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Frequency of Surgical Errors and Their Causes in Operating Room Students of Birjand University of Medical Sciences in 2024

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Abstract

Introduction: Surgical errors pose significant risks to patient safety, with operating room students being particularly vulnerable due to limited experience. This study aimed to determine the frequency and causes of surgical errors among operating room students at Birjand University of Medical Sciences in 2024.

Methods: This cross-sectional study included 71 fourth-semester operating room students selected via census sampling. Data were collected using a validated questionnaire adapted from Azarbad et al. (2018), assessing demographic information, error frequency, and contributing factors. Data were analyzed using SPSS version 26.

Results: In the study of the frequency of errors among the studied students, most medical errors were related to the presence of foreign bodies in the surgical site (3.00±1.014), incorrect counting of surgical sponges (2.96±0.992), and incorrect patient diagnosis (2.94±0.954). The most common causes of errors are a lack of adequate relationships and necessary interactions (2.44±0.806), acting beyond personal discretion (2.41±0.871), and a lack of appropriate relationships between team members (2.38±0.900).

Conclusion: A lack of adequate relationships and necessary interactions, along with decisions made beyond personal discretion, can lead to surgical errors. The best way to reduce the rate of errors is through prevention. Therefore, by promoting awareness of the types and causes of surgical errors and taking corrective actions based on these causes, clinical educators should implement the necessary measures to prevent errors during their education, particularly during the clinical education of students.

Keywords: Medical errors, operating room, Patient safety, students

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Introduction

The patient is considered the main component of treatment and care, and all treatment goals are focused on the patient, so any error or deficiency in care harms the patient (1).

Ensuring and promoting human health is the main goal of the nursing profession (2). Unfortunately, medical errors continue to threaten patient safety despite technological advances in the health system (3).

In medical sciences, an error is defined as an unplanned or unintentional action that may occur due to negligence or insufficient knowledge and can be associated with harm to the patient (4).

All health care and care team employees, regardless of how skilled, committed, and careful they are, may make mistakes while performing their professional skills (5). Errors in the provision of medical services can have serious consequences for patients (6). Studies in developed countries indicate that between 3 and 16% of patients admitted to hospitals are injured by medical accidents, of which 30 to 70% are caused by medical errors that could have been prevented by following simple standards (7). Other studies have shown that medical errors are the third most common cause of death in the United States (8), causing 210,000 to 440,000 deaths and more than one million injuries (6).

In Iran, the prevalence of errors in the health care system is no less than the prevalence of errors in other developing or developed countries, and between 50% and two-thirds of these errors occur in the operating room and emergency room of hospitals, and more than half of them are preventable (9).

The surgical department is considered a high-risk area within hospitals due to the complexity of treatment, the

level of training required, and the advanced technology involved (10). Surgery is a critical component of healthcare, with approximately 234 million surgical procedures performed globally each year, equivalent to one in every 25 individuals undergoing surgery (11). Given the essential role of surgery in healthcare systems worldwide, significant attention has been devoted to ensuring the safety of the operating room environment, personnel, and patient care. Nevertheless, the incidence of errors remains high, with studies indicating that 11.9% of medical errors occur in the operating room. Therefore, preventing healthcare-related injuries is a fundamental principle of patient care (3).

Students may be more prone to errors than licensed nurses due to their limited experience and developing clinical skills. However, only 16.7% of students report their errors to instructors (11). According to Aristotle's ethical framework, honesty should be regarded as a core virtue in medical education. Students should be encouraged to report clinical errors by the ethical principle of beneficence—that is, the moral obligation to maximize patient benefit (12). One effective strategy for reducing clinical errors is to enhance students' practical training while simultaneously improving the overall quality of education (13).

Clinical internships play a fundamental role in developing the essential skills and professional competencies of nursing students. These experiences constitute approximately 50% of the nursing curriculum and are considered indispensable in preparing students for their future professional responsibilities (12). Given the complexity of clinical environments, it is essential to provide preparatory educational opportunities—such as case-based learning and computer simulations—before students enter clinical settings. Moreover, students must be trained in the ethical and legal aspects of clinical error management. The implementation of structured clinical error reporting programs is therefore of critical importance (12).

