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Barriers to Implementing the Surgical Safety Checklist in Operating Rooms of Educational Hospitals of Dezful University of Medical Sciences: A Qualitative Study

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Abstract

Background: The Surgical Safety Checklist is a tool introduced by the World Health Organization in 2008 to reduce surgical complications such as performing surgery on the wrong site or patient, leaving instruments, and enhancing patient safety during anesthesia. The Surgical Safety Checklist (WHO SSC) consists of three stages: sign-in, Time-out, and Sign-out.

Aim: The present study was conducted with aim to identify the barriers to the proper implementation of the Surgical Safety Checklist in hospitals affiliated with Dezful University of Medical Sciences.

Method: This qualitative study employs the conventional content analysis strategy by the Graneheim and Lundman Method. The study participants include one anesthesiologist, one pediatric surgery subspecialist, one Master's Graduate in operating room nursing, and seven perioperative nurses. Purposeful sampling was conducted and semi-structured interviews were utilized to collect data.

Results: The analysis resulted in the extraction of 255 codes, categorized into four main categories, including individual barriers, educational barriers, managerial barriers, and cultural barriers.

Implications for Practice: To effectively implement the surgical safety checklist, periodic training for specialists and experts should be conducted during their student years and throughout their professional re-training course. Additionally, it seems that to have a culture of implementation, there is a need for oversight of the implementation and providing appropriate feedback to staff and specialists.

Keywords: Checklist, Patient safety, Perioperative care, Qualitative research

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Introduction

"Adverse events" harm patients and affect their lives. They engage patients, their families, and healthcare specialists. Additionally, adverse events are significant causes of disabilities and fatalities occurring in at least 10% of hospitalized patients (1-3). Research conducted in Canada has revealed that 5.7% to 7.12% of hospitalized individuals have been exposed to medical incidents, with approximately half of these incidents and side effects relating to surgical operations (4). In operating rooms, patient safety is always a priority concern. Surgery involves a series of organized and complex activities and efforts carried out by a large number of healthcare staff in a challenging and dynamic environment, often involving the use of complex devices (5). In addition to the complex work environment in the operating room, the high level of stress and the presence of vulnerable patients increase the likelihood of errors and harm to the patient (5-8). One of the greatest potential risks for patients during surgeries is human error, such as leaving instruments, performing surgery on the wrong side of the body, or mistakenly operating on the wrong patient (9).

International organizations, including the World Health Organization and the World Bank, have emphasized surgery as a vital component of global health development (10, 11). Healthcare managers and researchers have made significant efforts to identify areas for improving patient safety. In many cases, checklists are one of the proposed solutions introduced and promoted to healthcare staff as a simple reminder for issues that, if forgotten, could lead to harm and complications (12). To reduce such preventable harm, the World Health Organization (WHO) introduced the surgical safety checklist in 2008. This tool aims to improve preoperative actions and reduce the risk of adverse events during surgery and postoperative complications. The Surgical Safety Checklist (WHO SSC) consists of three stages: sign-in, Time-out, and Sign-out, respectively (13). In Iran, a study by Mohbifar et al. (2014) demonstrated that the implementation of this checklist effectively reduces complications and mortality among patients (14). However, the utilization of the surgical safety checklist in Iran is not at a desirable level (15, 16).

Since 2014, a surgical safety checklist has been introduced in operating rooms across the country as a comprehensive tool to reduce surgical complications such as performing surgery on the wrong site or patient, leaving instruments, and enhancing patient safety during anesthesia. However, field observations in the operating rooms of Dezful educational hospitals revealed that the implementation by surgical team members does not align with the purpose of this tool. Medical errors continue to occur in these centers, leading to significant costs for healthcare centers and patients. To date, no substantial studies have been conducted on the barriers to proper implementation of the checklist in Iran. To reduce costs incurred from these errors, reduce complaints against medical staff, and enhance patient health, this study was conducted with aim to elucidate the barriers to the effective application of the checklist within the context of patient safety culture in Dezful educational hospitals, contributing to improvements in the implementation of safety checklists and promoting safer surgical practices.

