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Unveiling the Veil of Silence: Exploring Challenges in Error Reporting among Operating Room Interns

Behzad Imani[1], **Iman Khahan-Yazdi**[2*]

[1]Department of Operating Room, School of Paramedicine, Hamadan University of Medical Sciences, Hamadan, Iran
[2]Student Research Committee, Hamadan University of Medical Sciences, Hamadan, Iran

*Corresponding Author: Iman Khahan-Yazdi, Email: Imankhahan@yahoo.com

Abstract

Background: Medical errors are particularly significant in the operating room due to their potential to critically affect patient care. For students, one of the key challenges is learning how to identify and report these errors during treatment and understanding their potential consequences. Accordingly, this study aimed to explore the challenges faced by the operating room interns in reporting medical errors.

Methods: This qualitative study was conducted using a content analysis approach from March to June 2024 in the operating theaters of teaching hospitals affiliated with Hamadan University of Medical Sciences in Hamadan, Iran. Data were collected through semi-structured interviews with ten operating room interns, selected via purposive sampling. Data were analyzed using conventional content analysis, following the methodology outlined by Graneheim and Lundman.

Results: Two main themes emerged from the analysis, including *personal challenges* and *organizational barriers*. These themes were further divided into five categories, including *perceptions of errors*, *emotional hurdles*, *structural limitations*, *educational challenges*, and *workplace culture*.

Conclusion: Addressing both personal and organizational challenges in error reporting is essential for improving patient safety outcomes. Fostering a culture of open communication and enhancing educational frameworks can empower operating room interns to actively participate in error reporting, thereby improving the overall quality of patient care.

Keywords: Medical errors, Operating room technicians, Students, Patient safety, Qualitative research

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Introduction

The operating room is a critical environment, particularly in urgent situations, where errors can have severe consequences, including patient mortality (1,2,3). Operating room departments in teaching hospitals provide care for a diverse range of patients with special conditions and treatment needs, further increasing the potential for errors (4,5). Students, as integral members of the healthcare team, play a significant role in patient care (6). However, in developing countries, interns often experience challenges and clinical stress during their hospital internship (7,8). One of the most pressing challenges for students is encountering and reporting errors and understanding their consequences in the treatment process (9,10). Students are particularly vulnerable to committing medical errors during clinical practice due to insufficient skills, lack of experience, and knowledge gaps (11,12).

These errors affect not only patients but also their families and healthcare providers, highlighting the need for safer systems and higher-quality care (13,14). The World Health Organization (WHO) has identified the reporting of medical errors as a key strategy for preventing their recurrence (15). However, healthcare providers often refrain from reporting errors due to factors such as perceived clinical incompetence, fear of job loss, lack of support, misunderstanding of error nature, documentation burdens, and fear of blame from colleagues (16).

It is crucial to address medical errors to ensure patient safety (17). Error reporting is a cornerstone of identifying and mitigating adverse outcomes in surgical settings (1). Nevertheless, finding effective solutions to address the root causes of medical errors remains challenging (18,19). For instance, punitive measures, despite their deterrent effect on error reporting, do not necessarily reduce the occurrence of errors. Instead, fostering an environment where healthcare providers can report errors without restriction is essential for enhancing the quality of medical care for patients (20,21).

While existing literature has extensively explored healthcare providers' awareness of medical errors (22-24), there remains a dearth of information on students' reporting practices, particularly considering their pivotal

role in the operating room. Therefore, investigating the perspectives of operating room students on reporting medical errors can provide valuable insights into the challenges and obstacles they face. This study aims to explore these experiences to enhance understanding of the barriers to effective error reporting and inform strategies for improvement.

Methods

Study design and setting

This qualitative study utilized a content analysis approach to analyze semi-structured interviews. Content analysis allows for the examination of both explicit and implicit data, enabling the interpretation of meaning and the drawing of inferences (25,26). The present study was conducted from March to June 2024 at teaching hospitals affiliated with Hamadan University of Medical Sciences in Hamadan, Iran. The primary objective was to explore the obstacles and challenges in reporting medical errors among operating room interns.