Considering that the operating room is one of the highest-risk areas in a hospital, and that students are particularly vulnerable to making errors due to the factors mentioned above, ensuring patient safety in this context requires heightened attention and care. Furthermore, identifying errors and their contributing factors plays a vital role in reducing their occurrence and enhancing patient safety.

This study addresses critical gaps in existing research by conducting the first investigation at Birjand University of Medical Sciences that simultaneously examines both error frequency and causative factors, most of which are outdated (7+ years old) or limited to single variables. Our research provides urgently needed regional data that accounts for Birjand's organizational structures, management approaches, and generational learning differences among students. This study will generate actionable insights to improve clinical training protocols and error reporting systems, specifically tailored to our academic medical center's needs.

Accordingly, the present study was conducted to investigate the frequency of surgical errors and their causes in operating room students at Birjand University of Medical Sciences.

Methods

This descriptive cross-sectional study was conducted at Birjand University of Medical Sciences in 2024 to evaluate surgical errors among operating room students. This study employed a census sampling approach, including all eligible operating room students (n = 71) who had completed their fourth semester at Birjand University of Medical Sciences during the 2024 academic year. While the sample size may limit generalizability, it represents 100% of the target population available for this single-center study. Participants were required to have completed at least one internship semester in the operating room and be present during the data collection period, while transfer students and those with incomplete questionnaire responses were excluded.

Data collection was performed using a validated 44-item paper-based questionnaire adapted from previous studies. The instrument was derived from Azarbad et al.'s work (11), which itself originated from Chard's "Nursing Errors in the Operating Room Questionnaire" (2010). The questionnaire demonstrated excellent reliability with a Cronbach's alpha of 0.89 (14) and strong validity, with all items showing content validity indices (CVI) above 0.7 and content validity ratios (CVR) exceeding 0.62 (15).

This questionnaire included demographic information, error cases assessment (15 statements with options: strongly agree, agree, disagree, strongly disagree), and causes of error (24 statements with options: strongly agree, agree, disagree, strongly disagree).

In this questionnaire, error cases and causes of error were determined based on a 4-point Likert scale (from strongly disagree to strongly agree). The scoring method was as follows: strongly disagree, score 1; disagree, score 2; agree, score 3; and strongly agree, score 4. If each item received a higher average score, it had a higher impact and importance.

The data collection process was carefully designed to ensure quality and participation. Researchers personally distributed printed questionnaires at the beginning of clinical shifts, allowing approximately 15-20 minutes for completion during work hours. Completed surveys were collected at shift conclusion using sealed envelopes to maintain confidentiality. This process continued over 4 weeks, yielding 71 fully completed questionnaires. The study received ethical approval (IR.BUMS.REC.1402.416) from the Ethics Committee of Birjand University of Medical Sciences.

Data were analyzed using descriptive statistics (frequency, mean, and standard deviation). To examine the relationships between demographic variables and error rates/their causes, parametric tests were used for normally distributed variables, while non-parametric alternatives

(Mann-Whitney U test) were employed for non-normally distributed variables, and also, the correlation coefficient was used to examine the relationship between age and the causes of errors. SPSS version 26 was used for data analysis.

Results

Of the 71 operating room students participating in the study, most were female (59.2%), single (91.5%), with an average age of 21.70 and an average GPA of 16.79. Also, 45.1% were studying in the 6th semester (Table 1).

The findings of this study revealed that the most prevalent surgical errors were retained foreign bodies at the surgical site (3.00 ± 1.014), incorrect surgical sponge counts (2.96 ± 0.992), and incorrect patient diagnosis (2.94 ± 0.954), all measured on a 4-point scale. In contrast, the least frequently reported error was inadequate equipment availability (2.31 ± 0.994). These results demonstrate that procedural and diagnostic errors occurred more commonly than equipment-related issues in this surgical setting (Table 2).

