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Nurses' Perceptions of Intraoperative Music and Their Association with Work Concentration, Team Communication, and Environmental Comfort

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Abstract

Intraoperative music has increasingly been recognized as a modifiable environmental factor that may influence nurses' experiences during surgical procedures. However, evidence regarding its association with work concentration, team communication, and environmental comfort among perioperative nurses remains limited. This study examined the association between nurses' perceptions of intraoperative music and work concentration, team communication, and environmental comfort at Marthen Indey Hospital, Jayapura, Indonesia. A quantitative cross-sectional study was conducted among 31 operating room nurses in 2026 using total sampling. Data were collected through a structured questionnaire assessing music perception, work concentration, team communication, and environmental comfort. The instrument demonstrated excellent reliability (Cronbach's alpha = 0.909–0.966). Data were analyzed using IBM SPSS Statistics version 25. Spearman rank correlation, Mann–Whitney U, and Kruskal–Wallis tests were performed, with statistical significance set at $p < 0.05$. Positive perceptions of intraoperative music were significantly associated with work concentration ($\rho = 0.680$, $p < 0.001$), team communication ($\rho = 0.589$, $p < 0.001$), and environmental comfort ($\rho = 0.738$, $p < 0.001$). Environmental comfort showed the strongest association. Frequency of music exposure was also significantly associated with all three outcomes ($p = 0.004$, 0.003, and 0.001). More favorable perceptions of intraoperative music were associated with better work concentration, team communication, and environmental comfort, highlighting its potential role in supporting a positive operating room work environment.

Keywords: *Environmental Comfort, Intraoperative Music, Music Perception, Team Communication, Work Concentration.*

Introduction

The operating room (OR) is a complex healthcare setting in which patient safety depends on effective collaboration among surgeons, anesthesiologists, and perioperative nurses. During surgical procedures, nurses are responsible for maintaining sterile techniques, preparing surgical instruments, monitoring patients, and coordinating communication within the multidisciplinary team [1], [2]. These responsibilities require sustained concentration, effective communication, and timely decision-making in a high-pressure environment. Therefore, creating a work environment that supports nurses' cognitive performance and psychological well-being is essential for delivering safe and high-quality perioperative care [3], [4].

The acoustic environment has emerged as an important factor influencing healthcare professionals' performance in the operating room. Nurses are continuously exposed to sounds generated by surgical instruments, anesthesia monitors, suction devices, alarms, ventilation systems, and conversations among surgical staff. Recent evidence indicates that excessive operating-room noise may contribute to increased cognitive workload, stress, fatigue, communication difficulties, and reduced workplace comfort, potentially increasing the risk of human error and compromising patient safety [5], [6]. These findings highlight the importance of managing the acoustic environment as part of efforts to improve perioperative working conditions.

Unlike unavoidable equipment-related noise, intraoperative music is a controllable environmental sound that can be intentionally introduced and adjusted according to clinical circumstances. Music is widely used during surgical procedures in many hospitals and is generally perceived as creating a calmer, more pleasant, and less stressful working atmosphere. Previous studies have reported that appropriately managed intraoperative music may be associated with improved emotional well-being, lower perceived stress, better teamwork, and greater satisfaction with the operating-room environment without compromising patient safety [7].

Because perioperative nurses remain in the operating room throughout surgical procedures, their perceptions of intraoperative music are particularly important. Favorable perceptions of intraoperative music may be associated with nurses' ability to maintain concentration, communicate effectively with the surgical team, and experience greater environmental comfort while working in a demanding clinical environment. Understanding these perceptions is therefore important for developing evidence-based strategies to optimize the operating-room environment, promote nurses' well-being, and support perioperative nursing practice [8].

Despite increasing interest in the use of music in healthcare environments, evidence specifically examining the relationship between nurses' perceptions of intraoperative music and work concentration, team communication, and environmental comfort remains limited, particularly in Indonesian operating-room settings. Therefore, this study aimed to examine the association between nurses' perceptions of intraoperative music and work concentration, team communication, and environmental comfort among operating-room nurses at Marthen Indey Hospital, Jayapura.

Literature Review

A. Intraoperative Music as a Modifiable Environmental Factor

The operating room environment is increasingly recognized as an important determinant of healthcare professionals' performance and well-being. Among various environmental factors, intraoperative music has gained attention because it represents a controllable auditory stimulus that may influence the psychological climate of the surgical team. Unlike unavoidable operating-room noise, music can be adjusted according to clinical needs, procedural circumstances, and team preferences, making it a potential strategy for supporting workplace experiences during surgery. Recent evidence suggests that intraoperative music may reduce perceived stress, enhance mood, and contribute to a

more supportive operating-room environment, although its perceived effects may vary according to the clinical context, music characteristics, volume, and implementation [6].