Methods

This qualitative study was conducted after obtaining permission from the Ethics Committee of the Research Vice-Chancellor of Dezful University of Medical Sciences. Sampling was done from the operating room by targeted and accessible method. The study population included the staff, surgeons, anesthesiologists, nursing surgical technologists, and nurse anesthetists working in the general and gynecological surgery department. This study commenced from June 2024 to August 2024. The study aimed to address the following questions: "What is your attitude toward the surgical safety checklist and its implementation?" "What are the barriers to the implementation of the surgical safety checklist?" and "What solutions do the surgical teams propose for the proper implementation of the surgical safety checklist?" This qualitative study utilized the content analysis methods (17). Following the first question ("How well is the surgical safety checklist being adhered to?"), subsequent questions were asked based on the content of the responses to the first question, in an exploratory and guided manner. A qualitative content analysis was conducted using a conventional approach based on the methodology outlined by Graneheim and Lundman (2004). Data analysis was performed following a structured step-by-step process, including: transcribing interviews immediately after completion, thoroughly reading the text to develop a comprehensive understanding, identifying meaning units and generating initial codes, grouping similar codes into subcategories, and analyzing the latent content

embedded within the data (18). This content analysis method was used to examine the presence of specific words and concepts in the texts, allowing for data reduction and structuring. In the conventional approach, the use of predefined categories was avoided, allowing categories and their names to be extracted directly from the data. To achieve this goal, the interview texts were read multiple times to grasp the overall sense. Then, the texts were read word by word to extract codes. Interviews with other participants and the coding of texts continued, with detailed codes being categorized under broader headings. Subsequently, the codes were grouped into categories based on similarity, and the relationships between them were established (25).

The study participants (surgeons, anesthesiologists, surgical technologists, and nurse anesthetists working in general and gynecological surgery departments) were selected purposefully. Inclusion criteria were: minimum of a bachelor's degree and at least one year of experience in the operating room. Exclusion criteria were: work experience less than six months and a lack of willingness to participate in the study.

The primary method of data collection in this study was semi-structured interviews using open-ended questions. The interviews were conducted individually in a quiet environment at a suitable time and place where the participants felt comfortable. When saturation was reached in the interviews, to ensure greater reliability, two additional participants were also interviewed. The researcher obtained the addresses and phone numbers of the participants at the end of the interviews using an informed consent form to verify their statements or determine the need for further interviews. The interviews with the participants began based on the main research question. Considering that the immediate recording of data is essential for the researcher’s success in qualitative research, the interviews were recorded with the participant's consent and then transcribed word for word immediately or as soon as possible. The interview location and individuals' workplaces were determined, and the average duration of each interview was about 50 minutes. All interviews were conducted individually by a single interviewer.

In this study, data collection and analysis were conducted simultaneously. All interviews were recorded with the participant's permission, and then was transcribed and reviewed multiple times. Then, the initial codes were extracted. The related initial codes that could form potential categories were grouped to shape the corresponding main categories. Each of the potential category was then reviewed and cross-checked with participants’ statements. In the final stage, the category was revised and redefined. Throughout the process of data collection and analysis, any reflections and insights related to the data that came to the researcher's mind were noted down and used for subsequent interviews. In this study, transcriptions from the tape and extracted statements (codes) were verified by the participants to ensure content validity (19). Coding and classification were conducted using MAXQDA software (version 2020). Additionally, two independent researchers were asked to confirm the accuracy and reliability of the method. During the study, methods were employed to ensure the accuracy and reliability of the data credibility. The concepts of credibility, fittingness, dependability, and conformability, which serve as criteria for scientific accuracy in qualitative research, were taken into consideration (19). One of the best methods for establishing credibility is long time engagement with the subject. In this research, the researcher was involved with the topic of study and work in the operating room for ten years. Since the researchers were consistently present in the operating room as a nurse and trainer before and during the research, they have maintained appropriate communication and interaction with the participants. Before conducting interviews, the researcher was the colleague of the participants to build trust and create a suitable environment for in-depth discussions. Findings were checked and reviewed with the participants by member checks. To this end, portions of the text (External Checks) from the interview, along with the corresponding codes and identified categories were sent to several member checks to review the analysis process and provide feedback on their accuracy. Additionally, to determine the fittingness of the findings, they were shared with several experts and specialists who had not participated in the research. The study also emphasized the use of maximum diversity sampling techniques, which aids in the fittingness or transferability of findings to others or readers. Furthermore, to ensure the conformability and authenticity of the research, the researcher meticulously documented and reported the research procedures to facilitate future follow-up for others.