Participants and sampling

The study sample consisted of fourth-year operating room students selected through purposive sampling. Purposive sampling, also known as judgmental sampling, involves the deliberate selection of informants based on specific characteristics they possess (27). In this study, participants were selected based on their willingness to participate and their prior experience with medical errors in the operating room. Data collection continued until saturation was reached, with a total of ten interns participating.

Data collection

After obtaining the necessary approvals, the researcher conducted in-person interviews with participants who met the inclusion criteria, having scheduled appointments with them. Key interview questions included, "Have you encountered any medical errors during your internship?", "Could you elucidate the circumstances that led to non-disclosure of these errors?", and "What are the primary challenges and impediments in reporting errors?" Probing questions, such as "Can you provide further details?" and "Could you furnish an example?" were posed to elicit detailed responses. All interviews were conducted by the same researcher, audio-recorded, and held in a private area of the participants' workplace to minimize interruptions. Each interview lasted between 30 and 45 minutes. Furthermore, a sociodemographic questionnaire was utilized to collect relevant background information (Table 1).

Data analysis

Conventional content analysis was performed following the methodology proposed by Graneheim and Lundman. This approach involves identifying the unit of analysis and the unit of meaning as well as abstraction, which encompasses the development of codes, categories, and themes (28). Initially, interviews were transcribed verbatim immediately after completion. The transcripts were then read multiple times to grasp the overall concept. Afterwards, semantic units and codes were identified, with similar codes consolidated into broader categories to reveal latent content (29). This analysis began with a thorough reading of the text to gain an overall understanding. The entire interview was then transcribed verbatim into Microsoft Word. Each transcribed interview served as a unit of analysis and was reviewed by the respective interviewee for any necessary corrections. An inductive coding approach was employed, where important terms were identified and marked to establish primary codes. Meaningful units were extracted, categorized, and summarized based on their similarities and differences. Subsequently, these codes were analyzed to form categories and subcategories. The final codes and categories were scrutinized and validated by all members of the research team (14). MAXQDA software (version 20) was utilized to systematically compare diverse data and streamline data organization.

Trustworthiness

The robustness of the findings was assessed using Lincoln and Guba's criteria, including credibility, transferability, dependability, and confirmability (30,31). Prolonged involvement in the research process and diverse sampling enhanced the credibility of the findings. Participants included interns from both the seventh and eighth semesters, representing varied demographic characteristics and hospital affiliations. The researcher established rapport with participants by obtaining informed consent and maintaining ongoing communication through messages and calls to gather additional insights. Data transferability was ensured through detailed descriptions of the research context, participants, and data collection procedures. To validate the findings, three external faculty members independently reviewed the codes,

Table 1. Sociodemographic characteristics of study participants

Gender	Age	Marital status	Educational semester	Clinical part-time job
Male	23	Single	8	No
Male	28	Single	8	Yes
Female	22	Single	7	No
Female	22	Single	7	No
Male	23	Single	8	No
Female	23	Single	8	No
Female	23	Single	7	No
Male	24	Single	8	No
Male	23	Single	7	Yes
Male	24	Married	8	Yes

subcategories, and categories extracted. Member checking was also conducted, allowing participants to review and validate the codes and categories extracted. Feedback from participants led to adjustments in the final analysis, further enhancing the study's credibility.

Results

This study explored the challenges and barriers associated with underreporting medical errors among operating room interns. The demographic characteristics of the participants are presented in Table 1.

Two major themes were identified, including *personal challenges* and *organizational barriers*, further divided into five categories including *perceptions of errors*, *emotional hurdles*, *structural limitations*, *educational challenges*, and *workplace culture* (Table 2).

Personal challenges

Personal challenges encompassed a broad spectrum of individual, psychological, and professional obstacles that influence interns' inclination to report medical errors. These factors could ultimately impact their decision-making process and behavior regarding error reporting.

