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The Effect of General Surgery Clinical Guidance Training on Self-confidence, Self-efficacy, and Clinical Decision-making of Operating Room Surgery Students

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Clinical education
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ABSTRACT

Aims The operating room is a critical area of the hospital where personnel must constantly be at the patient's bedside to perform their role. Therefore, the correct and effective teaching of clinical skills to the students of this field is of great importance. The present study aimed to investigate the effect of general surgery clinical guidelines on self-confidence, self-efficacy, and clinical decision-making of surgical students.

Materials & Methods The present semi-experimental work was conducted in 2022 on 30 operating room students who were undergoing internship in medical centers affiliated to Zahedan University of Medical Sciences, Iran. The subjects were randomly divided into two control and intervention groups. In the control group, training was carried out in the usual manner without clinical guidance, and in the intervention group, clinical guidance for general surgery was presented to the subjects at the beginning of the semester. Before and after the intervention, participants completed standard PEI self-confidence questionnaires, the Standard Student Self-Efficacy Questionnaire for academic self-efficacy, and a Clinical Decision-Making Skill Assessment Questionnaire by Lowry et al. The data were then analyzed using appropriate analytical tests.

Findings The analysis of the data obtained from the research indicated that the groups did not differ significantly in terms of demographic information; however, the average self-confidence, self-efficacy, and decision-making skills in the two groups had a significant difference after the intervention ($P<0.05$). Moreover, the average of these variables before and after the intervention did not result in a substantial difference in the control group ($P<0.05$); nevertheless, this difference was significant in the intervention group.

Conclusion The results of this research indicate that the use of clinical guidelines can be effective in enhancing the self-confidence, self-efficacy, and decision-making skills of operating room students, thereby improving the quality of education and students' learning outcomes.

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طب داخلی روز
فصلنامه دانشگاه علوم پزشکی و خدمات درمانی گناباد

مقاله پژوهشی

بررسی تاثیر آموزش راهنمای بالینی عمل های جراحی عمومی بر اعتماد به نفس، خودکارآمدی وتصمیم‌گیری‌بالینی‌دانشجویان‌کارشناسی‌اتاق‌عمل

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چکیده

هدف اتاق‌عمل یکی‌از بخش‌های اصلی بیمارستان است که در آن افراد برای اجرای نقش خود باید به طور مدام در بالین بیمار قرارگیرند. ازاین‌رو آموزش صحیح و موثر مهارت‌های بالینی به دانشجویان این رشته از اهمیت بالایی برخوردار است. این مطالعه باهدف بررسی تاثیر راهنمای بالینی عمل‌های جراحی عمومی بر اعتماد به نفس، خودکارآمدی و تصمیم‌گیری بالینی دانشجویان کارشناسی اتاق‌عمل انجام شد.

مواد و روش‌ها: این مطالعه نیمه تجربی درسال ۱۴۰۱ برروی ۳۰ نفر از دانشجویان اتاق‌عمل که واحد کارورزی خود را در مراکز درمانی وابسته به دانشگاه علوم پزشکی زاهدان میگذراندند اجرا شد. افراد مورد مطالعه به طور تصادفی در دو گروه کنترل و مداخله قرار گرفتند. در گروه کنترل آموزش به روش معمولی بدون راهنمای بالینی و در گروه مداخله در ابتدای ترم یک راهنمای بالینی جراحی عمومی‌در اختیار افراد قرارداده شد. قبل و پس از مداخله، پرسشنامه‌های استاندارد اعتماد به نفس PEI، خودکارآمدی تحصیلی CASES و سنجش مهارت تصمیم‌گیری لوری توسط شرکت‌کنندگان تکمیل شده و داده‌ها با استفاده از آزمون های آماری مناسب مورد تجزیه و تحلیل قرارگرفتند.

یافته‌ها: آنالیز داده‌های به دست آمده از پژوهش نشان دادند که گروه‌ها از نظر اطلاعات دموگرافیک تفاوت معناداری نداشتند اما میانگین اعتماد به نفس، خودکارآمدی و مهارت تصمیم‌گیری در دو گروه پس از مداخله به طور معناداری متفاوت بود($p<۰/۰۵$). همچنین میانگین این متغیرها قبل و بعد از مداخله در گروه کنترل تفاوت معناداری را نشان نداده($p>۰/۰۵$)، اما این تفاوت در گروه مداخله معنادار بود.