In reflectivity, it is important to note that the researcher has many years of experience working in the operating room. While efforts were made to minimize the impact of personal biases during data

collection and analysis, the researcher acknowledged that achieving complete objectivity was challenging. To enhance the validity of the findings, the data analysis was reviewed and validated by a co-researcher with extensive experience in qualitative research. This collaborative approach aimed to reduce potential biases and ensure a more accurate interpretation of the data.

Ethical Consideration

This study was approved by the Ethics Committee of Dezful University of Medical Sciences (ethical code: IR-DUMS.REC.1403.003). Informed consent was obtained from participants following an explanation of the study's purpose.

Results

In this content analysis, 10 participants were involved, comprising 3 males and 7 females. The average age of the participants was 38 years, and their average work experience was 13 years. The education of the participants was as follows: 1 anesthesiologist, 1 subspecialist in pediatric surgery, 1 master's graduate in operating room nursing, and 7 perioperative nurses (Table 1).

Table 1. General characteristics of the study participants

Row	Gender	Age (year)	Education	Role	Work experience (year)
1	Male	42	Specialist	Anesthesiologist	10
2	Female	30	Bachelor	Surgical Technologist	8
3	Female	47	Bachelor	Surgical Technologist	22
4	Female	40	Master's	Surgical Technologist	18
5	Male	38	Bachelor	Anesthesia Nurse	10
6	Male	55	Subspecialist	Surgeon	21
7	Female	32	Bachelor	Surgical Technologist	8
8	Female	23	Bachelor	Surgical Technologist	1
9	Female	39	Bachelor	Anesthesia Nurse	14
10	Female	37	Bachelor	Anesthesia Nurse	11

According to the of Graneheim and Lundman approach, four main categories and thirteen subcategories were identified. The primary categories comprise individual barriers, educational barriers, managerial barriers, and cultural barriers (Table 2).

Table 2. Categories and subcategories extracted from the barriers to the implementation of the surgical safety checklist

Category	Subcategory
Individual barriers	Heavy workload Bureaucracy fatigue
Educational and skills barriers	Lack of adequate training for specialists Absence of an educational placement for this checklist in the re-training courses for professionals
Organizational barriers	Lack of supervision of deficiencies Absence of a follow-up process Absence of team checklist monitoring Lack of teamwork skills Absence of emphasis from managers on its implementation Inadequate groundwork by physicians for its implementation
Cultural barriers	Lack of teamwork culture Lack of sufficient trust between operating room personnel

1. Individual Barriers

In the category of individual barriers, heavy workload and bureaucratic fatigue emerged as significant challenges. One participant noted:

‘…The excessive workload and demanding shifts leave little energy for handling paperwork’. (Participant No. 2)

2. Educational and skills barriers

In the category of educational and skill-related barriers, the lack of adequate training for specialists and the absence of an educational framework for this checklist in retraining programs were highlighted. In this regard, one of the participants said:

‘…In the specialization course, these topics are taught to us sporadically, but they are not presented in a comprehensive and systematic way’. (Participant No. 6)