Perceptions of errors

a. Insignificant incidents

Regarding an error as inconsequential and commonplace due to its perceived frequency can lead to precarious outcomes in patient care. Some interns in the study noted that certain events in patient care are so recurrent that they no longer consider them errors despite their actual significance. This attitude of trivializing errors is ingrained in the workplace culture, as one participant remarked,

> *"Once, for instance, I had nail polish on my hands, but as I arrived earlier than the others, I washed my hands with the same ones. No one noticed it, but in my view, it wasn't particularly significant as it was under gloves, and the gloves were sterile"* (Participant 9).

b. Uncertainty about error occurrence and outcomes

Trainees may encounter challenges in identifying errors, leading to uncertainty regarding their reporting. Moreover, they may lack awareness of the grave repercussions associated with non-reporting, including patient harm and ethical implications. In this regard, one of the participants noted,

> *"Our postoperative knowledge in the operating theater remains scant, engendering a lack of discernment regarding task significance... This knowledge gap impairs our ability to discern critical issues"* (Participant 9).

c. Responsibility shift

Non-reporting of errors due to a lack of professional obligation exhibits a multifaceted nature that can impede endeavors to enhance the quality of care and give rise to ethical predicaments for healthcare practitioners. While operating room interns are integral to the patient care process, they may disavow responsibility for certain tasks to evade potential consequences. One intern stated,

> *"... For instance, the staff members were in a rush and aimed to expedite their work, so when an error occurred, they displayed indifference towards it. I once mentioned that if someone listens and rectifies the mistake, great; otherwise, it's not my concern"* (Participant 8).

Emotional hurdles

a. Fear and apprehension about Insult, stigma, and mistrust

Fear underscores the intricate interplay of emotional and social factors that can deter interns from reporting errors. Fear of offending involves the apprehension that reporting an error may result in criticism, blame, or negative feedback from others, potentially harming one's self-esteem and confidence. Fear of distrust relates to the worry that reporting an error may lead to distrust

Table 2. Main themes, categories, and subcategories related to barriers to medical error reporting by operating room interns

Themes	Categories	Subcategories
Personal challenges	Perceptions of errors	Insignificant incidents Uncertainty about error occurrence and outcomes Responsibility shift
	Emotional hurdles	Fear and apprehension about insult, stigma, and mistrust Poor communication and lack of self-confidence Performance anxiety and pressure Hierarchy and power dynamics
Organizational barriers	Structural limitations	High workload Lack of corrective infrastructure and resources Lack of accountability in the healthcare system Policy enforcement
	Educational challenges	Negative impact on evaluation Inexperience Practical knowledge gap
	Workplace culture	Improper team behavior Normalization of ignoring errors Avoidance of conflict

from colleagues and superiors, potentially straining relationships and teamwork in the healthcare setting. For example, one of the participants shared,

*"There were times when we were afraid that if we reported an error, the staff would focus on us and not let it go easily. They would all look at us with suspicion and not trust us easily" (*Participant 4).

b. Poor communication and lack of self-confidence

Poor communication within the surgical team, coupled with a lack of self-confidence, may raise doubts about interns' abilities. This poor communication and lack of self-confidence can stem from a fear of making mistakes, exacerbating the situation, or facing negative consequences for speaking up. Conversely, shyness, which involves a reluctance to express oneself or communicate, can prevent interns from voicing concerns or asking for help when needed. In this respect, a participant highlighted,

"Once, I attended a laparotomy operation with an experienced staff member. Towards the end of the operation, he casually counted the gas, but I realized that he made a calculation error. However, I felt embarrassed to point it out because he was a hospital staff member, and I was just a simple student" (Participant 1).

c. Performance anxiety and pressure

Interns experience high stress and anxiety while working in the operating room. This stress can stem from various sources, such as the complexity of surgical procedures, time pressures, fear of making mistakes, and the specific conditions of the operating room, all of which can adversely affect trainees' ability to report errors. For example, one of the interns noted,

"That moment of making a mistake, you kind of freeze and don't know what to do, and most of the errors that occur in the operating room are a result of the stressful conditions" (Participant 4).

d. Hierarchy and power dynamics

Interns' misconceptions about their role can deter them from reporting errors and seeking help, resulting in underreporting and adverse outcomes for the patient. For instance, one of the participants mentioned,

"When something goes wrong, I don't want to report it because, here, if I want to report errors, there are personnel, there is a resident, there is a surgeon... It's like a child discussing tools in the company of adults... It's a situation where reporting sometimes feels impossible" (Participant 5).

