NTS and TS (Kauffman and Mann, 2014).

The efficacy of decision-making training was perceived as highest when initiated during clinical years, possibly attributed to improvement in cognitive skills due to the benefits of experiential learning, such as simulation sessions and ward-based teaching. Although situational awareness is also a cognitive skill, early training in this area fosters a habit of being aware of the surroundings in students, potential impacts on them as a practitioner, and anticipation of future events (Gordon, 2013; Flin, O'Connor and Crichton, 2017). Consequently, a spiral curriculum can be recommended for NTS. This means that core NTS including communication, teamwork, and leadership as well as situation awareness are started in the early years to establish proficiency till they reach clinical years. As students progress to

clinical years and engage in experiential learning, stress management and decision-making can be effectively taught using the situated-cognition model (Morris Gordon, Box, *et al.*, 2015; Griffin *et al.*, 2020). Figure 2 demonstrates these recommendations. *[Place Figure 2 about here]*

Turning now to the most effective training practices for NTS, simulation emerged as the unanimous and emphasised choice among all participants. This consensus aligns with prior research asserting that NTS training through simulation enhances students' confidence across all proficiency levels (Martinou *et al.*, 2015; Gordon, Box, *et al.*, 2015; Vattanavanit, Kawla-Ied and Bhurayanontachai, 2017; Nicolaides *et al.*, 2018) as it allows students to practice skills through experiential learning (Garden *et al.*, 2015) without the fear of harming the patients. Notably, simulation's versatility is highlighted as it can cater to students at various levels, from novices to experienced, across diverse healthcare domains (Awad *et al.*, 2004; Gaba, 2004).

Combining this aspect of study findings with the ones discussed above supports the proposition that simulation is an effective method for NTS training, commencing from pre-clinical years and incorporating related activities tailored to each skill (Table 2), supplemented by other methods.

Furthermore, the most effective simulation sessions can be designed by integrating NTS and TS, using the SMART technique (Specific, Measurable, Attainable, Relevant and Time-bound) (Ashmore and Robinson, 2014) for learning objectives. Designing sessions using the KISS principle (Keep It Simple Stupid) (Rich, 1995) can further enhance effectiveness, emphasising the efficacy of simply designed systems in achieving targets (Marco *et al.*, 2018). Table 3

details a comprehensive strategy derived from study results for training NTS using simulation in UMC. *[Place Table 3 about here]*

Conclusion

This study concludes that designing simulation sessions that integrate both TS and NTS yields the most effective results. The application of a spiral curriculum (Grant, 2014) appears well-suited to achieve the desired learning outcomes for NTS. This entails scheduling training across all academic years, gradually enhancing students' proficiency and competence through progressively intricate exercises in later years (Nicolaides *et al.*, 2018). Given that competency in all NTS and not only in communication skills is required for safe patient care, an integrated and systematic approach is deemed necessary to train undergraduates in these skills. Employing simulation-based education develops future doctors' knowledge, skills and attitudes required for competent and confident NTS practice in healthcare. Subsequently, regulatory bodies are urged to allocate attention to developing a faculty development program, equipping teachers with the principles of simulation-based education. This facilitates the integration of simulation throughout the curriculum, extending beyond specific skills to comprehensively address NTS training.

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Tables and Figures

Designation	Department	Number of Participants
Chairmen/Consultants	Clinical/Basic sciences faculties & disciplines	8
Professor/Associate/Assistant		3
Lecturers		4
Educators/Instructors/Trainers		3
Simulation Experts	Medical Skills and Simulation Centre	3
Senior Simulation Facilitators		5
Interprofessional Education Trainers		2
Curriculum Planning Experts	Medical Curriculum Planning & Designing	2

Table 1: Details of the participants

Table 2: Suggested NTS training in the pre-clinical/clinical year

Skill	Pre-clinical Years	Clinical Years	Training
Skills to be taught from pre-clinical years			
Communication	- Importance of communication skills - Learn effective communication rules; i.e. loud, clear, concise - Use of SBAR tool (basics)	-Communication in teams -Convey/share the thoughts according to the situation - Building a shared mental model with effective closed-loop communication among colleagues - Integrated with technical training to teach how to communicate technical information - Strategies of communication with different stakeholders such as patients/attendants/senior doctors/healthcare staff (such as Breaking bad news) - Use of SBAR tool (advance with clinical elements)	Role modelling, memorisation of technical terms, communication exercises, didactic lectures, encounters with simulated patients, medium-high fidelity simulation sessions

