

Understanding of Non-Technical Skills among Scrub Nurses in the Operation Theater of Sultan Ahmad Shah Medical Centre @IIUM (SASMEC @IIUM), Kuantan, Pahang, Malaysia

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ABSTRACT

Background: For efficiency and safety, operating theatre personnel including scrub nurses require both technical and non-technical skills (NTS). Despite how technology helps with surgical accomplishments, scrub nurses' competency still depends on their ability to operate as a team and think critically. Despite evidence of NTS improving patient care, training remains underdeveloped, especially in Malaysia. This study aims to explore scrub nurses' understanding of NTS and their perspectives on their own NTS.

Methods: Purposive sampling was used to choose 10 participants for this general qualitative research. In-depth, physical interviews were used to gather data, and they were audio recorded to enable comprehensive data analysis. To find significance themes, thematic analysis was used for analysing the transcriptions of all the interviews.

Results: For each research objective, four themes were found: Task management and decision-making with subthemes: a) proactive preparation, b) decision-making under pressure, and c) time management; (2) teamwork and collaboration with subthemes: a) clear communication, b) mutual support, and c) conflict management; (3) situational awareness with subthemes: a) anticipating complications and b) sterility & environmental control; and (4) interpersonal skills and emotional regulation with subthemes: a) establishing professional rapport, b) emotional control, and c) conflict resolution.

Conclusion: As conclusion, scrub nurses in SASMEC understand the importance of NTS and apply them in surgical settings. To improve efficacy and patient safety, however, specific interventions such as NTS-based training and simulations are required, as evidenced by deficiencies in training, evaluations, and skill development.

Keywords: Non-technical skills; Operating theatre; Scrub nurse; Patient safety; Qualitative study

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Article History:

Submitted: 19 February 2025
Revised: 2 July 2025
Accepted: 6 July 2025
Published: 31 July 2025

DOI: 10.31436/ijcs.v8i2.434
ISSN: 2600-898X

INTRODUCTION

In ensuring patient safety, technical skills and non-technical skills (NTS) are important aspects for an operating nurse to employ. Developing a well-rounded surgical team requires interprofessional training and assessment, where NTS is essential to patient-centered care (1). This NTS is universally applicable and relevant in crisis management as it covers communication, decision-making, and situational awareness, which technical skills are differing across surgical roles (1). However, even though previous studies support its significance, NTS training is still being implemented slowly, which restricts its incorporation into perioperative practice (2).

NTS is wrapped around both social and cognitive skills which enhance teamwork and decision-making skills. The social skills encompasses assertiveness, effective communication and coordination (3,4). While cognitive skills include situational awareness, information gathering, interpretation and anticipating complications or changes to minimize risks in procedures (3). Moreover, both dimensions also contribute to task management which would assist scrub nurses in organizing their resources, adapting to challenging situations, thus maintaining their standards of practice under pressure. The lack of this NTS skill was studied and considered to be linked to poor patient care and adverse events, thus it highlighted the need for integration in the nursing education to reinforce credibility of the profession and improving patient outcomes (5).

The importance of NTS is well recognized by scrub nurses in optimizing surgical procedures, particularly in preparation of instruments and anticipating surgeon needs during procedure (6). Unfortunately, challenges like dominant team members influence or limited collaboration could arise when hierarchical dynamics set foot and suppress the NTS application (7). Given that research shows excellent team skills have a substantial impact on the quality of perioperative nursing and the OR work setting, effective collaboration is vital (8). Nevertheless, the ability of OR teams to respond efficiently to emergencies can be hindered due to poor communication, disruptive behaviors and a lack of structured training (9). This will result in an effect upon patient safety and surgical outcomes.