Analysis of student perspectives revealed that interpersonal and teamwork factors were perceived as the primary causes of errors. The highest-rated factors included lack of adequate relationships and necessary interactions (2.44 ± 0.806), acting beyond personal discretion (2.41 ± 0.871), and lack of appropriate relationships among surgical team members (2.38 ± 0.900), all measured on a 4-point scale. Notably, lack of appropriate supplies and equipment received the lowest score (1.83 ± 0.756), indicating that while human factors were considered significant contributors to errors, resource limitations were less frequently identified as problematic in this clinical training environment (Table 3).

The results of the Mann-Whitney test on the relationship between gender and the amount and causes of errors showed that all errors had a significance level greater than 0.05, and there was no significant difference in their amount between the two groups of women (42 people) and men (29 people).

Regarding the causes of errors, the case of my mistake was due to someone else's mistake ($P = 0.049$) had a significance level less than 0.05; therefore, the difference between the two groups of women (42 people) and men (29 people) was significant. The remaining cases had a significance level greater than 0.05, and no significant difference was seen between the two groups.

The results of the Spearman's correlation test on the relationship between the academic semester and the rate and causes of errors showed that among the errors, the cases of incorrect use of drugs ($P = 0.007$), incorrect use of equipment ($P = 0.031$), failure to diagnose the correct patient ($P = 0.040$), and remaining foreign material in the surgical site ($P = 0.024$) had a significance level of less than 0.05, indicating that their relationship with the academic semester was significant and positive. The remaining cases had a significance level of more than 0.05, indicating that the relationship between them and the academic semester was not significant.

Among the causes of errors, the cases of momentary forgetfulness and failure to remember ($P = 0.044$) and incorrect assessment of the situation ($P = 0.031$) had a significant and positive relationship with the academic semester variable. The remaining cases had a significance level of more than 0.05, indicating no significant relationship between them and the academic semester.

Among the causes of errors, the cases of quick decision-making ($P = 0.049$) had a significant and inverse relationship, while the lack of appropriate supplies and

Table 1. Demographic information

Demographic Variable	Groups	Count (n)	Percentage (%)
Gender	Male	29	40.8
	Female	42	59.2
Marital status	Married	6	8.5
	Single	65	91.5
Academic semester	4	18	25.4
	6	32	45.1
	8	21	29.6
Mean ± Standard deviation			
Age (year)		21.70 ± 1.356	
Academic average		16.97 ± 1.020	

Table 2. Distribution of the frequency, average, and standard deviation of the errors of operating room students:

Error cases	Completely agree Number (percent)	Agree Number (percent)	Disagree Number (percent)	Completely disagree Number(percent)	Mean (standard deviation)
Remaining foreign material in the surgical site	8(11.3)	12(16.9)	23(32.4)	28(39.4)	3.00(1.014)
Incorrect counting of surgical sponges	6(7.0)	21(29.6)	17(23.9)	28(39.4)	2.96(0.992)
Failure to diagnose the correct patient	6(8.5)	16(22.5)	25(35.2)	24(33.8)	2.94(0.954)
Improper placement of electrosurgical pads	6(8.5)	16(22.5)	29(40.8)	20(28.2)	2.89(0.919)
Uncertainty of the surgical site	9(12.7)	16 (22.5)	21 (29.6)	25 (35.2)	2.87(1.041)
Incorrect counting of surgical instruments	7(9.9)	17(23.9)	25(35.2)	22(31.0)	2.87(0.970)
Uncertainty of the side of surgery (right or left in bilateral operations)	9(12.7)	18(25.4)	19(26.8)	25(35.2)	2.85(1.051)
Incorrect preparation of the surgical site	7(9.9)	16(22.5)	30(42.3)	18(25.4)	2.83(0.926)
Wrong use of medicines	9(12.7)	12(16.9)	33(46.5)	17(23.9)	2.82(0.946)
Reaction to blood or blood products	6(8.5)	18(25.4)	30(42.3)	17(23.9)	2.82(0.899)

Table 3. Distribution of the frequency, average, and standard deviation of causes of errors in operating room students:

