

Preparation of nursing students for operating room exposure: A South African perspective

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Background. Limited time for training and preparation of student nurses in a busy operating room (OR) could be attributed to a shortage of qualified OR nurses in South Africa.

Objective. To determine the participants' perceptions of the content and modes of delivery of an improved preparation programme for nursing students to enhance learning in the OR.

Methods. A qualitative research approach, which included nominal group discussions with students and OR staff, was used for data collection.

Results. The need for an improved preparation programme was confirmed. The programme should address documentation, equipment, maintaining sterility, orientation, swab and instrument control, and OR preparation. Suggested modes of delivery include practical demonstrations in small groups, flip-the-classroom approach and simulation.

Conclusion. Adequate preparation has a direct impact on students' learning in and their impression of the OR, which could result in more students selecting OR nursing as a career path.

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The nursing student entering the operating room (OR) for the first time often finds it an intimidating environment. Misconceptions and misunderstandings frequently result in a negative experience, leading to the inability to optimise the learning opportunity. The OR could be perceived by many nurses' standards as a demanding, hostile, overwhelming, high-paced and high-stress working environment, and even more so by a student nurse who is a novice in the OR.^[1] Nursing students often do not know what is expected of them or how to do the work.^[2,3] Global and local shortages of OR nurses^[4-7] put student nurses under even more pressure. Furthermore, OR personnel expect students to function as experienced members of the OR team, while students might have the perception of being useless and feeling out of place.^[3,5] Currently, in the South African (SA) context, student nurses are being placed in the OR even though they have very limited theoretical teaching or practical training for this work.^[8]

Several international studies^[5,9,10] where preparation programmes were implemented prior to OR placement, described positive outcomes and a positive impact on learning in the OR. Recruitment and retention of OR nursing staff are additional benefits of preparation programmes.^[5,9,10] Meyer^[3] and Van der Merwe^[8] found that students need an improved preparation programme before being placed in the OR. The participants in these studies were of the opinion that the development of such a programme would enhance student nurses' learning during placement and their overall perception of the OR.^[3,8]

In SA, OR placement is mandated by the SA Nursing Council (SANC).^[11] Most of the students are placed in the OR with limited preparation, contributing to compromise student nurses' learning during clinical placement.^[8] George *et al.*^[7] reported that in 2009, ~18.0% of registered nurses were

sedentary, 65% of nurses who were trained between 1997 and 2005 did not appear on the SANC register, and 76% of registered professional nurses were facing retirement within the next decade. This situation may result in a group of young and inexperienced registered nurses, who do not have the support and guidance of a large cluster of experienced registered nurses to become established in their new roles as registered nurses. The current international and local shortages of qualified registered nurses put increased pressure on student nurses, contributing to anxiety and even fear of the situation in the OR.^[4]

With regard to the OR as a learning environment, Meyer^[3] and Van der Merwe^[8] stated that for learning in the OR to be effective, students have to feel that they are being supported, encouraged and included as part of the team. For student nurses to cope with the complex OR environment and participate as team members, they need to be prepared sufficiently.^[12] Educational approaches to this type of preparation have been described extensively and include strategies and methods such as demonstrations, working in small groups, simulation, practical assessment and feedback.^[13,14]

Research that focuses on the preparation of student nurses for their first rotation in the OR is limited, both internationally and in SA. The findings of this study could contribute towards the improvement and/or development of a student nurse's preparation programme for OR rotation. A programme resulting from the findings could have a positive impact on SA students' OR rotation in terms of learning and general experience, similar to the international examples mentioned by Gregory *et al.*^[9] and Hope *et al.*^[10]

This study was conducted at an academic training hospital in SA to obtain the views of nursing students and permanent OR staff, who were directly involved with and affected by student nurses' placement in the

OR, the current OR preparation programme and how it could be improved to better prepare the student nurse for OR placement. Furthermore, their opinions with regard to the best modes of delivery of such a programme were determined. Based on the results of the study, the principal researcher intended to develop a preparation programme that would prepare the nursing student before OR placement. The matters that needed to be addressed were: (i) what an OR preparation programme should consist of regarding its content; and (ii) the optimal method of delivery of such a programme.