Narayanan et al. identified music as an environmental cue that may contribute to a therapeutic operating-room atmosphere. Their qualitative study found that surgeons, anesthesiologists, and nurses perceived music as supporting emotional regulation, reducing stress, and contributing to a more positive workplace culture. However, the participants also emphasized that music was not universally beneficial. Inappropriate music selection or excessive volume could interfere with communication and potentially influence interactions and hierarchical dynamics within the surgical team [7]. These findings suggest that the value of intraoperative music may depend not only on its presence but also on how it is perceived and managed by members of the surgical team.

For perioperative nurses, these considerations are particularly relevant because nurses must maintain concentration, communicate effectively, and respond promptly to changes throughout surgical procedures. Therefore, nurses' perceptions of intraoperative music may provide important information about how this auditory stimulus is experienced within the operating-room environment. Examining these perceptions in relation to work concentration, team communication, and environmental comfort may provide a more comprehensive understanding of the potential role of intraoperative music in perioperative nursing practice.

B. Nurses' Perceptions of Intraoperative Music

Nurses' perceptions of intraoperative music reflect their cognitive and emotional evaluation of music during surgical procedures and its role in their daily perioperative practice. Positive perceptions may be associated with feelings of relaxation, increased motivation, improved morale, and greater satisfaction with the operating-room environment. Because perioperative nurses remain continuously involved throughout surgical procedures, their perceptions are important in understanding how music is experienced within the operating-room environment.

A recent cross-sectional study involving multidisciplinary operating-room staff found that most healthcare professionals perceived music as reducing stress and anxiety during surgery and contributing to a more positive work environment. The study also reported that nurses perceived music as supporting emotional well-being without negatively affecting routine workflow when used appropriately [9]. These findings suggest that nurses' perceptions are shaped not only by music itself but also by how music is integrated into the workflow and accepted by members of the surgical team.

C. Intraoperative Music and Work Concentration

Work concentration is a critical component of perioperative nursing because nurses must simultaneously monitor patients, maintain sterile techniques, coordinate instruments, and respond promptly to changing clinical situations. Sustained attention can be challenging in operating rooms because nurses are exposed to multiple environmental distractions while managing high cognitive demands. Recent systematic evidence suggests that intraoperative music may be perceived as supporting concentration by reducing mental fatigue and contributing to a calmer working environment. A systematic review published in 2025 concluded that music was generally perceived by surgical teams as supporting concentration and reducing stress, although objective evidence regarding

its effects on technical performance remained inconsistent [10]. Similarly, a systematic review examining environmental factors in operating rooms reported that music was generally perceived more positively than environmental noise, despite increasing overall sound levels. Participants perceived music as supporting focus during routine procedures when played at an appropriate volume and during non-critical phases of surgery [6]. These findings indicate that the relationship between intraoperative music and concentration may depend on contextual factors, particularly music volume, timing, type of procedure, and the demands of the surgical phase. Therefore, examining nurses' perceptions of intraoperative music in relation to work concentration is important to determine whether more favorable perceptions are associated with better reported concentration among operating-room nurses.

D. Intraoperative Music and Team Communication

Effective communication is essential for patient safety because surgical procedures require continuous coordination among multidisciplinary professionals. Environmental noise is recognized as an important barrier to communication in operating rooms because it may reduce speech intelligibility and increase cognitive workload. A mixed-methods study published in 2025 found that operating-room nurses experienced communication challenges related to background noise, including sounds from suction devices, alarms, and music. Nearly all participants recommended interventions to improve acoustic conditions and emphasized that reducing unnecessary background noise could support communication and teamwork. Although intraoperative music may contribute to team cohesion and interpersonal interactions during routine procedures, recent evidence indicates that music should not interfere with critical communication. Therefore, music needs to be appropriately managed, particularly during complex or high-risk surgical phases when clear verbal communication is required [5], [7]. The balance between the potential benefits of music and the need for clear communication highlights the importance of understanding how operating-room nurses perceive music within their clinical workflow.