3. **Organizational barriers**

In the category of Organizational barriers, key challenges include the lack of oversight regarding deficiencies, the absence of a follow-up process, insufficient supervision of the team checklist, inadequate teamwork skills, the lack of managerial emphasis on its implementation, and insufficient preparation of physicians for its execution. One of the participants stated:

‘…Now, regarding this checklist, we have identified some deficiencies, but there is no place for follow-up’. (Participant No.1)

The other participant noted:

‘…It’s absolutely impossible for the surgical team to fill out this checklist simultaneously; each team member completes it based on the specific case they are dealing with’. (Participant No.5)

4. Cultural barriers

In the category of cultural barriers, the lack of a teamwork culture and insufficient trust among operating room staff were highlighted. In this regard, one of the participants said:

‘…Although the nature of work in the operating room is inherently collaborative, in practice, evidence suggests that personnel face challenges in teamwork and often operate individually, even in team-based tasks’. (Participant No.10)

Based on the interview conducted, it appears that the time-out procedure, during which all surgical team members confirm essential information such as the patient's name and the type of surgery, is not consistently followed. This procedure is not executed uniformly across different surgeries, and the method of confirmation varies depending on the individual. Additionally, the culture surrounding the time-out process is weak, where all team members are encouraged to share their comments. One participant noted:

‘…I check the items, patient identification, and surgery with the surgeon before starting the operation, but many colleagues do not do this. Many surgeons do not cooperate’. (Participant No.10).

Discussion

The purpose of the present study was to clarify the barriers to implementing the Surgical Safety Checklist, focusing on the surgical team's attitudes toward it. This checklist has been widely recognized in operating rooms as a tool for improving teamwork, sharing clinical information, and preventing errors and leaving something out (ignorance) (20). Since its introduction in 2009, the checklist has served as a standard in surgeries worldwide to reduce mortality and complications in patients undergoing surgical procedures (21). Surgical Safety Checklist is not always implemented correctly or consistently. This issue is particularly evident in the Time-Out phase, where the entire surgical team is required to pause, actively engage, and verify checklist items. This critical step is often not fully adhered to, which may compromise patient safety and surgical outcomes (22). In this study, by conducting interviews with the surgical team, the barriers to implementing the surgical safety checklist were identified under four main categories: individual barriers, educational barriers, managerial barriers, and cultural barriers. Excessive workload and lack of staff cooperation have been identified as the key barriers to the effective implementation of the surgical safety checklist (23). In the present study, this challenge falls under the category of individual barriers. The findings suggest that due to high workload demands, healthcare professionals tend to minimize their engagement in extensive documentation and bureaucratic procedures, which may further hinder the checklist’s proper implementation.

The findings of Sima *et al'* study highlight insufficient training as a major barrier to the effective implementation of the WHO Surgical Safety Checklist. Participants, including nurses, surgeons, and anesthesiologists stated knowledge gaps and a lack of structured education regarding the checklist and its role in patient safety. The absence of formal and standardized training programs led to inconsistent understanding and application across different hospital departments. Surgeons primarily perceived the checklist as a nursing responsibility, yet they also noted that nurses lacked sufficient knowledge to implement it effectively. Similarly, anesthesiologists expressed minimal engagement, indicating low institutional buy-in for checklist use and training. This limited commitment among surgical teams may contribute to incomplete adherence, reducing the checklist's impact on patient safety outcomes. Furthermore, the reluctance of operating room staff to participate in training workshops suggests that the checklist has not been fully integrated into the clinical culture (24).

Regarding the results obtained for the better implementation of checklists, it is advisable to consider surgeons and specialists as key individuals and leaders in the operating room. Therefore, it is essential to receive adequate training on the significance and role of the surgical safety checklist. Additionally, during re-training courses for surgeons and specialists, proper usage of the checklists should be taught, as the lack of surgeon engagement is one of the barriers to effectively implement the surgical safety checklist (25). According to the researcher, even changes in educational methods during the student years can be effective in enhancing students' understanding of their roles in adhering to checklists. This would also improve motivation and attitudes in graduates, contributing to better adherence to safety protocols in clinical practice.