Methods

A descriptive qualitative study design was employed, with the intention to explore the content and delivery methods of an OR programme.^[15] The investigation focused on the practical problems encountered by participants during their training, who all shared the unique experience of being novices in the OR, and to acquire practical solutions.^[16]

The nominal group technique (NGT) has been proven to be a feasible and reliable method for the production and prioritisation of responses relating to a specific phenomenon enquiry,^[17,18] and was used as data collection method for this study. The NGT process included the following steps: preparation (design, room and meeting preparation), silent idea generation, recording of the ideas, discussion of the ideas, preliminary voting, discussion of preliminary voting and final voting.^[19]

Setting and sample

The setting was an academic hospital, affiliated to the University of the Free State, Bloemfontein, SA, where undergraduate and postgraduate students from various disciplines are trained. The study included only one institution, but future studies might include more institutions, even private hospitals. Purposive sampling was done so that participants could objectively contribute to this specific phenomenon.^[17] The inclusion criteria for the sample of the following two groups were: (i) group 1 – undergraduate nursing students ($n=8$) with no prior OR exposure, who very recently completed their OR rotation; and (ii) group 2 – permanently employed personnel ($n=5$), including registered/scrub nurses, anaesthetic nurses and floor/circulating nurses, working in ORs where students had completed their clinical placement. As all participants were able to express themselves in English, it was the language used to conduct the NGT discussions, even though the participants spoke different languages.

Data collection and measures

The research was carried out in 2016 in a quiet room in the OR complex of the academic hospital while participants were on duty on Saturdays, because that day is not extremely busy and participants are in the OR complex should an emergency occur. The NGT discussions were conducted under the supervision of an experienced facilitator, with the researcher as an observer in the room. Both were unknown to the students. Two questions were posed to the two nominal groups: 'What should an operating room preparation programme consist of?' and 'What would be the most optimal way to present the programme?'

Data were collected from the two group discussions; both indicated what would be valuable skills for a novice OR student nurse to acquire, and the most effective methods to teach the students these skills.

Data were documented as accurately and comprehensively as possible to ensure that the findings of the study were dependable. The rigour of

this qualitative study was ensured by it having truth-valued, applicable, consistent, neutral and authentic data and results. The reliability of qualitative data is to a considerable extent determined by the methodological competence, sensitivity and integrity of the researcher,^[20] which in turn contributes to its trustworthiness and credibility. This study invites the reader into the phenomenon being researched by enabling them to develop an intensified understanding of the issues being addressed.^[17]

Ethical approval

The Ethics Committee of the Faculty of Health Sciences at the University of the Free State granted institutional approval to conduct the study (ref. no. ECUFS 202/2015). Permission was also obtained from the university and hospital authorities. Before the NGT discussions started, all participants were informed that participation was voluntary and would not in any way impose on or affect their human rights. They were made aware that they had the right to stop participating at any point without any form of penalty or discrimination. All participants had to give written informed consent to participate in the nominal group discussions.

Data analysis

Ideas and theories regarding the phenomenon were developed by the participants during the NGT process. Participants had to rank their chosen statements, which were placed in order of the most important to least important. The most important statement was scored with a 6 and the least important with a 1. The top 6 votes were indicated, and votes with their rankings were recorded. The researcher was involved with the data collection observer during the process,^[17] resulting in simultaneous collection and analysis of data. The data were captured by transcribing the participants' ideas verbatim. The text was then interpreted by the researcher to find similarities and identify categories/themes.^[17,21] The categories that were identified during the NGT were used when compiling the description of the content and modes of delivery of the preparation programme.^[17]

Results

With regard to a proposed preparation programme, the top 6 statements of both groups were combined and categorised according to their similarity. The categories that were identified and ranked are listed in Table 1. The main categories were documentation (29%), maintaining of sterility (19%), equipment use (19%), OR preparation (15%), swab and instrument control (10%) and orientation (8%). Both NGT groups identified these categories, which were in line with the needs of student nurses and OR personnel in a functioning, busy OR.

Both groups listed methods that they felt were best suited for presenting a preparation programme. Suggested modes of delivery included practical demonstrations and simulation, visual learning, practical group sessions, preplacement preparation and formal lectures with written tests. The suggestions were tabulated, categorised and prioritised according to group consensus (Table 2). In the student group, simulation, demonstrations and videos were considered the best modes of delivery for the preparation programme compared with those of the OR staff, who put more emphasis on lectures and booklets. This could be ascribed to the generation gap between the two groups. Demonstration and simulation, however, were top of the list in both groups.

Table 1. Combined findings for the top 6 statements regarding question 1: ‘What should the content of an OR preparation programme consist of?’

