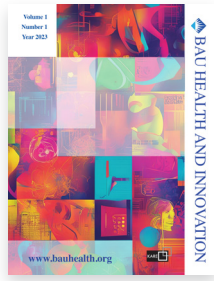
BAU HEALTH AND INNOVATION

Doi: 10.14744/bauh.2025.43534

BAU Health Innov 2024;2(3):109–114



Original Article

Investigation of Operating Theatre Nurses' Attitudes Towards Safe Technology Use in the Operating Theatre: A Descriptive Study

Hatice Azizoğlu, Zeynep Gürkan

Department of Nursing, Van Yüzüncü Yıl University Faculty of Health Sciences, Van, Türkiye

Abstract

Objectives: Since advanced technological equipment is used in operating theaters, the safe use of technology is crucial. This study aimed to examine the attitudes of operating theater nurses toward the safe use of technology in the operating theater.

Methods: This descriptive and correlational study was conducted with 120 operating theater nurses between December 2023 and March 2024. Data were collected using the *Healthcare Worker Identification Form* and the *Safe Technology Use Scale in the Operating Theatre*.

Results: The mean score of the *General Practices Scale* section was 4.24±0.78, the mean score of the *Surgical Team Scale* section was 4.24±0.69, and the total mean score of the *Safe Technology Use Scale in the Operating Theatre* was 4.24±0.67. A significant relationship was found between participants' educational status and their scores on the *General Practices Scale* section, the *Surgical Team Scale* section, and the total scale score. Nurses who were high school graduates had higher total scale scores and *General Practices Scale* scores than those with a bachelor's degree. Nurses with a bachelor's degree had higher total scale scores and *General Practices Scale* scores than those with postgraduate education. Additionally, nurses with a bachelor's degree had higher *Surgical Team Scale* scores than those with postgraduate education.

Conclusion: The findings indicate that operating theater nurses believe they use technology safely and have a positive attitude toward its use. The low standard deviations of the mean scores suggest that participants' opinions on this issue are consistent.

Keywords: Operating theater nurses, safe technology, surgical team.

Cite This Article: *Azizoğlu H, Gürkan Z. Investigation of Operating Theatre Nurses' Attitudes Towards Safe Technology Use in the Operating Theatre: A Descriptive Study. BAU Health Innov 2024;2(3):109–114.*

Surgical treatments, previously limited to specific age groups, are now accessible to all age groups. This change has been possible thanks to increasing knowledge on the subject and advancing technology. However, incorrect use of developing technology could potentially create an unsafe environment for both patients and healthcare professionals.[1–3]

The World Health Organization (WHO) has stated that unsafe and adverse events associated with care are one of the leading causes of death and disability. Based on this, patient safety should be a global priority.[2] Employee safety is defined as ensuring harmony between the person and the work by using protective methods to maximize both the physical and mental conditions of employees and to minimize situations that may pose a danger to their health.[4]

Operating theaters are among the most hazardous environments for medical errors. They require the use of advanced technological tools and equipment, demand

Address for correspondence: Hatice Azizoğlu, MD. Van Yüzüncü Yıl Üniversitesi Sağlık Bilimleri Fakültesi, Hemşirelik Anabilim Dalı, Van, Türkiye
Phone: +90 432 444 50 65 **E-mail:** haticeazizoglu@yyu.edu.tr

Submitted: January 21, 2025 **Revised:** February 04, 2025 **Accepted:** February 05, 2025 **Available Online:** February 13, 2025

BAU Health and Innovation - Available online at www.bauhealth.org

intense attention, and contain numerous dangerous elements for both patients and healthcare professionals. [5] While rapidly advancing healthcare technologies offer numerous benefits in surgical processes, their incorrect use can lead to harm. Problems arising from technological devices constitute a significant portion of errors in the operating room. A review of the literature reveals that operating theaters have various risk factors that may cause accidents or injuries for patients and employees, including technological devices, low lighting levels, slippery floors, anesthesia gases, flammable and harmful chemicals, and numerous instruments with cables.[6–10]

However, an examination of national and international literature reveals that while numerous studies document technology-related issues in the operating theater, none investigate the attitudes of operating theater nurses toward the safe use of technology. Additionally, the number of studies on this subject remains insufficient. Based on these observations, this study aims to evaluate the attitudes of operating theater nurses, who are key members of the surgical team and frequent users of medical devices, toward the safe use of technology and to fill the gaps in the literature. In this context, the study seeks to answer the following questions:

- What are the attitudes of operating theater nurses toward the safe use of technology in the operating theater?
- What is the relationship between the attitudes of operating theater nurses toward the safe use of technology, their demographic characteristics, and their status of receiving safe technology training?