Teamwork	-How to interact with others -Capability of working in any role in the team -How to seek and provide support from/to others -Clarity of roles -Giving respect to team members -Taking the initiative to perform a task	-Considering the patient as part of the team -Involving patients in decisions -Addressing the patient's concerns about a decision -Contributing to the team's decision-making -Establishing team satisfaction through collective task completion	Roleplay, video-assisted learning, case-based discussion, medium-high fidelity simulated sessions, problem-based learning
Leadership	-Giving clear instructions -Delegation by assigning responsibilities -Sharing information and seeking opinion -Maintaining the same understanding in the team throughout -Situational leadership -Collaborating and ensuring the integration of team members	-Prioritising the tasks -Structuring the workflow -Developing and sharing the mental models among members -Accountability for the team's performance and decisions	Didactic lectures, tutorials, case-based learning, problem-based learning, role play, medium-high fidelity simulated sessions, simulated emergency scenarios
Situation awareness	-Recognising and gathering timely and relevant patient information from all available resources -Recording correct information on observation charts (e.g. in the UK – National Early Warning Signs (NEWS)) -Anticipating the next steps based on the information	-Performing a structured and organised clinical assessment -Summarising key findings to reflect on their significance & creating a management plan accordingly -Arranging relevant resources & equipment -Managing distractions in clinical settings -Managing deteriorating patients	Roleplay, part-task trainers, low-fidelity manikins, high-fidelity simulation with full clinical immersion, video recordings of complex/emergency clinical cases, tactical decision games, use of basic equipment/clinical apparatus
Skills to be Taught from Clinical Years			
Decision making		-Assessing the situation - Prioritising the clinical assessment in a structured way -Completing tasks according to priorities and importance - Coordination with the team on potential differential diagnoses -Deciding & communicating a working diagnosis -Reviewing patient after treatment -Changing the management plan if required depending upon patients' changed condition -Managing the consequences/adverse effects of a decision	Case-based discussions, high-fidelity simulation with full clinical immersion, tactical decision-making games, video recordings of complex/emergency clinical cases
Stress & Fatigue Management		-Reducing mental workload -Recognising stress, its effects on own performance & making clear decisions -Interconnecting with others to get help with complex decisions/tasks -Time-sharing skills	Roleplay, case-based discussions, didactic sessions, tactical decision games

1. Do you think students should be trained for non-technical skills in pre-clinical years?
    a. Why do you think so?
2. If yes to Q1, from which year do you think teaching of non-technical skills would be most beneficial for students?
    a. What benefits can be achieved if training starts from your suggested year?
3. Which non-technical skills should be taught in particular to students?
4. Let's suppose if non-technical skills training is started from early years of medical education, which skills should be taught in pre-clinical and which skills in clinical years?
    a. And why
5. What is your opinion on using simulation for teaching non-technical skills?
    a. Should it be taught in separate simulation sessions or integrated with technical skills sessions
    b. And why do you think so
    c. Do you think integrating non-technical skills training with technical skills during the simulation sessions will be effective?
    d. Will it be effective in not putting extra burden on students to learn non-technical skills?
    e. And how effective will be the use of simulation from pre-clinical years?
6. How you will prepare/change the scenarios if currently used to train the students to incorporate the non-technical skills training?
7. Would you suggest on providing pre-simulation session knowledge about non-technical skills?
    a. If yes, what could be the benefits
    b. What would be the most useful method to provide knowledge about non-technical skills before attending the simulation session?
    c. What could be the possible composition of your suggested method/material?
8. Which part of a simulation session do you think will be most effective for training non-technical skills?
9. What other methods apart from simulation will be useful for training learners for non-technical skills?
    a. Which aspect of this method will make learners competent in non-technical skills?
    b. Which method in your opinion will be useful to teach each non-technical skill?
    c. Will this method be use alone/along with simulation?
10. Is there any possibility to have some kind of barriers for integrating non-technical skills in the current curriculum?
    a. What will be those barriers?
    b. How can be those barriers minimised?
11. Do you have anything to add at the end of interview?