Category	Statement	Group	Votes, <i>n</i>	Final ranking
Documentation	Learnt how to use and complete intraoperative documentation and OR registers	1	37	1
	Receiving a patient in the OR	1	18	2
Maintaining of sterility	Receiving a patient in the OR – consent and what questions to ask	2	12	
	How to correctly open sterile packs	1	17	5a
	Identification of sterile and non-sterile areas in the operating room	2	11	8a
	Pouring of solution into sterile containers	2	6	10
	Preparation of a sterile trolley	2	9	9
Equipment use	How to use the suction unit	1	11	8b
	Use of the suction unit	2	0	
	How to use the diathermy machine	1	17	5b
	Application of diathermy plate	2	8	9
	Knowing how the tourniquet works – use, hazards, application time limits, how it looks	2	0	14a
	How and where the OR lights are turned on and how to operate the ear, nose and throat headlight	1	0	14b
	How the OR beds functions	1	4	12
	How to use operating room doors – how and when too open and close	2	5	11a
	Use and hazards of the bear hugger	2	0	12
	OR preparation	Preparing the OR before each patient	2	16
Preparing the OR bed before each patient		2	13	7
Collecting of the refrigerated drugs and preparing intravenous infusions for assisting with anaesthesia		2	2	13
Basic procedural routine to be explained to know what to do and when		1	0	14d
Patient privacy in the OR – no over-exposure, cover patients		2	5	11b
Swab and instrument control		Counting of swabs and instruments: want to be able to differentiate between different swabs and instruments– the names and what each looks like	1	24
	Orientation	Student to know how to introduce themselves – name, what type and year student, what they want to learn	2	18
Placement to one discipline a week – to be orientated and instructed in one discipline at a time		1	0	14c

OR = operating room.

Table 2. Methods proposed for the presentation of an OR preparation programme for student nurses, and combined ranking of the two groups

Students	Permanent OR personnel	Combined ranking
Demonstrations and simulation	Simulation presentation and demonstration	Demonstration and simulation
Videos pre- and post-clinical placement	Lecture with pictures and a booklet to recheck information	Visual learning aids
Lectures and PowerPoint presentations	Formal lectures and a test during rotation	Formal lectures with assessment
Practice sessions in small groups	Formal lectures	Practical small-group sessions
Preparation programme before rotations	Simulation with outcomes	Preplacement preparation

OR = operating room.

Discussion

Content of a preparation programme

From a medico-legal perspective, *documentation* in the OR is of vital importance to safeguard patients and healthcare personnel.^[22,23] Competence with OR documentation is a skill that takes time to accomplish, and the staff indicated that they needed student nurses to be reasonably skilled in the completion of intraoperative documentation. They also felt that they did not have adequate time to teach student nurses during procedures, which is one of the main areas where student involvement increased their stress levels and workload.

Participants listed *maintaining sterility* as one of the areas that the student nurse should be well acquainted with. The problem that had been raised was that students were mostly ‘unaware’ that they were contaminating a sterile field, adding pressure on OR personnel, which often culminated in permanent staff becoming anxious and agitated. The fear of doing something incorrectly and being unsure of what was expected, caused student nurses to become anxious; they would often withdraw and not participate. Currently, the students’ programme includes a theoretical lecture, demonstrations and practical training and assessment pertaining to basic general aseptic principles. However, this programme is inadequate, as

students are not competent to comply with the sterility principles applicable to the OR.

When equipment in the OR fails, it can lead to a catastrophe.^[24] The term *equipment* was used as an overarching concept that enveloped numerous statements by participants. All participants were of the opinion that student nurses should be able to use some of the basic equipment in the OR. The inability to correctly manage basic OR equipment could lead to misuse of or damage to it, which might result in malfunction and/or harm to the patient. Student nurses thought that they were perceived as being 'dumb' or 'stupid' or 'not interested' when following or participating in the procedure while they were unsure of what equipment was being referred to or how to make the required adjustments.

OR *preparation* was mentioned by both groups. On the one hand, students did not feel sure of what OR personnel expected. On the other hand, the personnel thought that students did not want to participate in routine work in the OR. Students felt that they had to do what registered nurses do; however, the role of the student in the OR should be made clear in advance. To become an excellent OR nurse, one should be able to be an excellent student nurse.

Swab and instrument control was an area of concern for student nurses. They mostly felt unable to differentiate between the various swabs and instruments, and therefore were apprehensive of being responsible for a miscount that could have a negative impact on the staff or patient.