Materials and Methods

Type of Study

This study was descriptive and correlational.

Population and Sample of the Study

The study was conducted in the operating theaters of Van Training and Research Hospital (VTRH) from December 2023 to March 2024. The study aimed to include the entire population of 120 volunteers working as nurses in the hospital's operating theaters. The nurses included in this study participated in operations across all branches except Cardiovascular Surgery. Since there was no data loss, the study was completed with all 120 operating theater nurses.

Data Collection Tools and Methods

Data were collected using the Healthcare Worker Identification Form, which included the descriptive characteristics of the participants, and the Safe Technology Use Scale in the Operating Theatre (STUSOT).

Healthcare Worker Identification Form

Developed by the researchers based on literature review, this form consists of five questions regarding age, gender, education level, total years of work experience in the operating theater, and the status of receiving training on medical technological devices used in the operating theater.

Safe Technology Use Scale in the Operating Theatre (STUSOT)

Developed in 2023 by Hacıdursunoğlu Erbaş, STUSOT consists of three separate scale sections, which can be used individually or together. The first section, the General Practices Scale, includes 13 items and is applicable to all healthcare professionals working in the operating theater. It evaluates general practices for using technological devices in the operating room. The second section, the Surgical Team Scale, consists of 14 items and is applicable to operating theater nurses and surgeons. This section evaluates specialized interventions for the surgical team's use of technological devices. The third section, the Anesthesia Team Scale, includes 18 items and is intended for anesthesia technicians and specialists. Since this study focused on the attitudes of operating theater nurses toward safe technology use, it did not utilize the Anesthesia Team Scale. Each part of the scale is evaluated separately. Scores range from 1 to 5, with higher scores indicating safer technology use in the operating theater and lower scores indicating less safe use. Internal consistency analyses of the scale demonstrated high reliability: the Cronbach's alpha value was 0.92 for the General Practices Scale and 0.90 for the Surgical Team Scale.[11] In this study, the Cronbach's alpha values were 0.93 and 0.91 for the respective scales.

Researchers conducted face-to-face interviews with participants in the SBU VTRH operating theaters between December 2023 and March 2024 to collect data. The data collection process took approximately 5–7 minutes per participant. The study was conducted in accordance with STROBE guidelines.

Permission and Ethics Committee Approval

Before data collection began, permission was obtained from the Van Yüzüncü Yıl University Non-Interventional Clinical Research Ethics Committee (Decision No. 2023/11-18, Date: 10.11.2023). The informed consent form clearly stated that participation in the study was voluntary. It also included explanations regarding adherence to the principles of confidentiality, privacy protection, anonymity, and security. The study was conducted in compliance with the Declaration of Helsinki.

Table 1. Descriptive characteristics of participant nurses

	n	%	Mean±SD
Age	120		33.1±6.67
Total working time in the operating theatre (years)	120		6.9±5.3
Gender			
Female	62	51.7	
Male	58	48.3	
Education status			
High school graduate	16	13.3	
Undergraduate degree	81	67.5	
Postgraduate (Master's and Doctorate)	23	19.2	
Medical technological used in the operating theatre status of receiving training on devices			
Yes	91	75.8	
No	29	24.2	

SD: Standard deviation.

Data Evaluation

The SPSS 25.0 software package (SPSS Inc., Chicago, Illinois, USA) was used for the quantitative evaluation of the data. Descriptive data were analyzed using arithmetic mean, standard deviation, percentages, and minimum-maximum values. Normality was assessed using skewness and kurtosis values. For normally distributed data, an independent samples t-test and a one-way ANOVA test were used. Tukey's multiple comparison test was conducted to identify differences between significant three-group comparisons. Pearson's correlation test was used to determine the relationship between the scales. All statistical tests were evaluated at a 95% confidence interval, with a significance level of $p<0.05$.