Modern technologies like virtual reality (VR), simulation-based learning and organized training programs may be integrated to improve the scrub nurses NTS (10, 11). The strategies can be done to enhance teamwork, decision-making, and situational awareness while also take into account on the problems with hierarchy and change resistance (12). The researcher highlights the need for localized research to establish baseline data on scrub nurses' NTS in Malaysia as many existing studies focus on non-Malaysia settings. By filling in these gaps with focused training and policy modifications, perioperative collaboration will increase, mistakes will be decreased, and overall patient care will be improved. However, there will be hurdles and resistance to change (8, 9). For that reason, the researcher decides to initiate the study in Sultan Ahmad Shah Medical Centre (SASMEC), Kuantan, Pahang, Malaysia. Therefore, this study aims to explore scrub nurses' understanding of non-technical skills (NTS) in their roles and to know their perspective on how NTS are applied in daily surgical practice.

METHODS

Research Design

This study employed a general qualitative descriptive approach, which required a clear understanding of its core objectives, adherence to procedural guidelines, and ethical considerations to ensure research validity. Upholding these principles fosters consensus on the credibility of the methods used, enhancing acceptance among broader audiences (13).

Setting and Samples

Participants were recruited from the operating theatre department in a single teaching hospital, SASMEC using purposive sampling. To meet the study's inclusion criteria, participants had to be Malaysian citizens. Next, the participants should have at least one year of scrub nurse job experience and speak Malay and/or English well. Interviews were conducted until there were no further revelations or no new codes emerged, which indicates data saturation.

Data Collection

Recruitment processes were done between November 2024 and January 2025. The researcher has also taken the time to get to know the participants prior to the interviews to ensure

their familiarity with the participant and the interview. The semi-structured, physical interviews were organised by employing an interview guide that comprised the elements in the Scrub Practitioners' List of Intraoperative Non-Technical Skills (SPLINTS) assessment. Thus, the interview guide was done with the approval of the SPLINTS assessment's developer. With participants' consent, conversations were recorded and supplemented with notetaking for accurate transcription and analysis. All interviews took place in a designated room within the operating theater and lasted between 20 to 50 minutes.

Data Analysis

Data was analyzed using thematic analysis. The researchers systematically examined the transcribed interview texts to identify recurring themes, ideas, and patterns using a structured process, ensuring a thorough and unbiased interpretation of the data (14). In this process, in-depth data analysis was conducted, where the data was carefully coded to identify the main themes and the subthemes that may arise. To ensure accurate interpretation, the transcripts were reviewed and checked thoroughly by the research team.

Thematic analysis was carried out in several steps. First, the data was thoroughly read and re-read to gain familiarity. Important assertions were then coded, which made it possible for important ideas about NTS to surface. These codes were then grouped into broader themes based on patterns observed across participant responses. Then, the finalized themes were refined and validated to ensure consistency and relevance.

To further confirm the accuracy of participant statements, second and third interviews were conducted with selected participants. This allowed the researchers to verify their interpretations of the participants' statements, clarify any ambiguities of the data, and to ensure that the findings accurately reflected participants' experiences. Additionally, member checking was performed, where participants reviewed the interpretations to confirm accuracy.

Thematic coding was based on the assumption that participants would provide truthful and reflective responses based on their experiences. While efforts were made to maintain cultural

neutrality, the researchers acknowledge that interpretation is influenced by their own clinical background in perioperative nursing. Reflexive journaling was maintained throughout the data collection and analysis process to ensure awareness of potential biases. The primary researcher is a clinical nurse with operating room experience, which provided contextual insight but required conscious reflection to minimize interpretive bias.

Trustworthiness

Trustworthiness was ensured through dependability and confirmability measures. The dependability was maintained by conducting a confirmability audit by field supervisors and lecturers to verify consistency in methodology and adherence to credibility and transferability standards. The researcher employed reflexive journaling to reduce bias and increase confirmability, making sure that conclusions were based on participant data and previously published research. The consistency of the data and interpretations was further confirmed by a confirmability audit (15), reinforcing the study's rigor and reliability.

RESULTS

Demographic Characteristics of the Participants

A total of ten participants were interviewed in this study, representing a range of professional and demographic backgrounds (**Table 1**). Of these, seven were female and three were male, accounting for 70% and 30% of the sample, respectively. In terms of ethnicity, the majority of participants (90%) identified as Malay, while 10% identified as Indian. Educational qualifications varied across the group: six participants held post-basic certifications, three possessed diplomas, and one held a bachelor's degree, reflecting diversity in educational attainment.