نتیجه‌گیری: : نتایج این پژوهش نشان‌دادند که استفاده‌از یک راهنمای بالینی می‌تواند به‌طور قابل‌توجهی بر اعتمادبه‌نفس، خودکارآمدی و مهارت تصمیم‌گیری دانشجویان اتاق عمل موثر بوده و در کیفیت آموزش و بهبود یادگیری دانشجویان موثر باشد.

کلیدواژه‌ها:
آموزش بالینی، راهنمای بالینی، خودکارآمدی، تصمیم‌گیری، اعتمادبه‌نفس

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Introduction

Surgical technologists are an important member of the healthcare team, working closely with surgeons, anesthesiologists, and nurses to provide the best possible care for patients. This field relies on practical and clinical skills so that the first mistake in a surgical procedure can be the last, causing irreparable harm to the patient. Learning and adapting to various skills and roles in the operating room environment is challenging, as operating room technology students must master multiple interventions throughout the surgical process before, during, and after the operation. Teamwork and interdisciplinary collaboration, the emergence of hazards in the operating room, dealing with acute and demanding emergency situations, close interactions and simultaneous tasks of surgical team members, and the interactive, dynamic, and challenging nature of the environment have influenced clinical training in the operating room [1,2]. Operating room instructors play a crucial role in educating students in this field, supporting them, fostering self-confidence, self-efficacy, and clinical decision-making during training, and developing responsible and skilled professionals in providing care services. Studies have reported that students new to operating room training, despite having a strong theoretical foundation, lack sufficient navigation and practical skills in clinical environments. Therefore, strengthening the knowledge and skills of students specializing in the operating room is essential [3]. Educational authorities are seeking educational methods and teaching aids, such as study guides, that can meet the needs of students. Operating room students are highly exposed to stress and reduced self-confidence and correct clinical decision-making due to their exposure to complex surgical procedures, fear of transmitting blood-borne diseases, and anxiety and tension during surgical procedures. Self-confidence and self-efficacy are essential in maintaining and improving students' clinical competence and are effective in their clinical decision-making [4,5]. The concept of self-efficacy is formed by individuals' belief in their ability to control their own performance and environmental events. Self-efficacy plays a fundamental role in the acquisition of knowledge, the development and improvement of skills, and the application of scientific and professional knowledge and skills [6]. Bandura defined self-efficacy as an individual's beliefs about his or her ability to perform desired tasks [7]. Students who have higher self-efficacy tend to exert more effort and perseverance in completing academic tasks. A strong sense of self-efficacy leads to improved positive personal perspectives and better individual participation in activities, goal setting, and commitment [8,9]. Self-esteem is defined as the difference between the perceived self (an objective image of oneself) and the ideal self (what the individual values or would like to have), with a slight difference and gap indicating high self-esteem. Self-esteem is one of the components of clinical competence that gives the individual the courage to participate in the processes taking place for the patient. Operating room students can go through their development stages with self-confidence, and as a result, their efficiency in providing services to patients increases [10].

Self-confidence and self-efficacy in operating room students affect their performance and clinical decision-making in the stressful operating room environment. Clinical decision-making is a fundamental part of the professional work of medical personnel. Operating room staff need to make quick decisions due to the diverse nature and environment of the operating room. For instance, during surgery, the operating room specialist must base his/her decisions and interventions on preventing the risk of skin damage and performing the best possible function for its rapid repair and recovery. Unfortunately, inappropriate decision-making in acute situations has irreversible consequences [11-14].

The foundation of appropriate and healthy clinical practice in the operating room is compliance with professional codes of practice and standards of care. A clinical guideline is a statement of principles for performing a clinical procedure. In a clinical guideline, the details of principles and standards are presented in detail and can be effective in improving the performance of operating room personnel. To provide competent services to patients and achieve their satisfaction, operating room students must be fully familiar with practical skills that meet current needs, thereby providing the best clinical services [15,16]. Internships play a fundamental role in shaping the basic skills and professional competencies of operating room science students, and the quality of the internship is essential for the development of clinical skills. Therefore, it is necessary to conduct studies on providing ways, such as a study guide, that can help operating room staff be effective in providing patient care and improving patient outcomes, while also promoting self-confidence and self-efficacy, leading to the development of clinical decision-making among operating room personnel; since the main objective of any clinical experience is to bring the student to the highest level of learning, and the ultimate purpose of training operating room