Results

An analysis of the descriptive characteristics of the participant nurses revealed that their mean age was 33.1±6.67 years and their mean total experience in the operating theater was 6.9±5.3 years. Additionally, 51.7% of the nurses were female, 67.5% held undergraduate degrees, and 75.8% had received training on medical technological devices used in the operating theater (Table 1).

The mean score of the General Practices Scale section was 4.24±0.78, while the mean score of the Surgical Team Scale section was 4.24±0.69. The overall mean score of the STUSOT was 4.24±0.67 (Table 2).

When comparing the mean scores of the General Practices Scale section, the Surgical Team Scale section, and the overall STUSOT based on the nurses' descriptive characteristics, a significant relationship was found between educational status and scores on the General Practices Scale section, the STUSOT, and the Surgical Team Scale section ($p<0.05$). Tukey's multiple comparison test indicated that the STUSOT and General Practices Scale scores were higher among high school graduates than undergraduate nurses, and higher among undergraduate nurses than postgraduate nurses. Additionally, the mean score of the Surgical Team Scale section was higher among nurses with bachelor's degrees compared to those with postgraduate education (Table 3).

Table 2. Distribution and min-max value ranges of the mean scores of the participant nurses in stusot, general practices scale section and surgical team scale section

	Scale total scores	
	Min-max	Total score (Mean±SD)
General practices scale section	1.00–5.00	4.24±.78
Surgical team scale section	1.00–5.00	4.24±.69
STUSOT total score	1.00–5.00	4.24±.67

STUSOT: Safe Technology Use Scale in the Operating Theatre

A highly significant positive correlation was found between the total scores of the General Practices Scale section and the Surgical Team Scale section ($r=0.686$; $p=0.000$), as well as between the total scores of the General Practices Scale section and the STUSOT ($r=0.923$; $p=0.000$). Similarly, a highly significant positive correlation was observed between the total score of the Surgical Team Scale section and the STUSOT ($r=0.913$; $p=0.000$).

Discussion

In this study, in which the attitudes of the operating theater nurses towards the use of safe technology in the

Table 3. Comparison of general practices scale section, surgical team scale section and stusot total score averages according to descriptive characteristics of participant nurses

	STUSOT	General practices scale section	Surgical team scale section
Gender			
Female	4.21±.65	4.24±.78	4.19±.65
Male	4.27±.70	4.23±.79	4.30±.72
Test value	t=-0.436	t=0.066	t=-0.896
	p=0.664	p=0.948	p=0.372
Education status			
High school graduate[a]	4.40±.65	4.47±.66	4.33±.70
Undergraduate degree[b]	4.36±.58	4.38±.69	4.35±.58
Postgraduate (Master's and Doctorate)[c]	3.70±.75	3.56±.84	3.82±.87
Test value	F=10.676	F=12.706	F=5.651
	p=0.000	p=0.000	p=0.005
	a>c	a>c	b>c
	b>c	b>c	
Medical technological used in the operating theatre status of receiving training on devices			
Yes	4.29±.67	4.28±.79	4.29±.67
No	4.09±.66	4.10±.76	4.09±.73
Test value	t=1.336	t=1.071	t=1.390
	p=0.184	p=0.286	p=0.167

*: p<0.05 significance level, F: One way anova, t: Independent sample test. [a]: High school graduate, [b]: Undergraduate degree, [c]: Postgraduate (Master's and Doctorate. STUSOT: Safe Technology Use Scale in the Operating Theatre.

