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Research Article

Effectiveness of Teaching Procedural Skills to Undergraduates at Defence Services Medical Academy, Myanmar

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Summary

Introduction: Efficiency in doing procedural skills is important for patient safety and quality healthcare. Mannequin was used for training as well as assessment of procedural skills for undergraduates at Defence Services Medical Academy, Myanmar. This study aimed to determine the effectiveness of teaching procedural skills in real practice in internship period.

Methodology: It was a combined qualitative and quantitative method. In qualitative method, phenomenology approach was used; informal focus group interview was done to groups of interns who had completed internship at medical wards at No (1) Defence Services General Hospital (1000-bedded) and had undergraduate training at Defence Services Medical Academy, Myanmar. The responses were analyzed, coded and classified; thematic analysis was done. For quantitative assessments, open ended questions were set by the team who were skillful in medical education and research. The questions were answered anonymously; they were interpreted and grouped to formulate themes. This study was approved by 'Hospital Research and Ethics Committee' of No (1) Defence Services General Hospital. Informed consent was taken from each intern.

Results: A total of 20 interns were included. Four themes were formed: (1) applicability of procedural skills they were taught in undergraduate days; (2) self-reported confidence and satisfaction on doing procedural skills; (3) the challenges/gaps they encountered in doing procedural skills; and (4) their suggestions on undergraduate teaching to fill the gaps. All interns admitted that the procedural skills they taught in undergraduate period was 100% applicable in practice. And they had good self-reported confidence in doing procedure. They satisfied with procedural skills they were taught in undergraduate days. The challenges faced were logical and were solved with the help of senior colleagues. They advised teaching procedural skills on real patient in addition to mannequin.

Conclusion: Teaching procedural skills in undergraduate period was very effective. Self-reported confidence on doing procedure was good. The challenges faced by interns were acceptable. Teaching procedural skills with real patient was more preferable than teaching with mannequin.

Keywords: Procedural skills, Interns, Effectiveness, Teaching

Introduction

Procedural skills play an important role in patient safety. For interns, it may vary from minor one like venipuncture to major one like doing lumbar puncture. A complex chain of events may occur in every clinical intervention, especially those involving invasive procedures. Safety requires high levels of awareness and vigilance. Although the procedure is simple, it needs different abilities: psychomotor, clinical judgment, communication, decision making, and patient-focused interaction abilities [1]. For medical students, achievements in doing procedure depends on training, assessment and refresher courses. Acquiring skills in procedure training requires both short term and long-term training. Therefore, a longitudinal procedure course training during medical school was suggested by Ayandeh et al as they found that students who participated in the procedural skills training had better performance [2].

Studies on requirement of training on procedural skills in both developed and developing countries pointed out that the importance of the procedural skills training. In UK, the GMC requires surgical/procedural skill competence in graduating medical students; the study done in UK found that junior doctors had minimal training in procedural skills training at medical school. And, they suggested a National Undergraduate Curriculum in Surgery and Surgical Skills to equip newly qualified doctors with basic procedural skills to maximize patient safety [3-5]. On the other hand, the procedural skills training in a developing country is challenging because the mannequins and simulators are very expensive. However, teaching procedural skills is essential to improve the quality of care for patients; an important regional health problem [6]. Defence Services Medical Academy is one of six medical universities in Myanmar: University of Medicine (1) Yangon, University of Medicine Mandalay, University of Medicine (2) Yangon, University of Medicine Magwe and University of Medicine Taungyi. Defence Services Medical Academy is situated in Mangaladon, Yangon; and No (1) Defence Services General Hospital (1,000 Bedded), Mingaladon, Yangon is the main teaching hospital for Defence Services Medical Academy. Defence Services Medical Academy, Myanmar was founded in 1994. For basic degree, M.B.B.S, the teaching on procedural skills has been launched in the new integrated curriculum in undergraduate course for 5 years. Common procedural skills done in interns ranged from minor procedure to major procedure; Ryles' tube insertion, intravenous cannulation, intramuscular injection, urinary catheterization, lumbar puncture, pleural aspiration and paracentesis/tapping have to be done by intern himself. For success of doing procedure, direct observation by the supervisor during the procedure and his feedback are essential for the development of these skills [7]. According to study done by American College of Physicians, both the number and variety of procedures done by general internists have decreased considerably since 1986 [8]. As a tool for assessment of procedural skills, procedure logbooks are done as documents. Nonetheless, it monitors the breadth of experiences; it does not reflect the performance of interns [9]. In Defence Services Medical Academy Myanmar, the competency of procedural skills was assessed with mannequins in the Objective Structured Clinical Examination (OSCE) in year '3', year '4' and year '5'. All the medical students achieved good scores in assessment. As the examination setting used mannequins, the interns may have problems and challenges in real world. Therefore, this study aimed to determine the effectiveness of teaching procedural skills in real practice in internship.