technologists is to ensure that patients undergoing surgery receive high levels of care [17]. Bandura has explained the theory of self-efficacy and its role in students' clinical performance, which indicates that increasing self-efficacy can directly affect improved clinical decision-making [18]. Moreover, in a meta-analysis, researchers examined various factors affecting nursing students' self-confidence and reported that the use of clinical education guides can be effective in this regard [19]. However, the distinction of the present study is in its specific focus on undergraduate operating room technology students and its detailed examination of the role of clinical guides explicitly designed for this group, which has been less addressed in previous studies. Therefore, considering the importance of the issue of training operating room specialist students in the clinical field and the need for more attention to their clinical education, on the one hand, the level of self-confidence and self-efficacy of the student as two effective issues on clinical decision-making when faced with specialized surgical procedures that are directly related to the method of education, as well as the lack of studies conducted, led to the conduct of the present study with the aim of investigating the effect of clinical guidelines for surgical procedures. A general focus was placed on the self-confidence, self-efficacy, and clinical decision-making of nursing students.

Materials and Methods

In this quasi-experimental interventional study, all operating room intern students in 2022 at Zahedan University of Medical Sciences, Iran, were included in the study by census and considering the inclusion criteria (operating room students entering the first semester of 2019 who were in the seventh and eighth semesters in two consecutive semesters). Sampling was performed using the census method, and the study's statistical population comprised operating room intern students in teaching hospitals in Zahedan city, Iran. Participants were randomly divided into two control and intervention groups (random number table). The questionnaire was provided to them at the beginning and end of the semester (before and after the intervention), which included: a form of personal and demographic characteristics containing age, gender (male/female), marital status (single, married), academic semester, and the standard PEI self-confidence questionnaire, the validity and reliability of which was measured in 2019 by Mehri et al., and the Cronbach's alpha coefficient and ICC cluster correlation of all areas were higher than 0.7. In addition, the cluster internal correlation coefficient of each question was obtained as 0.72-0.98. This questionnaire consisted of 54 items with a 5-point Likert scoring style. The 54 questions of the questionnaire were divided into eight sections, six of which measured specific content in assessing the individual's perceived self-confidence towards his/her performance, one measured self-confidence in performing general functions correctly, and another was related to mood states in measuring self-confidence in facing academic exams [20].

In order to measure students' self-efficacy, the Standard Student Self-Efficacy Questionnaire (CASES) was employed, the validity and reliability of which were measured by Shokri et al., and the internal consistencies were 0.91, 0.90, and 0.91 for the entire test, men, and women, respectively, with 32 items that measured the student's confidence in taking notes, asking questions, paying attention in class, using the computer and library, etc. The questions in this questionnaire used a 5-level Likert scale, ranging from very low to very high, and were scored from 1 to 5. The average score achievable in this questionnaire was from 1 to 5. In this questionnaire, obtaining high scores indicated higher self-efficacy and low scores indicated low self-efficacy for completing school assignments [21]. The Clinical Decision-Making Skill Assessment Questionnaire by Lowry et al. was prepared in 2001 and measures students' clinical decision-making skills with 24 items based on a 5-point Likert scoring style. This questionnaire was confirmed in terms of validity and reliability in Iran in 2012. Respondents can score from 24 to 120, with a score below 67 indicating systematic analytical decision-making, a score between 68 and 78 indicating the second level of decision-making, i.e., analytical-intuitive, and a score higher than 78 indicating the third level of clinical decision-making, i.e., intuitive-interpretive. In a study conducted by Karimi Noghondar et al. (2012), the face and content validity of this scale was approved by university professors. Cronbach's alpha method was employed to examine the validity of the scale, and its value was reported to be 0.80 [22].

To reach undergraduate students in the operating room, we obtained approval from the hospital directors and operating room managers. We then visited the operating room to provide necessary explanations about the research implementation method. Afterward, for the students in the intervention group, a clinical guide prepared in relation to the types of general surgeries, their stages, and the tools and equipment required in this category of surgeries by researchers in the operating room group of Zahedan University of Medical Sciences based on the operating room curriculum headings and according to the operating room reference books for common general surgeries, including appendectomy, hernia, and cholecystectomy was provided to the students to utilize during the semester internships. In addition, during the

semester, students in both groups attended the internship, and if they had any questions regarding any of the aforementioned surgeries, their questions were answered by the professors of the group. During the semester, students in the intervention group were required to study the aforementioned clinical guide before attending the internship and at the bedside of patients undergoing the desired surgeries. They then observed the patients at their bedside. In the control group, students completed the semester relying on what they had studied in previous semesters regarding surgeries and learned in the patient's bed. At the end of the semester (end of the study), the questionnaires were completed again by students in both groups.