Organizational barriers

Organizational barriers highlight the complex interplay of factors within healthcare organizations that impede the reporting of medical errors by interns. Addressing these barriers is crucial in creating a culture of transparency, accountability, and continuous learning that supports professional development at all levels.

Structural limitations

a. High workload

High workload and fatigue can diminish students' focus and decision-making ability, increasing the likelihood of errors and their underreporting. These challenges cause students to hesitate in doing the right thing and often conceal mistakes. For instance, one of the participants expressed,

"*When you have a lot of work to do, you don't care if you make a mistake. You just want to finish it somehow, and sometimes you don't even notice the mistake at all*" (Participant 7).

b. Lack of corrective infrastructure and resources

Interns in the operating room face challenges due to inadequate systems for addressing and rectifying errors, as well as insufficient resources to support error reporting processes. This lack of infrastructure and resources can foster a culture of silence, making it difficult for students to report errors and effectively learn from them. For example, one of the participants mentioned,

"Every time we want to open some sterile packages here, the envelopes are not very good, so we have to tear them. These things are normal here mostly due to the facilities" (Participant 4).

c. Lack of accountability in the healthcare system

Healthcare systems are not sufficiently accountable for handling medical errors, and this lack of accountability on the part of the system can contribute to a culture of blame avoidance, fear of consequences, and reluctance to report errors. In this regard, one of the participants said,

"A few days ago, a patient in the recovery room fell off the stretcher due to a lack of strength, and no one took responsibility for it. Somehow, everyone blamed the staff who was there... The whole system seeks to blame the staff or the student if a mistake happens" (Participant 7).

d. Policy enforcement

Existing policies and procedures in healthcare organizations may not effectively support the reporting of medical errors and may directly or indirectly lead staff to make mistakes and hide them with irrational procedures. One participant explained,

"*We observed disposable cautery pens being washed and re-sterilized before use. When we raised concerns, we were told it was the hospital's policy*" (Participant 7).

Educational challenges

a. Negative impact on evaluation

Interns may fear that reporting errors and mistakes could lead to lower grades and negative feedback from evaluators

and damage to their professional credibility. Fear of these negative consequences can cause failure to disclose errors and disrupt learning opportunities as well as harm the patient. In this regard, one of the participants explained,

"We had a preceptor last semester who was like a nightmare for us. We couldn't talk to him at all because he was very strict. Every small mistake you made would affect your evaluation" (Participant 3).

b. Inexperience

Interns may lack the practical experience, skills, and situational awareness required to identify, address, and report medical errors in the operating theatre. Inexperienced interns may feel confused, anxious, and uncertain when faced with complex clinical situations that involve errors. One of the participants expressed,

"Once, in an orthopedic surgery, my friend and I tied the tourniquet cuff, and the operation took a bit longer. As we didn't have much experience, we forgot to remind the surgeon about the time. When we opened the cuff, the area was a little bruised. Since we had never dealt with such a case before, we didn't take any action" (Participant 1).

c. Practical knowledge gap

Trainees may lack the necessary communication skills, teamwork strategies, and problem-solving abilities to effectively manage errors and engage in open and transparent reporting practices. For instance, one participant shared,

"During a surgical procedure, a mistake occurred while I was scrubbing, but I didn't speak up about it at the time. Looking back now, I realize that it should have been addressed, but due to a lack of confidence and training, we kept quiet" (Participant 9).