operating theater were examined, it was determined that the mean score of the General Practices Scale section of the participating nurses was 4.24±0.78, the mean score of the Surgical Team Scale section was 4.24±0.69, and the mean total score of STUSOT was 4.24±0.67. A score of 5 on the scale indicates that technology is used safely in the operating theater, while a score of 1 indicates that technology is not used safely. The fact that the mean scores are generally above 4 in the total score and sub-dimension scores of the scale shows that the operating theater nurses use the technology safely and have a positive attitude on this issue. The fact that the mean scores have low standard deviations also indicates that the participants' opinions on this issue are consistent. In the study of Wiegmann et al. (2007),[12] it is stated that 11% of the interruptions that occur during surgery are caused by equipment and Technology. In the study of Jung et al. (2020),[13] it was determined that technological device malfunction developed in 34% of 265 operations analyzed. In the study of Sharma et al. (2021),[14] it is stated that 86 technological device-related interruptions occurred in 33% of the 144 surgeries examined, and these were technological device malfunction, incorrect assembly, and disconnection, respectively. These findings show that technological devices may cause unexpected disruptions during surgery and reveal the importance of the reliability and correct use of technological devices during surgery. Technological failures and interruptions can seriously jeopardize operation success and patient safety. Therefore, it is crucial for operating theater nurses to possess a high level of technological knowledge and skills, and to regularly check and maintain their equipment. When the results of close group studies in the literature are evaluated together with the results of this study, it shows that operating theater nurses have a positive attitude towards using technology safely and effectively. Theater nurses' positive attitudes toward the use of technology are critical for the safe and successful performance of surgeries. However, findings in the literature show that technological devices can sometimes malfunction and cause disruptions during surgery. This situation underscores the significance of anticipating potential malfunctions, ensuring safe technology use, and fostering trust in technology. It is thought that education and continuous professional development will play a key role in increasing the ability of nurses and the surgical team to cope with such technological problems.

In this study, it was determined that the mean score of the STUSOT and General Practices Scale section was higher in high school graduates than in undergraduate nurses and

in undergraduate nurses than in graduate nurses. At the same time, it was determined that the mean score of the Surgical Team Scale section of the nurses with bachelor's degree was higher than the nurses with postgraduate education. These findings show that high school graduates have a more positive attitude towards the safe use of technology than undergraduate graduates, and undergraduate nurses have a more positive attitude than graduate nurses. Additionally, the study revealed that undergraduate nurses had more positive attitudes towards the use of technology in the surgical team compared to those with postgraduate education. This suggests that there may be some changes in nurses' attitudes towards the use of technology as the level of education increases and that nurses with more advanced education may develop a more critical or different perspective towards the use of technology. However, researchers believe that further clinical research is necessary to delve deeper into the reasons behind these findings.

This study found a highly significant positive correlation between the total score of the General Practices Scale section, the total score of the Surgical Team Scale section, and the total score of STUSOT. Simultaneously, the total score of the Surgical Team Scale section and the STUSOT total score exhibited a highly significant positive correlation. These findings emphasize the strong links between safe use of technology, overall practice quality, and teamwork in operating theaters. The surgical team's cohesion and cooperation are critical to the safe use of technology in the operating theater. If there is strong cooperation and harmony among team members, the likelihood of safe and effective use of technological devices increases. This, in turn, positively affects patient safety and the success of operations. Furthermore, these findings encourage reflection on how nurses' positive attitudes towards general practice and teamwork may influence the safe use of technology. High-quality practices and strong team dynamics in operating theatres can help minimise technology-related risks and improve patient safety. In conclusion, the findings of the study suggest that safe use of technology in the operating theatre, overall quality of practice and teamwork are strongly interlinked. These links suggest that these elements should be addressed together in education and professional development programmes for theatre nurses.

Study Limitations

This study is limited to the participant nurses working in the operating theatres of a hospital and who agreed to participate in the study. Since the study was conducted in a single centre and the number of participants was limited, the results of the study cannot be generalised to all operating theatre nurses.

Conclusion

This study reveals a positive attitude among operating theater nurses towards the safe use of technology. The fact that the mean scores have low standard deviations indicates that the participants' opinions on this issue are consistent. At the same time, it is seen that high school graduated nurses have higher mean scores in the total scale score and the General Practices Scale section than undergraduate graduated nurses, and undergraduate graduated nurses have higher mean scores in the Surgical Team Scale section than postgraduate graduated nurses. This suggests that there may be some negative changes in nurses' attitudes towards the use of technology as the level of education increases and that nurses with more advanced education may develop a more critical or different perspective towards the use of technology.