Participants in the personnel group felt that during the *orientation* of students, the latter should be made more aware of the importance of correct and thorough introduction to the specific OR staff they had been allocated to. This would ensure that students are allocated correctly to reach their specific clinical goals, as students from various healthcare professions receive their training in the hospital OR complex.

Mode of delivery of a preparation programme

In reply to the second question regarding the optimal format of transferring the content of an improved preparation programme, different categories were identified by both groups. During the nominal group discussions, the participants suggested modes that are presented in order of highest ranking.

Simulation and demonstrations was the category that was rated highest in the combined section by both groups, despite permanent staff members having no or little simulation experience. The student participants indicated that simulation was one of the more effective ways to transfer knowledge to clinical practice. Simulation gives the student the chance to observe and practise actions, and can be used to train both technical and non-technical skills, such as communication, teamwork and professionalism. Demonstrations of certain procedures, equipment functioning and protocols could be incorporated into simulations with scaffolding from 'show and tell' to a simulation where students can perform the procedure or action themselves with feedback through debriefing.^[25]

Most students preferred *visual learning* and mentioned examples such as videos, PowerPoint presentations, pictures and booklets. In Dale's^[26] cone of experience, people generally remember between 30% and 50% of what they see and hear. Today's technology-dependent learners prefer visual teaching aids to gather and process new knowledge and to apply it in the clinical situation.^[27]

Formal lectures and written tests were proposed by the permanent OR staff, but nursing students did not mention this format. It could probably be

ascribed to lectures currently being part of the students' training and the main frame of reference of the older staff members. Contributing to these frames, students are being exposed to newer teaching strategies, such as simulation, to which the older OR personnel had little or no exposure. Dale^[26] postulated that learners remember only 20% of what they hear in a lecture, opposed to 80 - 90% if they simulate a real experience or perform a task.

Practical group sessions could assist students in learning, training and practising what they should apply, especially through simulation. Students preferred smaller groups for demonstrations, ensuring that all group members have the opportunity to practise their skills. Deliberate practice principles of technical skills should be introduced to allow students to master skills. In smaller groups, students tend to support each other, and it would allow the lecturer to observe all group members to identify problems and assist where needed.^[28]

Preplacement preparation prior to the student's placement is preferred, so that the newly acquired information may be implemented while fresh in the student's memory. E-learning of theoretical principles can form part of the preplacement preparation before contact time with preceptors or faculty. Principles of the flip-the-classroom concept can be introduced to augment the preplacement preparation to enhance the learning experience with empowered and engaging students.^[29] A comprehensive and well-prepared programme would benefit the students' perceptions of the OR and have a positive impact on their learning while there.

Study limitations

The study population was linked to one training institution. The specific expectations may not be reproducible in another study with a different unit of analysis in an alternative context. However, the main categorical findings (documentation, swab and instrument control, maintaining of sterility and equipment use) are basic and should correlate with the needs and expectations at other institutions.

Recommendations

Education

- The findings of the study could contribute to the development of a preparation programme for this institution, institutions in Africa and internationally.
- The improved programme could be presented at different nursing schools and also for different nursing qualification levels where clinical placement of students in an OR is obligatory.
- A preparation programme could also include students in other professions who rotate in the OR.

Clinical practice

- The programme could be adjusted and implemented in other healthcare settings to prepare nurses and other healthcare professionals with no previous OR exposure for placement in the OR.

Future research

- A follow-up study should be conducted with a larger sample group, including students from other nursing schools, provinces and countries.

Conclusion

The problem identified was that student nurses rotating in the OR for the first time were not adequately prepared for their placement. This study

provided a platform whereby participants had the opportunity to give their opinion on what was needed in a preparation programme that would improve the student nurses' participation and learning. Shortcomings identified were that students needed more preparation prior to placement in the OR. Specific content that participants felt should be included in a preparation programme included documentation, equipment, maintaining sterility, orientation, swab and instrument control and theatre preparation.

All stakeholders were of the opinion that an improved preparation programme was needed, as it would have a direct and positive impact on students' learning and impression of the OR. Moreover, it could result in recruiting more students to choose OR nursing as a career.

This study provides first-hand research into the needs, content and modes of delivery of a preparation programme for student nurses in SA prior to first placement in the OR.

Declaration. This publication was compiled from results of a study by SB for a Master's degree, but was not a prerequisite for the degree.

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