In this study, from a managerial perspective, it seems that monitoring and supervising the proper implementation of surgical safety checklists can yield positive outcomes. Additionally, using checklists can positively impact the effective implementation of the checklist if the items and errors identified in the surgical safety checklist are written in the checklist and feedback is provided to them. For instance, in case of equipment failure, instead of simply writing "yes", the failure case of the device should also be noted in the checklist. Then checklist must be considered and feedback regarding the fixing device failure by the responsible parties to create a more dynamic and serious atmosphere in the surgical safety implementation process, thereby presenting the checklist as a more effective tool.

In the cultural area, although the surgical team considers the existence of a surgical safety checklist as positive and valuable, and demonstrates this through intervention studies where the surgical team shows appropriate feedback in the implementation of the surgical safety checklist (26), the culture of team implementation is not highly enough for surgical safety checklist. Each individual tends to review options based on their own experience and responsibilities, filling out the checklist individually. Here, culture, training, management, and supervision overlap, and in the researcher's view, continuous training and supervision can lead to improved team-based implementation of the surgical safety checklist. Studies indicate that checklists enhance teamwork and safety atmosphere (27). The World Health Organization has developed the surgical safety checklist as a part of the "Safe Surgery Saves Lives" initiative to reduce surgical injuries and complications while enhancing communication and teamwork during surgery (20). However, weaknesses in culture, training, and management in implementing the surgical safety checklist can undermine its significant impact, resulting in its use merely as a personal reminder. Lack of perceived necessity and awareness of its role in improving patient safety could hinder long-term compliance. Addressing these barriers requires structured, interdisciplinary training programs and institutional support to foster a team-based approach to surgical safety practices (24).

A qualitative study by Munthali et al. demonstrated that factors such as incoherent and intermittent training, lack of supervision on the proper use of checklists, absence of protocols for properly following surgical safety checklist, fatigue, staff shortages, and lack of necessary tools and equipment at the start of surgery led to individuals leaving the operating room to prepare instruments, which resulted in lost time for the surgical team to review the surgical safety checklist. They also indicated that the hierarchical structure of the surgical team and the attitudes of surgeons significantly impact the implementation of the surgical safety checklist (25). As shown in the results of the present study, it is advisable to provide periodic training for surgeons held by peers, or during their specialization training, they can be trained by their peers or instructors to foster a more positive attitude towards the surgical safety checklist (25). Many physicians and nurses view patient safety as an individual

responsibility rather than a team responsibility (28). In the study by Munthali et al., the professional and ethical attitudes of the surgical team were linked to the implementation of the surgical safety checklist (25). In the present study, the findings in the management area indicate that individuals pay attention to the checklist based on their attitudes toward the professional tasks assigned to them and do not consider all the items on the checklist collectively.

The other qualitative study conducted by Facey et al. found that surgical teams, without using a physical copy of the surgical safety checklist, often improvise by recalling checklist items from memory and experience. Furthermore, time-out briefing sessions aimed at introducing the surgical team and strengthening communication and teamwork are rarely conducted in the SCC informal setting or during a break. Another issue is that surgeons prefer that the responsibility for leading briefing sessions for the surgical safety checklist falls to the surgical team personnel (29). However, due to the factors such as the hierarchical structure within the surgical team and lack of autonomy among personnel in decision-making and initiative, individuals often overlook the physical checklist and its implementation sequence, reviewing only those items they deem important. The checklist structure for determining each item is limited to selecting either "yes" or "no". If the checklist documentation is checked incomplete, meaning neither the "yes" nor "no" options, the case is returned to the section as a deficiency error (29). Their results align with the findings of the present research. Based on this study and the mentioned research, as well as the experiences of the researcher, if the checklist includes sections for reporting items that are not feasible or require documentation, management can provide feedback to the surgical team, operating room staff, surgeons, and specialists based on these points. Additionally, follow-up measures to address identified deficiencies could improve the functionality of the surgical safety checklist.