Objective 1: Understanding Non-Technical Skills Among Scrub Nurses

The study explored how scrub nurses understand and describe NTS in the scrub nurses' roles. Four key themes have been discovered: situational awareness, teamwork and collaboration, task management and decision-making, and interpersonal skills and emotional regulation. Each theme was further

categorized into subthemes, providing a deeper understanding of how scrub nurses integrate NTS into their daily practice.

Theme 1: Situational Awareness

Anticipating Complications

Most participants have mentioned the importance of preparation for unexpected changes during operation. They highlighted how scrub nurses play a role in recognizing any warning signs and how they need to proactively respond to any potential complications.

"Everything is to decide fast, like during LSCS. The critical situation is when the baby is out from the mother. Our priority is both the mother and the baby but most importantly the baby. The baby has the risk of injury during the minute they come out of the

operation site."

(P1)

Sterility and Environmental Control

While sterility is indeed encompassed in the technical skills that were addressed and trained, it was also mentioned by the participants how important it is to be maintained and controlled through the NTS of situational awareness. Where it was stressed how important it is to check the surgical instruments, monitor the sterile fields, and ensure that the surgical environment remains contamination-free. A participant (P4) mentioned:

"We should check every single instrument, item, facility, and system in the OT before a patient comes in. Know the function and risks of using anything in the OT."

Table 1: Characteristics of Participants

Participant	Age	Gender	Race	Marital Status	Highest Qualification	Years of Experience
#1	31	F	Malay	Single	Post Basic	6 years
#2	35	F	Malay	Married	Post Basic	6 years
#3	27	F	Malay	Single	Diploma	1 year
#4	28	M	Malay	Single	Post Basic	7 years
#5	25	F	Malay	Single	Diploma	2 years
#6	37	M	Malay	Married	Post Basic	8 years
#7	36	F	Malay	Married	Post Basic	14 years
#8	35	F	Indian	Married	Degree	13 years
#9	34	F	Malay	Single	Post Basic	6 years
#10	29	M	Malay	Single	Diploma	3 years

Theme 2: Teamwork and Collaboration

Clear Communication

In order to guarantee that every team member is on board with the surgical procedure, participants have emphasised the necessity of clear, assertive, and structured communication. One participant (P8) highlighted the significance of speaking up during emergencies:

"In critical moments, especially in emergencies, you have to speak up clearly and make sure everyone in the team knows what's happening – whether it's the surgeon, scrub nurse, or anesthesiologist. Every second counts."

Mutual Support

In the operating room settings, the participant emphasized how scrub nurses relied on teamwork to handle unexpected challenges.

Many of them noted that trust and collaboration were critical in reducing stress which eventually prevents errors. A participant has also recalled their experience as a scrub nurse in a Total Hip Replacement surgery where team coordination made the surgery process smooth and stress free.

"During the hip replacement, we were all so well-coordinated. Every time something unexpected happened, the team was ready to support each other."
(P5)

Conflict Management

Professional dispute management is also essential to preserve team harmony in the OR. With this, participants have shared that addressing conflicts or dispute outside of the operating room helps maintain focus during surgeries.

"It's essential to manage conflicts away from the operating room so the team's performance isn't impacted during surgery."
(P10)

Theme 3: Task Management and Decision-Making

Proactive Preparation

The important aspect of gathering instruments and supplies ahead of time to avert interruptions was brought up by the participants.

"Reviewing the surgical schedule and making sure all necessary items are ready in advance reduces potential interruptions."
(P2)

Decision-Making Under Pressure

In critical or under pressure situations, decisions must be made quickly and assertively. The participants shared how it is important to act swiftly when complications arise during surgery.

"In cases like when an accidental injury occurs during surgery, we have to make quick decisions. Coordination and decisive actions are critical to ensure patient safety."
(P9)

Time Management

Scrub nurses are also required to ensure efficient completion of the procedures where it does not compromise the quality of their work.