After collecting the data, the researcher entered it into the SPSS (version 20) software and used the Kolmogorov-Smirnov and Shapiro-Wilk tests to assess the normality of the data. Then, the data were statistically analyzed using the independent t-test and chi-square or Fisher's exact test.

Results

The present study was conducted on 30 operating room students of Zahedan University of Medical Sciences, Iran; 56.6% were male, 43.3% were married, and 46.6% were living in the dormitory. These individuals were divided into two groups of 15, including intervention and control. According to the results of the chi-square or Fisher's exact test for qualitative variables and the independent t-test for the age variable, there was no significant difference in gender, marital status, and place of residence between the participants in each group. The mean ages were 21.8±0.77 and 21.8±0.83 in the intervention and control groups, respectively (Table 1).

Table 1. Comparison of demographic information in the studied groups.

Variable Group		Intervention Frequency (%)	Control Frequency (%)	P-value
Gender	Male	7 (46.7)	10 (66.7)	0.269
	Female	8 (53.3)	5 (38.5)	
Marital Status	Single	6 (40)	11 (33.3)	0.065
	Married	9 (60)	4 (26.7)	
Place of Residence	Dormitory	8 (53.3)	6 (40)	0.464
	Private House	7 (46.7)	9 (60)	
Age	Average	21.8	21.8	0.870
	SD	0.77	0.83	

The first objective of the present research was to determine the effect of using a clinical guide for general surgery on the self-confidence of the participants. The results of data analysis using a paired t-test indicated that in the intervention group that was trained with a clinical guide, there was a significant difference in the participants' self-confidence before and after the intervention. However, this difference was not significant in the control group before and after training in the usual manner and without a clinical guide (P>0.05). In addition, based on the results of an independent t-test, self-confidence between the control and intervention groups did not demonstrate a significant difference before the intervention; however, after the intervention, the two groups were significantly different (P<0.05) (Table 2).

Table 2. Comparison of average self-confidence in the studied groups.

Variable Group		Mean±SD	P-value
Self-confidence in the Control Group	Before	2.9±0.8	0.805
	After	2.8±1	
Self-confidence in the Intervention Group	Before	3±1.2	0.001
	After	1.90±0.5	
Comparing self-confidence in Two Groups	Before		0.790
	After		0.008

In the next stage, the researchers examined the effect of using the clinical guide for general surgical procedures on the clinical decision-making skills of the students in the two groups. The results of the paired t-test indicated that the clinical decision-making score in the control group did not show a significant difference before and after training (P=0.335); however, in the intervention group, this difference was significant (P=0.000). Moreover, the two groups demonstrated a significant difference in terms of clinical decision-making score after training (P=0.013) (Figure 1).

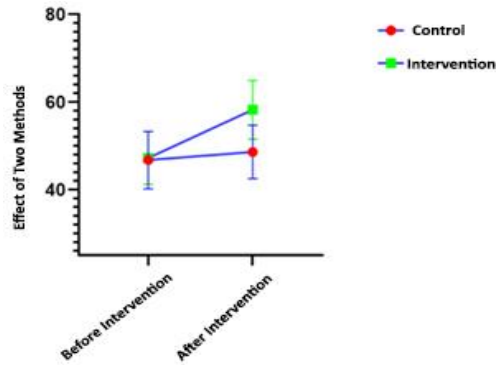

Figure 1. Comparison of clinical decision-making scores before and after the intervention in the intervention and control groups.

The third hypothesis examined in this study was the effect of clinical guidance training on students' self-efficacy scores. The results of the One-way ANOVA test indicated that there was no significant difference between the two groups before training (P>0.05); however, after training, the self-efficacy score in the intervention group was significantly higher than that of the control group (P=0.001). In addition, there was no significant difference in the control group before and after training; nevertheless, this difference in the intervention group was significantly higher than that before the intervention (P=0.028).

Table 3. Comparison of average self-efficacy scores in the studied groups.