Among the strengths of the present study, it can be noted that this is the first qualitative research conducted regarding the barriers to the implementation of the Surgical Safety Checklist. The researcher has ten years of experience working in the operating room as a member of the surgical team and has a background in this field, worked as a clinical colleague familiar with all members of the surgical team, and served as the interviewer. Interviews were conducted with anesthesiologists, surgeons, and perioperative nurses. However, the present study had also limitations. Some individuals were reluctant to self-report during interviews due to biases, but the researcher was able to establish a good rapport thanks to their familiarity with the environment and individuals. Moreover, participants had no enough awareness of various aspects of the checklist. This was mitigated by the researcher providing a physical version of the checklist during interviews as a reminder. Additionally, concerns about having their voice recorded for the interview posed another limitation; in such cases, if participants were unwilling to have their voices recorded, written methods were used.

Implications for practice

Periodic training should be incorporated for specialists and experts during their educational journey and re-training courses throughout their professional careers in order to implement the surgical safety checklist. Furthermore, it appears that to foster a culture of implementation, it is essential to supervise implementation and provide appropriate feedback to staff and professionals.

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Conflicts of interest

The authors declared no conflict of interest.

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Authors' Contributions

Mohadese Pourzamani drafted and prepared the manuscript. Analysis and interpretation of data was done by Marzieh Beigom Bigdeli Shamloo. Neda Rashidi and Leila Kalani contributed to the

manuscript preparation. Sahar Keshvari contributed to the conceptualization, study design, and acquisition of data. All authors reviewed and approved the final manuscript.

References

1. World Health Organization. Global patient safety action plan 2021-2030: towards eliminating avoidable harm in health care: World Health Organization; 2021.
2. De Vries EN, Ramrattan MA, Smorenburg SM, Gouma DJ, Boermeester MA. The incidence and nature of in-hospital adverse events: a systematic review. BMJ Quality & Safety. 2008;17(3):216-23.
3. Schwendimann R, Blatter C, Dhaini S, Simon M, Ausserhofer D. The occurrence, types, consequences and preventability of in-hospital adverse events–a scoping review. BMC health services research. 2018;18:1-13.
4. Baker GR, Norton PG, Flintoft V, Blais R, Brown A, Cox J, et al. The Canadian Adverse Events Study: the incidence of adverse events among hospital patients in Canada. Cmaj. 2004;170(11):1678-86.
5. Stelfox HT, Palmisani S, Scurlock C, Orav EJ, Bates DW. The "To Err is Human" report and the patient safety literature. BMJ Quality & Safety. 2006;15(3):174-8.
6. Paige JT, Garbee DD, Bonanno LS, Kerdolff KE. Qualitative analysis of effective teamwork in the operating room (OR). Journal of surgical education. 2021;78(3):967-79.
7. Henry L, Hunt SL, Kroetch M, Yang YT. Evaluation of patient safety culture: a survey of clinicians in a cardiovascular operating room. Innovations. 2012;7(5):328-37.
8. Nanji KC, Patel A, Shaikh S, Seger DL, Bates DW. Evaluation of perioperative medication errors and adverse drug events. Survey of Anesthesiology. 2016;60(6):259-60.
9. Cramer JD, Balakrishnan K, Roy S, David Chang C, Boss EF, Brereton JM, et al. Intraoperative sentinel events in the era of surgical safety checklists: results of a national survey. OTO open. 2020;4(4):2473974X20975731.
10. Meara JG, Leather AJM, Hagander L, Alkire BC, Alonso N, Ameh EA, et al. Global Surgery 2030: evidence and solutions for achieving health, welfare, and economic development. The lancet. 2015;386(9993):569-624.
11. Safety WP, World Health Organization. WHO guidelines for safe surgery 2009: safe surgery saves lives. InWHO guidelines for safe surgery 2009: safe surgery saves lives 2009.
12. Gawande A. Checklist manifesto, the (HB). Penguin Books India; 2010.
13. World Health Organization. Implementation manual-WHO surgical safety checklist. 2008.
14. Mohebbifar R, Purrostami K, Mahdavi A, Hassanpoor E, Sokhanvar M, Nazari M, et al. Effect of surgical safety checklist on mortality of surgical patients in the α University Hospitals. Alborz University Medical Journal. 2014;3(1):33-9.
15. Seif Hashemi M, Rassouli M, Darvishpour Kakhki A, Shakeri N, Bonakdar H, Jafari Manesh H. Auditing standards for safe surgery in the operating room of selected hospital of the Shahid Beheshti University of Medical Sciences. Journal of Health Promotion Management. 2015;4(1):51-9.
16. Zadi Akhule O, Lotfi M, Nasiri E, Chalangari S. Survey of the Performance of Operating Room Personnel Regarding the Observance of Surgical Safety Principles in Hospitals of Mazandaran University of Medical Sciences in 2019. Payavard salamat. 2021;14(6):484-96.
17. Speziale HS, Streubert HJ, Carpenter DR. Qualitative research in nursing: Advancing the humanistic imperative: Lippincott Williams & Wilkins; 2011.
18. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. Nurse Education Today. 2004;24(2):105-12.
19. Elo S, Kääriäinen M, Kanste O, Pölkki T, Utriainen K, Kyngäs H. Qualitative content analysis: A focus on trustworthiness. SAGE open. 2014;4(1):2158244014522633.
20. Lives SS. WHO guidelines for safe surgery 2009. Geneva: World Health Organization. 2009.
21. Fridrich A, Imhof A, Schwappach DLB. How much and what local adaptation is acceptable? A comparison of 24 surgical safety checklists in Switzerland. Journal of Patient Safety. 2021;17(3):217-22.
22. Keshvari S, Amini Rarani S, Shafiei Z, Mojdeh S. Evaluation of Implementation of the Principles of Patient Safety Standards by Surgical Team in Iranian Hospitals. Evidence Based Care. 2023;13(2):40-5.
23. Aydin Akbuga G, Sürme Y, Esenkaya D. Compliance With and Barriers to Implementing the