"Time management is crucial. We ensure all tasks are delegated among team members, so everyone knows their role."
(P6)

Theme 4: Interpersonal Skills and Emotional Regulation

Building Professional Rapport

In highlighting the role of NTS in fostering a productive OR environment, developing strong professional relationship is required. One participant (P7) stated:

"Kindness and openness are crucial. When we all communicate openly, it creates a supportive environment."

Emotional Control

Furthermore, among the participants, most of them emphasized staying calm while being under pressure is important. Which underscores the role of NTS such as emotional regulation in ensuring smooth procedure.

"During stressful surgery, staying calm is important not only for me but also for the whole team."
(P8)

Conflict Resolution

Continuation of conflict management in the theme situational awareness, the subtheme also emerges in the interpersonal and emotional regulation theme as how they are essential to maintain a positive team dynamics. A participant (P4) noted:

"If there's a misunderstanding between the surgeon and me, I always try to stay calm and talk through things."

Objective 2: Scrub Nurses' Perspectives on Their Non-Technical Skills

The participants have also shared their experiences in applying the NTS in their individual scrub nurses' role. The themes emerge was situational awareness and patient

safety, teamwork and collaboration, task management and decision making, and Each of these main themes was further divided into subthemes, offering deeper insights into how scrub nurses perceive and utilize NTS in their daily practice.

Theme 1: Situational Awareness and Patient Safety

Maintaining Sterility

A key element of situational awareness involves adhering to strict sterility protocols to prevent infection. As one participant (P6) noted,

"We need to keep adhere to the 13 principles of aseptic technique,"

emphasizing the critical discipline required to prevent contamination and safeguard patient health throughout the surgery.

Alertness to Surroundings and Monitoring Conditions

Scrub nurses emphasise the value of a proactive approach by being constantly aware of possible and current hazards.

"We should be alert of every action and anticipate future actions,"

said P1, highlighting the need of situational awareness in foreseeing issues. Furthermore, maintaining patient safety greatly depends on knowledge of the working environment, including the state of the equipment and the surrounding circumstances.

"We need to understand what procedure, where to do it, and what instrument to use",

according to P6 who also underlined the importance of keeping an eye on environmental factors,

"OR has its own temperature and humidity; if it's above the normal range, we should notify the TL and engineers."

Cross-Checking Consents and Details

It was also emphasized by the participant how situational awareness is reflected in the careful verification of patient information and surgical details in preventing errors.

"Check everything again – the identity, consents, site marking, even allergies."

(P3)

This is one of the vital practices to safeguard the patient from any potential harm.

Safe Positioning and Transfers

The component of safe positioning and transfer was highlighted by several participants in maintaining safety throughout the procedure. This skill also incorporate other NTS like teamwork and communication.

"Before intubation, we should check surroundings, lock the bed, and cover the patient's skin appropriately to avoid cases like burns due to our instruments."

(P2)

Recognizing and Managing Changes

Situational awareness is also described as the ability of scrub nurses to identify and respond effectively to any changes during surgeries. For example, one participant (P3) had shared on their experience where unforeseen bleeding complication changes a scheduled laparoscopy surgery into laparotomy surgery. This underscores how the nurse's ability to quickly adapt to such changes in situations while putting the patient safety as their top priority. Foremost, it was also agreed by another participant in regards of addressing emergent situations, that recognizing and managing changes is crucial.

"We need to alert the surgeon that our item is missing, while others – sterile or not sterile – should search for it until we find the missing items."

(P1)

Equipment and Instrument Verification

Confirming the readiness of all instruments and equipment was another key aspect of situational awareness highlighted. The meticulous verification is also in aspects of functionality and availability of the items. This step was taken in order to minimize the risk of any potential complication due to equipment failure.

"We should check every single instrument, item, facility, and system in the OT before a patient comes in."