Methodology

It was a combined qualitative and quantitative methods. In qualitative method, phenomenology approach was used. Phenomenology is a form of qualitative research that focuses on the study of an individual's real-life experiences within the world [10]; it requires an in-depth understanding of the participant's thoughts and perceptions of the phenomenon you're researching [11]. Phenomenological researchers record and analyze the beliefs, feelings, and perceptions of the participants in their study group. Therefore, phenomenology approach was used for this study. Informal focus group interview was done to groups of interns who had completed internship at medical wards at No (1) Defence Services General Hospital (1000-bedded) and had undergraduate training at Defence Services Medical Academy, Myanmar. A total of 20 interns participated voluntarily in this study. Two focus group discussions, each consisting of 10 interns, were done. Each focus group was held in a separate meeting room in the hospital. A trained focus group moderator was a facilitator for the discussion. The moderators encouraged the participation of all focus group interns; they did not influence the group discussion. In the introduction to the focus group, interns were asked to discuss procedurals skills they did, to reflect the extent of applicability of procedural skills in undergraduate days, the challenges they faced and their feedback. Moderator prompted questions to interns; and, he clarified some opinions heard and discussed by interns. Each focus group was scheduled for 80 minutes. The moderators involved in focus group discussion were those who did teaching on procedural skills; did assessment on procedural skills; received training on focus group discussion; and, had Diploma in Medical Education. Each interview lasted 90-120 minutes. Five procedural skills scenarios were selected; (1) Ryles' tube insertion; (2) urinary catheterization; (3) paracentesis/tapping; (4) pleural aspiration; (5) lumbar puncture; (6) intravenous access; and, (7) intramuscular injection.

The following questions were asked of all the focus group interns:

a. How do you feel about undergraduate knowledge training on procedural skills? To which extent it is helpful in practice? (100%, 75%, 50%, 25%, less than 25%) Can you describe the strengths and weaknesses?

b. What is your impression on undergraduate procedural skills training with mannequin? To which extent it is helpful in practice? (100%, 75%, 50%, 25%, less than 25%) Can you describe the strengths and weaknesses?

c. Mention your self-reported confidence on doing procedure. (100%, 75%, 50%, 25%, less than 25%)

d. Mention your level of satisfaction on doing procedure. (100%, 75%, 50%, 25%, less than 25%)

e. Mention challenges you faced while doing procedure and describe their details.

f. Based on your experiences, how do you think procedural skills would best be taught and assessed during your undergraduate training?

Moderators took field notes during the focus group discussions to record important themes and discussion trends. At the end of each focus group, the moderator used their field notes to generate a summary of the important themes and discussion trends of that focus group. Next, the moderator wrote the summary at the end of the focus group session. The moderator recapped the group to confirm or to correct the summary. Discussion with each focus group was individually recorded and transcribed. All transcriptions were classified/separated anonymously during the transcription process. Each focus group and intern within the group was assigned a number during the transcription process for better anonymization. The interns were observed, asked and discussed. The conversations were recorded.

First, the research team immersed themselves in the data; they repeatedly did this by reading and re-reading the transcribed interviews and listening to the recorded interviews in order to hear the tone and timbre of the voices of interns. The goal at this stage was to get a sense of the whole feelings. Second, the texts were coded, in phrases or sentences that stand out as describing the experience or phenomena under study, or which express outright its meaning for the participant were extracted or highlighted. Third, similar meaning units were placed into categories. Fourth, for each meaning unit the meaning of the interns' own words was spelled out. Here the investigators inferred the meaning behind the interns' words and articulate it. Finally, each of the transformed statements of meaning were combined into a few thematic statements that describe the experience. Then, it would be appropriate to do member-checking and a subsequent revision of the final model based on interns' responses and feedback [12]. The interns were observed, asked and discussed. The conversations were recorded. Then, they were transcribed. Personal texts and observations from interns related to the theme were analyzed. The responses were analyzed, coded and classified; thematic analysis was applied.

The two focus group transcripts were independently analyzed by two study researchers. Thematic analysis was done. A total of four themes were formed: (1) applicability of procedural skills they were taught in undergraduate days; (2) self-reported confidence and satisfaction; (3) the challenges/gaps; and (4) their suggestions on undergraduate teaching to fill the gaps. Data analysis was done based on 4 main themes in the data and were coded. For quantitative methods, 'open ended questions' were set by the group of interviewers; they assessed and validated by experienced physicians. They were responded anonymously and the answers were kept confidential. Both information from interview and written answers from questions were collected, analyzed together with the results from qualitative method. This study was approved by 'Hospital Research and Ethics Committee' of No (1) Defence Services General Hospital. Informed consent was taken from each intern. It was conducted at No (1) Defence Services General Hospital (1000-Bedded), Mingaladon, Yangon.