Figure 1: Schedule for semi-structured interviews and FGD with teachers

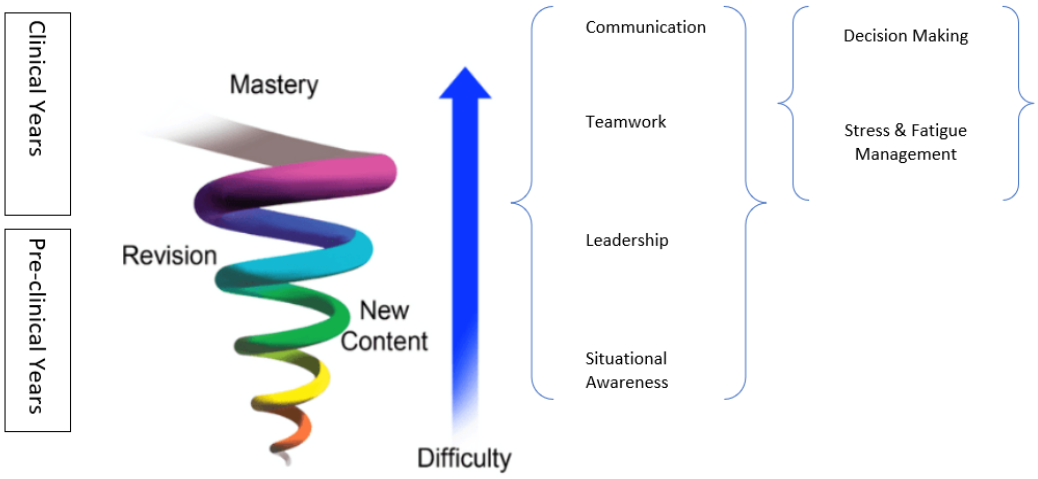

Figure 2: Using a spiral curriculum to train undergraduate medical students for NTS

Table 3: Suggestions for planning simulation sessions for effective training of NTS

Pre-requisites for simulation sessions	• Knowledge of NTS provided to students before systematic practice through simulation sessions • The knowledge provided through didactic sessions, reading materials, pre-recorded case-based videos of errors due to NTS followed by small group discussions, seminars, eLearning, pre-test • Ward rounds with a focus on observing how NTS work in hospital settings
Year level for NTS teaching	• Pre-clinical years – start social skills including communication, leadership, and teamwork as well as introduce situational awareness • Clinical years – continue social skills/situation awareness, introduce decision-making and stress/fatigue management and gradually increase the difficulty level of all skills
Elements for effective simulation-based NTS sessions	• Integration with the core medical curriculum from year 1, and taught longitudinally throughout the curriculum • NTS elements based on previously validated taxonomies in literature (Gordon, Baker, *et al.*, 2015) • Integrated sessions for teaching both technical and NTS in most cases • Using standardised patients to augment the element of patient involvement/interaction and to maximize patient safety education • Keeping the scenarios simple by incorporating the least number of skills practised emphasising knowledge retention in students – use SMART and KISS principles • Intend to teach knowledge, skills and attitudes in the session • Debriefing – instructor-led with or without video aid or self-led, depending on learning outcomes/ skill level • Aim the scenarios to improve knowledge, skills and attitudes

Appendix

Sample quotes from each theme

Starting NTS training from pre-clinical years	Teacher 5: I believe that students should be trained on NTS, so they know how to manage and behave like team players when they go to clinical years. It will help shape their personalities and skills as doctors
	Teacher 7: Yes definitely it is important to train them from pre-clinical years. Most of the students don't communicate with us properly so how they will communicate with their team in the hospital or with the patients? It is very necessary to train them from year 1 or 2 so they are habitual in applying these skills
	Teacher 23: If students are taught NTS from pre-clinical years, they will be able to better correlate to the clinical problems they are given. In the pre-clinical years, students are given problems to deal with related to clinical history taking, breaking bad news etc. They face problems in communicating with acting patients because they do not have access to hospitals at this stage where they can observe seniors and get know-how about NTS, so it will be very good if they are trained for the NTS from early years.
	Teacher 4: I think it is better that NTS are taught to students in clinical years because they will remember them better as they will directly apply in the wards. Let's suppose if they are taught communication skills using standardized patients in year 1 or 2, and because they will not go to the hospital and apply learning to real patients, they will make an understanding that all patients are like standardized patients. So in my opinion, training for NTS will not benefit students until they are going to practically apply it in hospitals and by dealing with the real patients."
Determining the year to teach NTS	Teacher 6: Doctors should know how to act in a specific role, if they are in a team how to be an active team member rather than being passive. Some doctors only like to be a leader but when it comes to follow and perform according to certain instructions, they fail to succeed. Training the students for communication, teamwork and leadership will give them an opportunity to learn the basics of these skills from the beginning.
	Teacher 1: Skills like leadership and teamwork take time to develop. Being a good leader is very important for dealing with the complex clinical cases. And if students are not taught leadership skills from the beginning, how they will understand how to plan, allocate the tasks, manage the stressed situations, asking and giving help in complex situation. Same is with communication skills. They need to learn how to communication at different levels and with different people in work settings. So in my opinion these skills should be softly introduced from the beginning so they are competent in how to lead a team when they reach near to clinical practice. When students are provided opportunities to learn as active students, they will learn more.
	Teacher 22: When I observe undergraduate students or even new doctors who have just started their practice in wards, they lack situation awareness which is a fundamental skill for the patient care. They do not gather previous data and not do clinical assessment of patients in an organised manner. Sometimes they get distracted by the workload or pressure due to a patient's critical condition. This creates many problems for them, they are unable to respond to patients' signs or conditions on time. Sometimes they do not pick the changing clinical sign due to an unorganised assessment. That is why it is very important that undergraduate students are taught situation awareness as soon as possible so they have correct direction from the start.
	Teacher 29: Decision-making capabilities are directly related to the knowledge and expertise level of person. Students in pre-clinical years will not have enough exposure to clinical cases that it can help them to improve their decision-making skill.
	Teacher 14: Decision-making is a cognitive skill and it has some pre-requisites which students will not have until they reach in clinical years.
Using simulation to teach NTS	Teacher 18: Simulation is a teaching tool which allows students to transport themselves into a real hospital setting. This was students connect what they have been learning in lectures or classrooms with what they will be practicing in the hospitals. This provides them an active learning process. When these benefits are achieved in clinical skills, why not we extend these benefits to incorporating NTS in students' behaviors.
	Teahcher 12: If we teach students only theoretically about NTS, they will only gain knowledge, but using simulation will give them chance of developing skills as well as attitudes to take care of NTS along with clinical skills when they will be practicing with real patients. They will become quite effective team members
Devising effective simulation sessions for training NTS	***Integrated training with technical skills*** Teacher 6: I think best is to keep them more integrated not fragmented. The only situation where I think they can be fragmented in curriculum would be in first year of the program. But I think it would be better to integrate as early as possible, I think from year 2 onwards. You know the