While developing and accelerating health care technologies offer numerous benefits in surgical processes, their improper use can lead to damage. Malfunctions caused by technological devices account for a significant portion of the errors in the operating room. Surgeries that require more technological devices may involve a higher rate of equipment-related errors.

Medical technology devices have become an integral part of operating theaters. Before introducing these devices into clinical practice, we must address the potential negative consequences and cognitive errors they may introduce, even though they may improve patient safety. Attitudes towards the correct use of technological devices in terms of nurses, who are the user healthcare professionals, and the patient being used are important.

Disclosures

Ethics Committee Approval: The study was approved by the Van Yüzüncü Yıl University Non-interventional Clinical Research Ethics Committee (no: 2023/11-18, date: 10/11/2023).

Authorship Contributions: Concept – H.A., Z.G.; Design – H.A., Z.G.; Supervision – H.A.; Funding – H.A., Z.G.; Materials – H.A.; Data collection and/or processing – H.A., Z.G.; Data analysis and/or interpretation – H.A.; Literature search – H.A., Z.G.; Writing – H.A.; Critical review – H.A.

Conflict of Interest: All authors declared no conflict of interest.

Use of AI for Writing Assistance: No AI technologies utilized.

Financial Disclosure: The authors declared that this study received no financial support.

Peer-review: Externally peer-reviewed.

References

1. Khan B, Fatima H, Qureshi A, Kumar S, Hanan A, Hussain J, et al. Drawbacks of artificial intelligence and their potential solutions in the healthcare sector. Biomed Mater Devices 2023:1–8.
2. Ruskin KJ, Corvin C, Rice SC, Winter SR. Autopilots in the operating room: Safe use of automated medical technology. Anesthesiology 2020;133(3):653–65.
3. World Health Organization. Patient safety. https://www.who.int/news-room/fact-sheets/detail/patient-safety. Accessed Feb 11, 2025.
4. World Health Organization. Occupational health. https://www.who.int/health-topics/occupational-health. Accessed Feb 11, 2025.
5. Michalak A, Kotomska M. Patient safety in the operating theatre. Pol J Public Health 2021;131:1–6.
6. Azizoğlu H, Eti Aslan F. Evaluation of the effectiveness of "cable fixing tool" in ensuring and maintaining patient and employee safety in the operating room. Perioper Care Oper Room Manag 2023;33:100355.
7. Uçak H. Ameliyathanede hasta ve sağlık çalışanı güvenliği. In: Uçak H, ed. Ameliyathanede yönetim-organizasyon & cerrahi uygulamalar. Ankara: Nobel Tıp Kitabevleri; 2020. p. 24–44.
8. Otlamaz İ. Ameliyathanede çalışan cerrahi hemşirelerin teknolojik cihazların kullanma konusundaki becerilerinin değerlendirilmesi [Master's Thesis]. Konya: Selçuk Üniversitesi; 2019.
9. Çakmak C, Konca M, Teleş M. The evaluation of medical errors through Turkey National Safety Reporting System (SRS). [Article in Turkish] Hacettepe Sağlık İdaresi Derg 2018;21:423–48.
10. Canbolat Seyman Ç, Ayaz S. Opinions of operating room nurses regarding patient and staff safety in the operating room. Dicle Med J 2016;43:12–7.
11. Hacıdursunoğlu Erbaş D. Ameliyathanede güvenli teknoloji kullanım ölçeği'nin geliştirilmesi ve etkinliğinin değerlendirilmesi [Doctoral Thesis]. İstanbul: Bahçeşehir Üniversitesi; 2023.
12. Wiegmann DA, ElBardissi AW, Dearani JA, Daly RC, Sundt TM 3rd. Disruptions in surgical flow and their relationship to surgical errors: An exploratory investigation. Surgery 2007;142(5):658–65.
13. Jung JJ, Elfassy J, Grantcharov T. Factors associated with surgeon's perception of distraction in the operating room. Surg Endosc 2020;34(7):3169–75.
14. Sharma S, Grantcharov T, Jung JJ. Non-technical skills and device-related interruptions in minimally invasive surgery. Surg Endosc 2021;35(8):4494–500.