Results

Interns finished 3 months internship period in medical wards. They did acute medicine (emergency), out-patient clinic, intensive care units and out-patient units. A total of seven procedural skills scenarios were focused; (1) Ryles' tube insertion; (2) urinary catheterization; (3) paracentesis/tapping; (4) pleural aspiration; (5) lumbar puncture; (6) intravenous access; and, (7) intramuscular injection. A total of 20 interns were included. Analysis of the focus group data yielded 60 distinct comments from interns. Four themes were formed: (1) applicability of procedural skills they were taught in undergraduate days; (2) self-reported confidence and satisfaction; (3) the challenges/gaps; and (4) their suggestions on undergraduate teaching to fill the gaps. Each distinct comment was coded with its surrounding text (2 or 3 sentences) so that the analysis of each intern' statement would include consideration of statement contexts. To be designated as a theme, each theme had to include comments from across the two focus groups, and across multiple interns within each focus group. The following reporting of results includes a description of each theme and sample comments from the interns.

The Applicability of Common Procedural Skills They Were Taught in Undergraduate Days

Interns acknowledged that the procedural skill they were taught in their undergraduate days was nearly 100% applicable in internship. They gave great value on the procedural skill they were taught in their undergraduate days: "It makes me easier in doing practically because of systematic teaching procedural skills in undergraduate days". The interns mentioned that doing procedure with real patient was not easy, for example, "I don't get the proper position for lumbar puncture though instruction is given" (Intern 3.1). Another example was "It is difficult find good vein for intravenous cannulation particularly in first 2 cases" (Intern 3.3). The interns also reported that they felt confident if the procedure was supervised by senior physicians, for example, "Doing peritoneal tapping with supervision makes me less stressful" (Intern 3.7). In addition, required more practice than they were currently able to obtain stating, the interns admitted that the guidance from experienced person was very helpful: "Intravenous cannulation with assistance from nursing officers/staffs makes me less difficult" (Intern 3.9).

Self-Reported Confidence and Satisfaction in Doing Procedure

Most of them seemed to have confidence out of proportion to their medical experience. They were satisfied with procedural skills they were taught in undergraduate days.

The Challenges Faced by Interns in Doing Procedure

The challenges faced were logical and were solved with the help of senior colleagues. The interns appreciated that acquiring and ability to perform bedside procedures were a valuable skill. However, doing procedure in real patients was difficult unlike mannequin. One intern made comments as "I can see veins clearly in mannequin

whereas the veins disappear in obese patient" (Intern 4.1). Moreover, the intern found extremely difficulty in procedure in emergency situation. One intern stated "I cannot find veins in patient with shock due to acute gastroenteritis" (Intern 4.3). In addition, interns stated another difficult status as "because the patient has oedema, I cannot do intravenous access" (Intern 4.5). The interns commented that the mannequin did not represent a realistic situation. For example, in Ryles' tube insertion, one intern stated that "all our mannequins are rigid and there is no gag reflex or cough reflex. No special position is necessary for mannequin whereas the position of neck in our patient is important. It is not easy if the patient has successive cough reflex" (Intern 4.7). Another intern supported the fact that "my duty coat is soiled with vomitus from patient as a result of severe gag reflex and vomiting during Ryles' tube insertion" (Intern 4.9). Another challenge mentioned by interns was related with lumbar puncture. The interns reported that ability to perform lumbar puncture was essential both for diagnosis and treatment. Nonetheless, it had several challenges: "I cannot put the needle because the patient does not keep still" (Intern 5.1). Another intern confirmed the fact that "doing proper position can be done by skillful helper otherwise I cannot get successful lumbar puncture" (Intern 5.3). The interns did appreciate advice and feedback from senior colleagues in the team: "I cannot put the needle in horizontal approach and it is easy when the senior does the lateral approach" (Intern 5.1). Interns perceived that they were observed doing a procedure in clinical assessment made them stressful; however, it was easy as the mannequin was quiet and kept still. It did not feel pain. In practice, the patients were sensitive and made complaints. One intern stated "I do not know the exact size of catheter for 65 years old man. He has prostate enlargement. I cannot perform indwelling catheterization. One senior physician does with guide wire and it is okay" (Intern 5.5).

Suggestions on Undergraduate Teaching to get Better Skills on Procedure

The interns commented that the mannequin did not represent a realistic situation because of some of the physical characteristics of the mannequins. For instance, in intravenous cannulation: "our mannequins have prominent veins in cubital fossa and forearm. My patient is obese and veins are not visible. It is better to teach with real patients" (Intern 5.7). "I cannot put needle because the patient is not kept still and he is twitching once the needle touches his skin. Handling with such patients should be trained" (Intern 5.9). The interns reported that doing procedure with senior physician would be useful to their learning; and, they would get more confidence. One intern suggested that "I feel safe for myself as well as patient if senior physician accompany during procedure" (Intern 5.3). The interns also committed that they need to learn more to improve their skills: "My skills in doing lumbar puncture will improve with real practice" (Inter 5.5). They advised teaching procedural skills on real patient in addition to mannequin.