Workplace culture

a. Improper team behavior

Inappropriate behaviors can take the form of bullying and intimidation, victimization, and lack of support and guidance that may either facilitate or hinder the reporting of medical errors. A participant stated,

"Well! You want to do something and you make a mistake because you don't know how to do it... After all, you can learn whatever you want to do. You may make mistakes a few times, but rather than being given constructive criticism, they will undermine you and make you feel like you don't know anything. When you make a mistake, somehow cover it up" (Participant 10).

b. Normalization of ignoring errors

The medical team might not stress the importance of reporting medical errors as a crucial aspect of patient care and quality improvement, leading to a culture in which errors are played down. This lack of attention can influence interns to adopt similar attitudes and behaviors towards errors. For instance, one of the participants remarked,

"We used to see the cautery plate sticking where it was not shaved, and they did not fix it at all. When we pointed it out, they said that the operation was short or nothing would happen" (Participant 7).

c. Avoidance of conflict

Avoiding disagreements can indicate a lack of open and transparent communication within the treatment team, where team members may hesitate to express their concerns or challenge the decisions made for fear of creating conflict or tension within the team. For example, one of the interns stated in this regard,

"We witness these mistakes and point them out, but things are not rectified. So, we no longer bother to speak up, because no one wants to start a dispute. The instructor says one thing, the staff say another, and so on. In the end, it leads to arguments and conflicts" (Participant 6).

Discussion

The operating room is a high-stakes environment that requires meticulous attention to detail and a steadfast focus on patient safety due to the intricate nature of medical procedures. Prompt and accurate reporting of medical errors is crucial for delivering high-quality care, as it promotes a culture of transparency, accountability, and ongoing improvement within the healthcare system. Nonetheless, challenges in error reporting remain significant.

This study identified two main themes regarding the barriers to reporting errors, including *personal challenges* and *organizational barriers*. Personal challenges were further classified into two categories, including *perceptions of errors* and *emotional hurdles*. In the high-pressure environment of the operating room, students encounter various emotional barriers (32). Participants in this study reported experiencing emotions such as fear of disrespect, concerns about being perceived as incompetent, and mistrust, which hindered error reporting. These findings align with previous research, such as that by Soydemir et al, which identified fear of blame, potential jeopardizing situations, uncertainty, and peer censure as significant impediments to error reporting (33).

Previous studies have not only highlighted fear as a primary factor inhibiting error reporting but also have pointed out other individual-related factors that influence error reporting, particularly among younger medical professionals (34). This study revealed that factors such as lack of self-confidence in admitting errors and the stress associated with clinical conditions potentially influence error reporting. While moderate stress can enhance performance, excessive stress in the operating room may reduce effectiveness (35). Moreover, poor communication within the operating room was found to contribute to

negative patient outcomes and increased medical errors. This finding is consistent with previous studies that identified poor communication as a leading cause of unwanted incidents (36).

In addition to emotional hurdles, interns' perceptions of errors and their significance in the operating room also played a role in underreporting. Healthcare workers may trivialize mistakes due to heavy workloads, which leads to a lack of attention, diminished motivation, and increased fatigue (33). This normalization of errors as commonplace and inconsequential hinders accurate reporting of errors in the care process (37). Similarly, interns in this study demonstrated a lack of understanding regarding the nature and significance of errors, as well as uncertainty about their consequences. This inadequate comprehension of errors and their importance in the operating room was a primary reason for their concealment.

Organizational barriers also significantly impeded error reporting. Structural issues such as high workloads, a lack of opportunities to report incidents, insufficient corrective mechanisms, the absence of accountability within the system, and rigid policies were recurring themes in interviewees' responses. In line with this study, Fathi et al identified high workloads as one of the main barriers to error reporting, largely attributed to a shortage of nursing staff in the wards (38). The lack of manpower and excessive workloads were reported to have adversely affected participants' ability to report errors. Besides, the absence of mechanisms to address errors further discourages reporting. Hall et al similarly highlighted that systems and feedback pathways within organizations can pose significant barriers to error reporting (39). Previous studies indicate that most healthcare institutions lack adequate support systems to assist employees when errors occur (40). Furthermore, participants in this study expressed concerns about the lack of systemic support and the tendency to evade responsibility within the organization.