Causes of Error	Completely agree Number (percent)	Agree Number (percent)	Disagree Number (percent)	Completely disagree Number (percent)	Mean (standard deviation)
Unfamiliarity with the procedure	18(25.7)	30(42.9)	18(25.7)	4(5.7)	2.11(0.860)
My mistake was due to someone else's mistake	8(11.3)	37(52.1)	24(33.8)	2(2.8)	2.28(0.701)
Fast decision-making	10(14.3)	39(55.7)	18(25.7)	3(4.3)	2.20 (0.734)
Distraction	17(23.9)	37(52.1)	13(18.3)	4(5.6)	2.06 (0.809)
Inadequate supervision by managers	13(18.3)	39(54.9)	11(15.5)	8(11.3)	2.20 (0.872)
Defects in the service delivery system	12(16.9)	36(50.7)	18(25.4)	5(7.0)	2.23 (0.814)
Not following hospital standards and policies	14(20.0)	29(41.4)	22(31.4)	5(7.1)	2.26 (0.863)
Lack of appropriate relationships between surgical team members	14(19.7)	22(31.0)	29(40.8)	6(8.5)	2.38 (0.900)
Making the wrong decision	11(15.5)	36(50.7)	19(26.8)	5(7.0)	2.25 (0.806)
Incorrect assessment of the situation	8(11.3)	40(56.3)	17(23.9)	6(8.5)	2.30 (0.782)
Failing to pay attention to warning signs	15(21.1)	29(40.8)	21(29.6)	6(8.5)	2.25 (0.890)
Relying on the judgment of others	12(16.9)	29(40.8)	25(35.2)	5(7.0)	2.32 (0.841)
Acting beyond one's discretion	9(12.7)	33(46.5)	20(28.2)	9(12.7)	2.41 (0.871)
Lack of adequate relationships and necessary interactions	8(11.3)	30(42.3)	27(38.0)	6(8.5)	2.44 (0.806)

equipment ($P=0.048$) had a significant and positive relationship with the grade point average variable.

The results of the Spearman's correlation test on the relationship between age, rate, and causes of errors showed that none of the error cases had a significant relationship with the age variable ($P>0.05$).

Among the causes of errors, the case of being forced to do several things at the same time ($P=0.049$) had a significant and positive relationship with the age variable. The remaining cases had a significance level greater than 0.05, indicating no significant relationship between them and age.

Discussion

The results of this study indicated that, from the perspective of operating room students, the highest average scores among reported errors were associated with the foreign bodies remaining in the surgical site, incorrect counting of surgical sponges, and failure to diagnose the patient correctly. These results indicate that students consider these errors as serious threats to patient safety. In contrast, the lowest average score was related to the lack of appropriate equipment.

In the study conducted by Lincourt et al, it was reported that 52% of retained sponges and 43% of retained instruments were due to incorrect counting and the simultaneous performance of multiple major surgeries (16). These findings suggest that identifying such risk factors may influence operating room policies and help reduce the occurrence of these types of errors.

Similarly, the results of the study by Nemati et al. aligned with the present findings, identifying the retention of surgical devices in the patient's body as a significant error Among the strengths of this study, it can be pointed out its larger statistical population; while in our study, unlike this study, a census method was used that included all available data (9).

In the study by Azarbad et al, the most frequently reported error was the failure to maintain sterile technique (11), which is different from the findings of the present study. Although the statistical population of both studies was students and the data collection tool was the same, this difference may be due to the difference in the attitude of the students in the two studies, the difference in educational programs, clinical experiences, or the views of the students in the two different centers.

Of course, in the study of "Azerbad", the foreign body remaining in the surgical site was recognized as one of the most important errors (73.3% agreed) (11).

To eliminate such frequent errors, especially the remaining of instruments and gases inside the patient's body, standard checklists for counting gases and instruments before, during, and after the operation can be used. Also, the use of PFID or barcode technologies for tracking instruments will be effective. On the other hand, one of the reasons for such errors could be the tense and stressful conditions in the operating room, which may be reduced by practical training of students and creating simulated scenarios. On the other hand, one of the reasons for such errors could be the tense and stressful conditions in the operating room, which may be reduced by practical training of students and creating simulated scenarios.