Surgical Safety Checklist: A Mixed-Methods Study. AORN journal. 2023;117(2):e1-e10.
24. Sima N, Scribante J, Perrie H, Green-Thompson L. Perceptions of the perioperative team regarding the use of the WHO Surgical Safety Checklist. Southern African Journal of Anaesthesia and Analgesia. 2024;30 (1): 13-19.
25. Munthali J, Pittalis C, Bijlmakers L, Kachimba J, Cheelo M, Brugha R, et al. Barriers and enablers to utilisation of the WHO surgical safety checklist at the university teaching hospital in Lusaka, Zambia: a qualitative study. BMC Health Services Research. 2022;22(1):894. https://doi.org/10.1186/s12913-022-08257-y
26. Fridrich A, Imhof A, Staender S, Brenni M, Schwappach D. A quality improvement initiative using peer audit and feedback to improve compliance. International Journal for Quality in Health Care. 2022;34(3):mzac058.
27. Haynes AB, Weiser TG, Berry WR, Lipsitz SR, Breizat A-HS, Dellinger EP, et al. Changes in safety attitude and relationship to decreased postoperative morbidity and mortality following implementation of a checklist-based surgical safety intervention. BMJ quality & safety. 2011;20(1):102-7.
28. Arad D, Finkelstein A, Rozenblum R, Magnezi R. Patient safety and staff psychological safety: a mixed methods study on aspects of teamwork in the operating room. Frontiers in public health. 2022;10:1060473.
29. Facey M, Baxter N, Hammond Mobilio M, Moulton Ca, Paradis E. The ritualisation of the surgical safety checklist and its decoupling from patient safety goals. Sociology of Health & Illness. 2024: 46(6):1100-18.