(P4)

Theme 2: Communication and Teamwork

Clarity in Communication

A total of 9 participants emphasized the need for clear and concise communication in the OR work settings. As a participant (P4) stated,

"We need to convey order or message clearly to our teammates because sometimes, not everyone knows what to do."

Where this shows how precision in the transmission of instruction or updates can reduce the risk of confusion thus would not jeopardize the operational flow.

Collaboration Across Roles

Communication skills and interprofessional collaboration in the surgical team are needed to ensure good operational flow or the smoothness of the procedure. 8 participants have noted the element in their daily practices.

"We need to prepare our things and communicate with our team. Sometimes, other teams like the on-call team are the ones who prepare them, so we need to ask them what is there and what is not."

(P2)

Support for Less Experienced Teammates

Effective teamwork also involves mentoring and supports among team members. Most participants highlighted the role of senior scrub nurses in guiding junior scrub nurses or the less experienced in fostering skills development. They agreed that through such guidance, it can also ensure team's competence and cohesion.

"Being a leader is quite hard due to the expectation of others towards us. It's quite a burden, but we should settle problems on our own."

(P5)

Adamantly, this reflects how senior nurses are responsible to not only to lead but also provide support professionally.

Professionalism in Conflict Resolution

Six participants discussed the importance of mitigating conflicts calmly and professionally. The participants stated that such action reflects that personal differences among team members

should not compromise patient care or teamwork.

One participant (P4) remarked,

"If there's a breakdown of teamwork due to fights, we should keep it to ourselves first and handle it outside of work later."

Given that, private conflict resolution should be made and team members are to maintain professionalism in the workplace to prevent any disruptions in patient care.

Theme 3: Task Management

Preparation and Anticipation

Participants emphasized the need of preparation and anticipation of changes to allow scrub nurses to remain adaptable and proactive during surgery. The 'looking forward' mindset is important to have the team prepared for any changes in the procedure.

"We usually estimate the duration of surgery, but complications can also happen and delay the estimation time."

(P1)

Delegation and Role Clarity

The complexity of workflows in the operating theatre pivoted the importance of clear delegation and understanding of one's role. One participant mentioned that effective tasks delegation could contribute to smoother operations (P6). Which also addresses that clear communication and task division is needed to prevent any potential confusion which ensures all responsibilities are managed accordingly.

Time Management

Seven participants noted time management is particularly essential in the progression of procedures, where time should be efficiently managed and not cause any unnecessary delays. One participant (P10) stated,

"If possible, we fasten our pace to call out the patient to OT, transferring. When the patient comes in, we should start immediately".

Where in fact, time management contributes to optimal patient care by demonstrating strong

commitment in keeping the surgical schedule and cutting down waiting time.

Adapting to Unfamiliar Cases

In regards of having support from more experienced staff, scrub nurses underscore how they personally need to adapt to new and unfamiliar cases.

"Scrub nurses should find out and study about the surgery before the actual thing happens."

(P9)

Participants noted the importance of individual researching and effective communication within the team to ensure successful outcomes and adaptation.

Theme 4: Stress and Conflict Management

Maintaining Calmness

Considering the closeness of the themes from the previous objective, this subtheme reflects the practice of the participants on their individual emotional regulation skills. Most of the participants highlighted how maintaining composure is vital for both personal performance and overall teamwork.

"Staying calm and focused is key, especially when things don't go as planned. It's essential to keep your mind clear and continue to think rationally."

(P10)

"When an emergency occurs, like when a patient's condition deteriorates unexpectedly, it's crucial to stay calm to avoid panicking and ensure a swift response."

(P7)

Proactive Problem-Solving

Participants shared that they are able to proactively address issues during procedures thus resolving them effectively. These aspects would involve taking initiatives in minimizing any sort of disruptions to the procedure and OR environment.

"If there's an alarm or some technical issue, I know I can count on the engineering team to respond fast. It's about addressing the problem immediately to avoid delays."

(P4)

"Sometimes, if something unexpected happens, like a broken instrument or system malfunction, I step in to ensure we get a solution quickly, so we don't fall behind."