According to the findings of the present study, the most significant contributing factors to errors, based on average scores, were insufficient communication and interaction among surgical team members, acting beyond one's scope of responsibility, and the absence of effective collaboration within the team. The lowest average score was associated with the lack of adequate supplies and equipment.

Similarly, the study by Shiyasi et al. identified poor communication and lack of interaction among surgical team members as major contributors to errors (17).

In addition, the results of Nemati et al. were consistent

with our findings, emphasizing that inadequate communication skills are a key cause of clinical errors (9). A study by Mahmoud Shaker in Egypt also highlighted communication issues between medical departments and units as contributing factors to errors (18). Likewise, Sundler et al. identified poor communication and weak interprofessional teamwork as two common causes of adverse events (19).

The study by Kumar et al. further supported these findings, reporting that effective communication and teamwork are essential for delivering high-quality, safe patient care (20). This consistency in the findings indicates that communication problems are a systematic challenge in the surgical environment, and on the other hand, it can be concluded that the nature of the surgical team is the same all over the world, and any deficiency in coordination and communication can directly affect patient safety. To address this problem, interdisciplinary communication skills workshops can be held to strengthen the ability to resolve conflicts and group decision-making in the surgical team.

One of the limitations of this study is the use of a self-reported questionnaire for data collection. As a result, some participants may have withheld accurate responses or provided socially desirable answers. Additionally, the length of the questionnaire may have led to respondent fatigue, potentially affecting the accuracy of the responses. Furthermore, the relatively small sample size (n = 71), though encompassing all eligible students at the study site, limits the generalizability of our findings and statistical power for detecting subtle associations. Therefore, future research is recommended to be conducted on a larger scale to investigate a broader range of error-related factors to validate these findings.

Conclusion

According to the results of this study, the occurrence of errors by students in the operating room, as in other departments, is significant, and given that errors in the operating room have a significant impact on patient safety and also due to the inevitability of mistakes, continuous examination of common errors and their causes in different groups, especially students, is essential for prevention. Therefore, educational content should be designed for students to reduce the incidence of errors.

Friendly communication between the instructor and more supervision of students' work, holding training classes to improve student interactions with the surgical team, not affecting the evaluation of errors, and supporting the student in the event of an error can be effective in reducing errors. On the other hand, students should honestly state their errors and the reason for their occurrence in the event of an error, regardless of the consequences. Finally, it is necessary to state that students, relying on their strengths, should not be afraid to express their weaknesses, and reporting any type of error to the instructor or treatment team can be a solution to problems related to patient safety on a large scale.

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Authors' Contribution

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Competing Interests

The authors declare that they have no conflict of interests.

Data Availability Statement

All necessary data will be available from the corresponding author upon reasonable request.

Ethical Approval

This study is the result of a project approved by the Research Council of the Student Research Committee of Birjand University of Medical Sciences (Ethical code: IR.BUMS.REC.1402.416).

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References

1. Tabarsi B, Javadzadeh S, Moeini F. Investigating the frequency and causes of nursing errors from the perspectives of emergency department nurses. Iran J Nurs Res 2022;17(5):38-45. doi:https://doi.org/10.22034/IJNR.17.5.38
2. Manjoghi N, Noori A, Arizi H, Fasihizadeh N. Errors, misconducts, improper hospital conditions, and whistle-blowing by nurses of Isfahan hospitals. Iran J Med Ethics Hist Med 2012;5(4):51-64. [Persian].
3. Hannani S, Khachian A, Haghani H, Rahmani V. Identification of medical errors reporting barriers from the viewpoints of operating room technologists in educational and therapeutic centers affiliated to Iran University of Medical Sciences. Mil Caring Sci 2020;7(1):53-62. doi:10.29252/mcs.7.1.53
4. Sabagh K, Ghanbarzehi N, Heydarikhayat N, Alazmani Noodeh F. Frequency and causes of medication errors in nursing intern students in the field in Sistan and Baluchistan. Mil Caring Sci 2023;10(1):69-78. doi:10.22034/10.1.69
5. Mohammadnejad I, Hojjati H, Sharifniya SH, Ehsani SR. Evaluation of medication error in nursing students in four educational hospitals in Tehran. Iran J Med Ethics Hist Med 2010;3(1):60-9. [Persian].
6. Zaboli R, Shahabinejad M, Ghiasi AR, Soltani Poor Sheikh S. Identifying barriers of self-reported error by nurses in polices hospitals. J Police Med 2016;4(4):235-44. doi:10.30505/4.4.235
7. Sheikholeslami S, Jabbarpour M, Khalilzadeh M, Salarpour O, Farokhzadian J. Frequency of errors reported in hospitals affiliated to Kerman University of Medical Sciences during 2014-2018: a short report. J Rafsanjan Univ Med Sci 2021;20(6):713-20. doi:10.52547/jrums.20.6.713
8. Makary MA, Daniel M. Medical error-the third leading cause