Variable Group		Mean±SD	P-value
Self-efficacy in the Control Group	Before After	64.6±6.6 63.5±7.5	0.668
Self-efficacy in the Intervention Group	Before After	65.7±6.2 8.8±6.75	0.009
Comparison of Self-efficacy Scores in Two Groups	Before After		0.060 0.001

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Discussion

The present research was conducted on operating room intern students and examined the effect of training with and without a general surgery clinical guide on three variables: self-confidence, decision-making skills, and self-efficacy. The results of the study demonstrated that using this guide can increase self-confidence, decision-making skills scores, and students' self-efficacy scores. In the control group, before and after training without using this guide, none of the variables showed a significant difference.

A study by Abdolmaleki et al., which was conducted regarding the effect of a learning guide on the learning rate of nursing students in cardiac intensive care unit internship, indicated its positive effect on increasing the rate of students' achievement of clinical skills. This study also examined student satisfaction and reported that 88% of students were satisfied with the clinical training guide [23]. Other studies indicated a high level of student satisfaction with the clinical study guide [17]. However, what was important in the present study was the students' self-confidence, self-efficacy, and decision-making skills, and it is noteworthy that the increase in each of them can have a positive effect on students' satisfaction and learning; in other words, when students express higher scores of self-confidence, self-efficacy, and decision-making skills, they will learn more and experience high levels of satisfaction. In a study in the United States, researchers found that there was a significant relationship between the self-confidence score and the competence of students who had been in basic surgical skills training workshops before attending clinical situations [12]. Other studies also indicated that holding training workshops increased self-confidence, which in turn had a positive relationship with their competence after being in clinical situations [8].

In another study, researchers measured the impact of reporting on the self-confidence of operating room students and showed that preparing a report of surgical procedures and presenting it to others during the internship increased the students' self-confidence. This study also examined the students' self-efficacy and indicated the positive effect of reporting on it. The present study also investigated self-confidence and self-efficacy in students. However, what distinguishes the present work from other studies is the use of a clinical training guide instead of report writing methods and training workshops. This educational tool accompanies students step by step during the clinical internship in the operating room. At any stage, if a student encounters a problem or has a question, they can refer to it for answers. In this regard, Waseem et al. (2022), in a review and meta-analysis, after examining 52 articles related to teaching clinical skills to operating room students and related factors, divided the factors affecting learning in the operating room into four areas: teaching management methods like using lesson plans and methods of familiarizing students with the operating room, factors related to professors, factors related to students like basic knowledge and their study, and factors relevant to the psychological conditions of individuals like fear and anxiety, etc. Finally, the researchers concluded that the use of structured processes and the improvement and development of lesson plans and courses to enhance student experiences have an effective role in the learning of operating room students. This study has well pointed out the importance of familiarizing oneself with the training course before being placed in this situation [24], and the present study, by implementing a clinical guide, which goes beyond a typical lesson and course plans, demonstrated the

importance of using this tool in training students who have plans to work in the operating room at the patient's bedside.

The results of the present study showed that the use of a clinical guide during the internship period, in addition to affecting students' skills, directly affects psychological factors, such as their decision-making skills, which are related to learning, similar to the findings of Moshtaghi Khozani et al. regarding nursing students that there is a significant relationship between decision-making skills and the quality of nursing care [25]. However, in a study conducted by Lotfi et al., this conclusion was not reached [14], which suggests that this difference may be due to the difference in the educational methods and tools applied, since the simulation and critical thinking training method was used, which is different from the present study.

Conclusion

According to the findings of this study, using clinical training guides to train operating room students enhances their psychological and functional skills, including self-confidence, self-efficacy, and decision-making. Since the operating room is one of the most sensitive parts of the hospital where students are placed in the beds of patients with different and perhaps critical conditions, the use of educational methods, such as clinical guides, to familiarize them with the environment and conditions of the operating room and various surgeries, is of great importance. By specifying the path, this guide makes learning easier for students and education easier for professors, and reduces the challenges in clinical training. The present study only used clinical guides in general surgery training, and researchers recommend using a broader guide that includes other dimensions of clinical skill training. It is also recommended to measure other variables that may be affected by this educational tool.

Ethical Considerations

Compliance with ethical guidelines

This study was conducted in accordance with the ethical standards of the institutional research committee and the 1964 Helsinki declaration and its later amendments. All participants provided informed consent prior to inclusion in the study.

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Authors' contributions

M. M. and SH.S contributed to the overall study design and methodology and to the preparation of the manuscript. T.A and N. GH and O. S and F.R carried out data collection, F.P carried out analysis and preparation of the manuscript. All authors have read and approved the final version.

Conflicts of interest

The authors declare that there is no conflict of interest.

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