	perfect balance and harmony between the technical and NTS would be from phase three where students start clinical year and when they start practicing practical cases
	Providing pre-simulation sessions knowledge of NTS Teacher 7: Success for any intervention depends on how well we orient the faculty, how well we orient the students and the students have all the rights to know what they're learning and it will in fact increase their motivation and it will increase their interest and I think they will come forward to learn it in a better manner so I think the pre simulation orientation will definitely help them
	Considerations to develop scenarios for simulation sessions Teacher 21: We don't have sufficient patient involvement in the simulation cases, specially doing a procedure. Increasing the fidelity of simulation by using standardized patients will improve students' opportunities to interact with patients as they would be doing in real practice. For example there is a scenario of a complex medical procedure, we train students to do the procedure on the manikin and that is it. But in real life, if patients are told about a complex procedure, most of them are reluctant and are not ready for the procedure. That is where the role of good communications comes to convince the patient, and this can be taught using standardized patients in the simulation sessions. This will train patients for conflict resolution in the tough situations. Teacher 2: Standardized patients will make simulation sessions more interactive, will build students' confidence by making them visualize how the clinical practice will be in presence of patients.
	Most effective part of simulation session Teacher 10: Debriefing allows to make sense of what has just happened during the session. Facilitator gets a full chance to enforce the positive aspects of students' performance and let them reflect on weaknesses in their performance. Not only this, students can express their feelings also. They can express where they felt stressed out during the session. And this is the first questions we ask in the debriefing that how you feel about the session. This can be very helpful in training for stress management. In my opinion debriefing is the most important part to train for NTS. Teacher 13: Feedback provided in debriefing is the most important part of simulation-based education because it leaves lasting impact on students' learning by allowing them to reflect and develop deeper understandings about their performance. A skilled facilitator can provide a valuable learning experience in debriefing sessions to learners, which they will take to their clinical practice
Other methods of teaching NTS	Teacher 23: Classroom-based methods such as lectures and small group teaching are suitable for every type of topic or skill and at all levels. These methods can be used alone or along with practical elements to maximise students' learning. And they will be adult learners so providing videos on specific cases using Moodle and then discussing these videos in classroom-based settings can be helpful in making students realise the importance of practising non-technical skills correctly.
	Teacher 9: We can use different methods at different stages for the same skill. For example, if I say that we use classroom-based methods to teach communication skills in pre-clinical years and then use simulation-based methods in clinical years. This will help students to practice what they have been learning in classrooms. We can use simulation when clinical communication or team communication is meant to be taught, and before that we use classroom-based methods. Similarly for other skills. Use case-based discussions, video-based discussions in classrooms for situation awareness and decision-making and then students practice these skills in the simulation lab.
Challenges/barriers in training NTS using simulation	Teacher 17: Training the trainers will be an initial challenge. As NTS and on top of that using simulation to train for NTS is a comparatively new thing in medical education. Many experienced and senior clinicians are not good at it because they were not trained this way. It will not be easy for them to integrate simulation into their teaching practices.