E. Intraoperative Music and Environmental Comfort

Environmental comfort refers to nurses' perceptions of physical and psychological comfort while working in the operating room. Continuous exposure to equipment noise, alarms, and other auditory stimuli may contribute to stress, fatigue, and reduced workplace satisfaction. Recent studies suggest that intraoperative music may be associated with greater environmental comfort by masking unpleasant background sounds and contributing to a calmer workplace atmosphere. Narayanan et al. reported that healthcare professionals perceived music as supporting relaxation and psychological well-being during surgery, while participants also described music as contributing to a more pleasant operating-room environment [7]. Similarly, a mixed-methods study published in 2025 found that operating-room noise affected nurses' psychological comfort, communication, and work efficiency, highlighting the importance of appropriate acoustic interventions for supporting workplace well-being [11]. Taken together, these findings indicate that the operating-room acoustic environment may influence how nurses perceive their workplace. However, the extent to which nurses' perceptions of intraoperative music are associated with environmental comfort remains an important area for further investigation. Examining this association may provide additional insight into the potential role of intraoperative music in supporting a more comfortable working environment for perioperative nurses.

Material and Methods

A. Study Design and Setting

This study employed a quantitative cross-sectional design to examine the relationship between nurses' perceptions of intraoperative music and selected work-related outcomes. The study was conducted among nurses at Marthen Indey Hospital, Jayapura, Papua, Indonesia, in 2026.

B. Participants and Data Collection

The study involved nurses working at Marthen Indey Hospital who were members of the surgical team. Data were collected using a structured questionnaire assessing nurses' perceptions of intraoperative music, work concentration, team communication, and environmental comfort. Information on participants' demographic and occupational characteristics was also collected, including gender, age, educational level, length of employment, surgical team role, and frequency of exposure to intraoperative music. Before data collection, permission to conduct the study was obtained from Marthen Indey Hospital, Jayapura. Participation was voluntary. Participants were informed about the purpose of the study and the confidentiality of the information provided. The collected data were used solely for research purposes.

C. Study Variables

The primary explanatory variable in this study was nurses' perceptions of intraoperative music. Three work-related outcomes were examined: work concentration, team communication, and environmental comfort. These outcomes represented the aspects of perioperative work examined in relation to nurses' perceptions of intraoperative music. Participants' gender, age, educational level, length of employment, surgical team role, and frequency of exposure to intraoperative music were included as demographic and occupational characteristics. These characteristics were also examined in comparative analyses to determine whether work concentration, team communication, and environmental comfort differed across participant groups.

D. Validity and Reliability

The questionnaire was assessed for validity and reliability before being used in the study. The calculated correlation coefficients for the questionnaire items ranged from 0.651 to 0.829, indicating acceptable item validity based on the study criteria. Internal consistency was assessed using Cronbach's alpha, with coefficients ranging from 0.909 to 0.966 across the four study variables. Specifically, Cronbach's alpha was 0.966 for music perception, 0.952 for work concentration, 0.909 for team communication, and 0.963 for environmental comfort, indicating high internal consistency of the questionnaire scales.

E. Data Analysis

Data were analyzed using IBM SPSS Statistics version 25. Descriptive statistics were used to summarize participants' demographic and occupational characteristics and the study variables. Categorical variables were presented as frequencies and percentages, while continuous or ordinal variables were summarized using appropriate measures of central tendency and dispersion, including means, medians, and standard deviations. The Spearman rank correlation test was used to examine the association between nurses' perceptions of intraoperative music and each of the three work-related

outcomes: work concentration, team communication, and environmental comfort. The direction and strength of the associations were evaluated using the Spearman correlation coefficient (ρ). Comparative analyses were also conducted to examine differences in work concentration, team communication, and environmental comfort according to participants' demographic and occupational characteristics. The Mann–Whitney U test was used for comparisons involving two groups, whereas the Kruskal–Wallis test was used for comparisons involving more than two groups. Statistical significance was determined at a p-value of *<0.05.*

F. Ethical Considerations

This study was conducted after obtaining official research approval from Marthen Indey Hospital, Jayapura, Indonesia. Ethical approval was granted by the hospital under approval number B/403/VIII/2026 before data collection began. All participants received an explanation of the study objectives, procedures, potential benefits, and their rights as research participants before providing informed consent. Participation was voluntary, and participants were informed that they could decline participation. The confidentiality of participants' information and research data was maintained throughout the study.