of death in the US. BMJ 2016;353: i2139. doi:10.1136/bmj.i2139
9. Nemati M, Mohammadzadeh Zarankesh S, Ebrahimi Abyaneh E. Factors affecting errors in the operating rooms: study of employees' viewpoint. Medical Science Journal of Islamic Azad University Tehran Medical Branch 2018;28(2):153-61. doi:10.29252/iau.28.2.153
10. Kavosi Z, Setoodehzadeh F, Fardid M, Gholami M, Khojastefar M, Hatam M, et al. Risk assessment of the processes of operating room department using the failure mode and effects analysis (FMEA) method. Journal of Hospital 2017;16(3):57-70. [Persian].
11. Azarabad S, Zaman SS, Nouri B, Valiee S. Frequency, causes and reporting barriers of nursing errors in the operating room students. Res Med Educ 2018;10(2):18-27. doi:10.29252/rme.10.2.18
12. Sanagoo A, Majnoni MZ, Mahasti Jouybari L, Ghana S, Kalantari S. Studying the nursing students' experiences of clinical errors and dealing with them. Iran J Nurs Res 2012;7(25):45-53. doi:10.22038/hmed.2016.13668
13. Mohammadi Z, Mojtahedzadeh R, Najimi A, Mohammadi A. Virtual reality-based simulation in medical education: development strategies and policies. Iranian Journal of Culture and Health Promotion 2024;8(2):184-8. doi:10.22034/8.2.8
14. Taifoori L, Valiee S. Understanding or nurses' reactions to errors and using this understanding to improve patient safety. ORNAC J 2015;33(3):13-22.
15. Norouzinia R, Shyasi K, Khedmatizare M, Rahmatpour P. Designing and evaluating psychometric properties of two scales of the factors contributing to errors and reporting barriers in the operating room from the viewpoints of student. Alborz Univ Med J 2024;13(4):254-64. doi:10.61186/aums.13.4.254
16. Lincourt AE, Harrell A, Cristiano J, Sechrist C, Kercher K, Heniford BT. Retained foreign bodies after surgery. J Surg Res 2007;138(2):170-4. doi:10.1016/j.jss.2006.08.001
17. Shiyasi K, Norouzinia R. Factors affecting the occurrence of errors and barriers to reporting them in operating room from the perspective of students. Sci J Nurs Midwifery Paramed Fac 2023;9(2):141-56. [Persian].
18. Mahmoud Shaker Mohamed T, Elsehrawy MG, Nadr Ebraheim Ahmed M. Factors affecting occurrence of nursing errors in operating room: suggestive preventive guidelines. Egypt J Health Care 2023;14(2):878-95. doi:10.21608/ejhc 2023.309215
19. Sundler AJ, Johansson E, Johansson L, Hedén L. Incidents reported by nurse anaesthetists in the operating room. J Interprof Care 2018;32(6):699-705. doi:10.1080/13561820.2018.1500452
20. Kumar A, Srivastava RK, Ali I, Wadhwani P, Singh H. Mishaps and errors in surgery: a new chapter. International Journal of Dental and Medical Specialty. 2014;1(1):21-4.