Discussion

This study provides insights into the perceptions of interns on doing procedure in internship; it is based on training in their undergraduate days. Self-reported confidence and satisfaction, the challenges they faced in real practice and suggestions for further improvement in future are explored. The interns acknowledged the training they obtained in their undergraduate days in this study; it was similar findings with Briggs et al [13]. Furthermore, they perceived the value of the assessment on procedural skills in undergraduate periods; it provided their confidence in real practice. The interns realized that the proficiency in procedural skills is important. Therefore, teaching and assessing procedural skills in undergraduate period in Defence Services Medical Academy Myanmar gave great benefit in internship. It supported the study done by Ayandeh et al. A longitudinal procedure course during medical school was suggested by Ayandeh et al as they found that "students who participated in the procedural skills training during the elective period had better self-reported confidence as well as performance in both practical and theory exam compared to students who participated in only the standard curriculum" [2]. In this study, the interns paid great value to the amendments on procedural skills by intimate supervisor in their team; therefore, their performance was improved significantly. They also privileged the feedback they received immediately after clinical exam in undergraduate days too. It was in accordance with the report by Bosse et al; feedback may improve early procedural skill acquisition [14].

The importance of the age of students was highlighted by Solvik & Struksnes; the younger age group was better in clinical laboratory practice skills training in nursing students [15,16]. Therefore, we should emphasize procedural skills training in undergraduate curriculum in Defence Services Medical Academy Myanmar. In this study, the interns acknowledged the training in their undergraduate days; they had increased levels of self-reported confidence in doing procedural skills. Therefore, it is likely that the interns would give better patient safety as confidence of doctor plays an essential role in patient safety [3-5]. According to Swing, the intern's self-motivation and self-regulation skills impact competencies in procedural skills in future [17]. In this study, the procedural skills we taught in their undergraduate curriculum was very effective according to perception by interns. Nonetheless, we should promote self-directed adult learning for further improvement and sustainability in skills [18]. In this study, the interns pointed out that training with real patient in clinical setting would provide better performance in procedural skills; on the other hand, they realized the weakness of training with mannequin. Simulation is widely seen as a space where procedural skills can be practiced in safety, free from the pressures and complexities of clinical care [19]. According to Kneebone, the acquisition of procedural skills should be learned in three distinct phases: (1) the interns have to practice procedural skills himself and it should be directly observed by mentor; (2) the interns have to practice patient-focused simulation; and, (3) integration of the procedure into direct patient care which will require supervision, feedback and assessment of proficiency. In undergraduate curriculum in Defence Services Medical Academy Myanmar, the interns had practiced procedural skills with mannequin in their undergraduate days; it was supervised by teacher. They did observation in medical wards when the senior physicians were doing

procedure. Then, the skills were assessed in clinical exam with patient-focused simulation; they get feedback from examiners. After that, the skills were applied into direct patient care in internship period. Therefore, the acquisition of procedural skills to undergraduate students in Defence Services Medical Academy Myanmar was in accordance with Kneebone. Moreover, long term training pattern on procedural skills was in agreement with [2]; they highlighted the importance of longer training and sustainability. They suggested longitudinal procedural course in medical school [2,20]. In this study, the interns had insight; they recognized their requirements and they were positive on continuing medical education. This study pointed out that the interns could do some basic procedural skills. They also committed that they would try to improve proficiency by further practice. Caleb Hale et al suggested that the importance of skill maintenance. Periodic simulation-based training and assessment were recommended to sustain skills in addition to learners' self-directed adult learning [21,22]. In this study, the interns would carry on self-directed learning. This study was conducted only at one study site. Therefore, the perceptions of the interns on procedural skills training from another hospital may differ. Although the environment for 'Focus Group Interview' was created as friendly atmosphere, the interns may have some stress during interview. They may not express their real perception in stressful atmosphere [23-39].

Conclusion

Training on procedural skills is an essential components of basic doctor training to get patient safety. Teaching procedural skills in undergraduate period was very effective. The interns are satisfied with their training in undergraduate days. It enhances self-confidence in real practice. Self-directed learning for step-wise acquisition of procedural skills including direct observation and feedback is necessary.

Recommendation

The success of procedural skills depends not only on technical skills but also on non-technical skills. Non-technical skills include cognitive (situation awareness, decision-making) skills and social (communication and teamwork, leadership) skills. The feasibility of teaching non-technical skills in undergraduate curriculum is recommended.

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Conflict of Interest

None.

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