(P8)

Team Support

A total of seven participants have stated their contribution in supporting team members during high-stress situations was important. Which fostering positive team dynamics was said to be emphasized in reducing stress and improving overall team performances.

"Motivating each other, reassuring one another, especially in stressful surgeries, can make a big difference in how we perform and how we handle difficult situations."

(P5)

"We have a very supportive team, so when stress levels rise, we know we can count on each other for emotional support and practical help."

(P2)

DISCUSSION

The findings of this study highlight the significant role of NTS among scrub nurses in SASMEC. Although these findings are consistent with previous research outlining the value of NTS in maintaining patient safety and maximising surgical performance, there were clear absences in proper assessment and structured training, indicating the need for targeted measures to increase the effectiveness in high-risk operating room settings.

It was shown that situational awareness was essential for preserving sterility, foreseeing challenges, and ensuring optimal surgical workflows. In order to prevent disruptions and improve surgical outcomes, participants reported being able to acquire, evaluate, and anticipate information. This aligns with previous study, who emphasized that perioperative nurses must critically assess patient conditions and environmental factors to ensure procedural safety (16). Furthermore, findings from the previous study emphasized the need for training to enhance situational awareness among surgical team members (3).

Teamwork and collaboration were identified as a foundation of successful surgical procedures, with clear communication and mutual support

emerging as important elements. The findings reflect the findings from previous studies which indicate that structured interprofessional collaboration improves patient outcomes and reduces surgical errors (8). But several participants expressed concerns, which at times made it harder to be assertive and communicate effectively. This corresponds with previous study, who observed that perioperative teams' power dynamics could hinder cooperative behaviours, affecting the performance of the team (7). Fostering a culture of psychological safety and implementing collaborative training programs are suggested as solutions to this.

While the findings generally aligned across participants, there were different views, particularly regarding the handling of stress and conflict. A few participants reported that certain team dynamics discouraged open communication, which contrasted with others who emphasized team cohesion. These discrepancies were explored through reflexive journaling and discussed with the research team to ensure balanced interpretation. By acknowledging and analyzing such contrasts, the study offers a more nuanced understanding of NTS practices within the operating theatre.

From the results, it shows how participants acknowledged that task prioritization and decision-making under pressure are a necessity in their role as scrub nurses. Next, their ability to adapt to changes or unexpected challenges was also pivotal while ensuring procedural efficiency. Thus, the findings correspond with previous study, which highlighted the decisions made by scrub nurses have a major impact on risk reduction and surgical readiness (6).

Interpersonal skills and emotional intelligence have been found to be essential for averting conflicts, managing stress, and preserving a healthy work environment. According to the participants, controlling their temperament in high-stake situation and cultivating professional relationships improved the cohesiveness of the team. The significance of emotional control correlates with research stressing the relevance of psychological resilience in high-stakes surgical situations (5). Additionally, stress management strategies, such as peer support and organised debriefings lends more credence to the necessity of incorporating these elements throughout NTS training.

By integrating structured NTS training into nursing education and perioperative practice, healthcare institutions can strengthen teamwork, decision-making, and communication skills, which may lead to better patient outcomes. Additionally, fostering a culture of continuous professional development, including simulation-based training and competency assessments, can further refine these skills and address hierarchical barriers in the operating room. Foremost, certain limitations can be observed from this study. Because the study was limited to a single healthcare facility, the findings may not be generalised to other health care facilities with different organisational frameworks and collaborative dynamics. Additionally, recall and social desirability biases may be introduced by depending too much on self-reported data gathered through interviews, which might affect participants' responses. To further confirm the findings, future study should broaden its scope by involving various healthcare facilities as well as applying observational methods.

CONCLUSION

This study emphasises the importance of non-technical skills (NTS) are to scrub nurses' roles in Sultan Ahmad Shah Medical Centre (SASMEC). The findings indicate that scrub nurses recognize the significance of NTS, particularly in situational awareness, teamwork and collaboration, task management, and emotional regulation. Both patient safety and the general effectiveness of surgical treatments are enhanced by these competencies. But to improve NTS implementation in the operating room, structured educational programs and competency evaluations to enhance NTS application in the operating room should be made accordingly.