Results

Table 1 presents the demographic and occupational characteristics of the 31 nurses included in the study. The majority of respondents were female (54.8%), while male nurses accounted for 45.2% of the sample. The largest age group was 30–39 years (45.2%). Most respondents held a Diploma in Nursing (D3) qualification (71.0%). Regarding length of employment, nurses with 1–5 years of experience represented the largest group (45.2%). Most respondents worked as scrub nurses (67.7%). In terms of intraoperative music exposure, frequent exposure was the most commonly reported category (41.9%). Overall, the sample was predominantly composed of female nurses, D3-qualified nurses, and scrub nurses, with frequent intraoperative music exposure representing the largest exposure category.

Table 1. Characteristics of nurses and intraoperative music exposure at Marthen Indey Hospital, Jayapura, 2026

Characteristics	Category	N	%
Gender	Male/ Female	14/ 17	45.2/ 54.8
Age	30–39 years (most common)	14	45.2
Education	Diploma in Nursing (D3)	22	71.0
Length of Employment	1-5 years (most common)	14	45.2
Team Role	Scrub Nurse	21	67.7
Frequency of Music Exposure	Frequent (most common)	13	41.9

Source: SPSS data analysis, 2026

Table 2 presents the descriptive statistics of the four study variables. Music perception had the highest mean score (42.48), followed by environmental comfort (41.81), work concentration (41.26), and team communication (37.87). The median scores were higher than the corresponding mean scores for all four variables. The largest mean–median differences were observed for environmental comfort

and team communication. The standard deviations ranged from 7.32 to 7.94, indicating a relatively similar degree of score variability across the study variables.

Table 2. Descriptive statistics of research variables

Variable	Mean	Median	SD
X (Music Perception)	42.48	45.00	7.94
Y1 (Work Concentration)	41.26	42.00	7.69
Y2 (Team Communication)	37.87	40.00	7.32
Y3 (Environmental Comfort)	41.81	44.00	7.50

Source: SPSS data analysis, 2026

Table 3 presents the results of the Spearman rank correlation analysis between nurses' perceptions of intraoperative music and the three work-related outcomes. A strong positive association was observed between music perception and work concentration ($\rho = 0.680$; $p < 0.001$). A moderate positive association was observed between music perception and team communication ($\rho = 0.589$; $p < 0.001$). The strongest positive association was found between music perception and environmental comfort ($\rho = 0.738$; $p < 0.001$). All three associations were statistically significant. These findings indicate that more favorable perceptions of intraoperative music were associated with higher reported scores for work concentration, team communication, and environmental comfort.

Table 3. Spearman rank correlation analysis of music perception with work concentration, team communication, and environmental comfort

Variable Relationship	rho	Sig.	Strength
X – Y1 (Work Concentration)	0.680	< 0.001	Strong
X – Y2 (Team Communication)	0.589	< 0.001	Moderate
X – Y3 (Environmental Comfort)	0.738	< 0.001	Strong

Source: SPSS data analysis, 2026.

Table 4 presents the results of comparative analyses of work concentration, team communication, and environmental comfort according to nurses' demographic and occupational characteristics. No statistically significant differences were observed in work concentration, team communication, or environmental comfort according to gender, educational level, or age ($p > 0.05$). Length of employment was not significantly associated with differences in work concentration or team communication; however, a statistically significant difference was observed in environmental comfort according to length of employment ($p = 0.025$). Surgical team role was significantly associated with differences in work concentration ($p = 0.044$) and environmental comfort ($p = 0.020$), whereas no statistically significant difference was observed in team communication ($p = 0.392$). Frequency of intraoperative music exposure showed statistically significant differences across all three outcomes: work concentration ($p = 0.004$), team communication ($p = 0.003$), and environmental comfort ($p = 0.001$). These findings suggest that occupational characteristics and music exposure frequency may be more closely associated with nurses' perceptions of the operating room environment than demographic factors. Further investigation is needed to clarify these associations and identify potential underlying mechanisms.

Table 4. Comparative analysis of nurses' characteristics and perceptions of music effects on work concentration, team communication, and environmental comfort

Demographic Characteristics	Y1 (p-value)	Y2 (p-value)	Y3 (p-value)
Gender	0.618	0.339	0.263
Highest Educational Level	0.498	0.337	0.154
Age	0.285	0.621	0.077
Length of Employment in the Operating Room	0.295	0.654	0.025*
Surgical Team Role	0.044*	0.392	0.020*
Frequency of Music Exposure	0.004*	0.003*	<0.001*

*Significant at the 5% significance level ($p < 0.05$).
Source: SPSS data analysis, 2026

Discussion

This study examined the association between nurses' perceptions of intraoperative music and three important dimensions of perioperative practice: work concentration, team communication, and environmental comfort. The findings demonstrated significant positive associations between music perception and all three outcomes. Among the three outcomes, environmental comfort showed the strongest association, followed by work concentration and team communication. These findings suggest that intraoperative music may be an important modifiable component of the operating-room acoustic environment and may contribute to how nurses perceive and experience their workplace. Recent literature has increasingly recognized the operating-room environment as an important factor related to healthcare professionals' cognitive performance, communication, and occupational well-being [6], [12]. However, because this study used a cross-sectional design, these associations should not be interpreted as evidence of a causal effect of intraoperative music.