Among the various challenges related to the organization, the prevailing workplace conditions were also highlighted. Koehn et al pointed out that unfavorable working conditions, such as a negative work atmosphere, mistrust among team members, and poor interdepartmental coordination, significantly exposed medical caregivers to errors (40, 41). Such environments not only elevate stress levels but also increase conflicts that may deter open communication about mistakes (42). Conversely, a supportive workplace culture can encourage nurses to engage in safety monitoring, risk prevention, teamwork, and effective error management (43).

Another challenge related to working conditions was the unfair treatment of errors by personnel. According to interns' experiences, this had a significant impact on their subsequent behavior when faced with similar situations, as they unconsciously modeled their behavior based on that of the personnel. The importance of positive role models and a collaborative environment was underscored by previous research, suggesting that sharing experiences and encouraging open dialogue can significantly enhance error reporting practices (42).

Educational structures also play a pivotal role in shaping students' responses to errors. Challenges such as the gap between theory and practice, the negative impact of reporting errors on evaluations, and lack of experience in dealing with errors were highlighted. In line with the findings of the present study, Lee et al noted that insufficient knowledge among healthcare providers and inadequate organizational training on optimal reporting practices were significant factors influencing error reporting. They recommended training programs for both new and experienced staff to improve error reporting standards and methods (44). Given that students do not receive formal training in handling errors, it seems that many of the educational challenges encountered when students face errors stem from the absence of an appropriate educational curriculum.

Conclusion

This study underscores the multifaceted challenges that operating room interns face when reporting medical errors, revealing a significant interplay of personal and organizational factors. Key issues included difficulties in recognizing and defining errors, emotional obstacles such as fear and anxiety, inadequate reporting systems, lack of formal training, and a workplace culture that stigmatizes mistakes. To address these challenges and enhance patient safety, healthcare institutions should implement comprehensive educational programs on error recognition and reporting, promote open communication to foster a supportive environment, establish clear and user-friendly reporting protocols, and provide mentorship opportunities to guide interns through the process. By addressing these barriers and adopting these strategies, healthcare organizations can empower interns to report errors more effectively and cultivate a safer healthcare environment for all. This study acknowledges several limitations that may have influenced the findings. The researchers' personal beliefs and values regarding error reporting and professionalism may have unintentionally shaped the study's design and analysis. Such biases could affect the interpretation of qualitative data, leading to findings that may not fully reflect the interns' perspectives. To mitigate this, future studies should involve a more diverse research team with varied experiences and backgrounds. Besides, the researchers' prior knowledge and experiences in the surgical environment may have affected their interactions with participants, potentially leading to social desirability bias. Interns might have tailored their responses to align with perceived expectations rather than expressing their genuine views. Furthermore, researchers' interpretations

may reflect their perspectives rather than the true sentiments of the interns. To address this, future studies should employ triangulation methods, such as having multiple researchers independently analyze the data and compare findings.

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Authors' Contribution
Conceptualization: Behzad Imani.
Data curation: Iman Khahan-Yazdi.
Formal analysis: Behzad Imani, Iman Khahan-Yazdi.
Investigation: Behzad Imani.
Methodology: Iman Khahan-Yazdi, Behzad Imani.
Software: Behzad Imani.
Supervision: Behzad Imani.
Writing–original draft: Iman Khahan-Yazdi, Behzad Imani.

Competing Interests
The authors declare that there is no conflict of interest in this study.

Ethical Approval
This study adhered to the principles outlined in the Declaration of Helsinki. Before conducting the study, ethical approval was obtained from the Medical Ethics Committee at Hamadan University of Medical Sciences (registration number: IR.UMSHA.REC.1403.013). Written informed consent was obtained from all participants, who were free to withdraw from the study at any time.

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