Addressing these gaps through targeted interventions, such as simulation-based training and interprofessional collaboration, may help to further strengthen the effectiveness of scrub nurses' roles. Future research should expand the scope to multiple healthcare facilities and institutions to gain better and broader insights into the NTS application across different settings. Through reinforcing NTS training and fostering a supportive perioperative culture, healthcare institutions in the future can optimize surgical team performance and improve patient outcomes.

LIMITATIONS

The findings of this study can be greatly valuable for future studies, but it's limited in the generalizability aspects. This is due to the conduct in just one healthcare institution, specifically within SASMEC. Foremost, the results are tied closely to the unique organizational structure, culture, and operational environment of this healthcare setting. It may differ significantly if the study is done in other institutions, making it challenging to apply the insights universally. The outcomes and the context in which they were interpreted can be influenced by the distinctive characteristics of SASMEC. Which the conclusions to broadly applicable reduces.

While the qualitative approach aims for deeper exploration of participant experiences and perceptions and taking a limited amount of samples. Another limitation is observed in the sample size used in this study. A larger sample would have provided a wider scale of understanding on the NTS, offering a larger range of viewpoints and the reliability of the findings would also be increased. And again, the limited scope of the sample may pressurize the ability to make definitive or widely applicable conclusions.

Lastly, the study's reliance on self-reported data may introduce potential biases. An issue influenced by recall bias, where their memories of past events may not be entirely accurate can actually happen among the participants. Additionally, social desirability bias could also have affected the participants' responses. These biases could impact the validity of the data collected, and further emphasize the need for cautious action when interpreting the results.

CLINICAL IMPLICATIONS

The findings of this study suggest several key strategies that can improve nursing practice, education, and organizational management. Enhancement of training programs is one significant implication. Scrub nurses can prepare better in managing high-pressure situations if an incorporation of stress management and emotional regulation techniques into existing training frameworks can be made. Ensuring that nurses are well-equipped to navigate challenging scenarios effectively, these additions can foster resilience and composure in critical environments.

Development of clear policies to improve teamwork and communication should also be considered. By establishing protocols that prioritize open communication and conflict resolution, hierarchical barriers in healthcare settings will be significantly reduced. Better collaboration and more efficient problem-solving can be nurtured if nurses are encouraged to express their concerns and ideas openly. Such policies can create a more supportive work culture where staff members feel heard and valued, ultimately improving patient care.

Lastly, the highlights on the importance of continuous professional development can be observed from the findings. Focusing on NTS elements for regular workshops and simulation-based training would become an essential role in enhancing team performance. These training opportunities are for constantly refining nurses' skills while staying up-to-date with the practices in patient care. To empower the nurses, a supportive work environment which emphasizes psychological safety and mutual respect should be created.

ETHICAL CONSIDERATION

The study received ethical approval from the Kulliyyah of Nursing Postgraduate and Research Committee (KNPGRC), the IIUM Research Ethics Committee (IREC(UG) 2024-058), and the SASMEC Research Committee (IIUM/413/013/14/11/1/IIR24-05).

Participation was entirely voluntary, and participants were informed of their right to withdraw at any time without consequences. Written consent was obtained before data collection, and interviews were recorded only with participants' permission, ensuring confidentiality and anonymity.

CONFLICT OF INTEREST

The authors declare no conflict of interest with respect to the research, authorship, and publication of this article.

FUNDINGS

There is no funding for this research.

ACKNOWLEDGEMENTS

The researcher sincerely appreciates the participants for their time and valuable contributions to this study. Gratitude is also extended to the management and staff of the Operating Theatre, SASMEC for their support and assistance in facilitating the research process.

AUTHORS CONTRIBUTIONS

NAR: Study design, data analysis and manuscript writing.

NSO: Study design, data collection, data analysis and manuscript writing.

KTA: Manuscript writing.

NAR: Manuscript writing.

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