The present study found a strong positive association between nurses' perceptions of intraoperative music and work concentration ($\rho = 0.680$, $p < 0.001$). Nurses with more favorable perceptions of intraoperative music reported higher work-concentration scores. This finding is particularly relevant because perioperative nurses are continuously involved in maintaining sterile techniques, monitoring patients, preparing surgical instruments, and responding to the changing needs of surgeons and anesthesiologists throughout surgical procedures. Sustained concentration is therefore an important component of safe perioperative nursing practice.

These findings are consistent with previous evidence indicating that intraoperative music may be perceived as supporting concentration by reducing stress and contributing to a calmer working atmosphere. A recent systematic review concluded that intraoperative music was generally perceived as beneficial for focus, stress reduction, and perceived work efficiency among surgical professionals, although objective improvements in technical performance remained inconsisten [10]. Similarly, Narayanan et al. reported that healthcare professionals described music as supporting emotional regulation, reducing mental fatigue, and helping them remain engaged during routine surgical procedures [7]. However, the potential benefits of music may depend on how it is implemented. Evidence from systematic reviews suggests that loud music, unfamiliar genres, or music played during technically demanding procedures may increase distraction and cognitive workload. Therefore, the

relationship between intraoperative music and concentration may depend on factors such as volume, timing, music selection, and the complexity of the surgical procedure [6], [13].

A significant positive association was also identified between nurses' perceptions of intraoperative music and team communication ($\rho = 0.589$, $p < 0.001$). Nurses who viewed intraoperative music more favorably also tended to report higher team-communication scores. Communication is a core component of perioperative nursing because safe surgical care requires timely information exchange, coordinated teamwork, and shared situational awareness among multidisciplinary professionals.

The current findings are supported by qualitative evidence suggesting that music may contribute to team cohesion and a more collaborative working atmosphere in the operating room. The BACH study reported that music encouraged positive interpersonal interactions, reduced workplace tension, and fostered a sense of team unity among surgeons, anesthesiologists, and nurses during routine procedures [7], [14]. Nevertheless, the potential benefits of music must be considered alongside its possible interference with critical communication. Hughes et al. reported that operating-room nurses experienced communication barriers related to background sounds, including suction devices, alarms, conversations, and music. Nearly all participants recommended reducing unnecessary ambient noise and strengthening communication practices, particularly during critical phases of surgery [5], [15]. Similarly, the AORN Guidelines recommend maintaining music at a volume that permits clear communication among team members and minimizing non-essential auditory distractions during critical surgical moments to support patient safety [16], [17]. Thus, the positive association observed in the present study should not be interpreted as evidence that music directly improves communication; rather, it may indicate that favorable perceptions of appropriately managed music coexist with more favorable perceptions of the operating-room work environment and team interaction.

Environmental comfort demonstrated the strongest association with nurses' perceptions of intraoperative music ($\rho = 0.738$, $p < 0.001$). Nurses with more favorable perceptions of intraoperative music also reported higher environmental-comfort scores. This finding suggests that music may be particularly relevant to how nurses perceive the physical and psychological characteristics of the operating-room environment. Operating rooms involve continuous exposure to equipment noise, alarms, ventilation systems, and staff conversations, which may contribute to occupational stress, fatigue, and reduced workplace comfort. Recent evidence indicates that excessive operating-room noise is associated with increased mental workload, stress, communication difficulties, and reduced workplace comfort among healthcare professionals [6], [12]. In contrast, Narayanan et al. reported that healthcare professionals perceived music as supporting relaxation, emotional well-being, and a more therapeutic workplace atmosphere for operating-room staff [7]. A recent bibliometric analysis also demonstrated growing international interest in research examining operating-room noise, music, communication, and healthcare professionals' well-being, highlighting the importance of acoustic environmental management in perioperative practice [18]. Taken together, these findings suggest that the acoustic environment may be an important component of nurses' workplace experience. However, the present study cannot establish whether intraoperative music itself produces greater environmental

comfort because other environmental and organizational factors may also contribute to nurses' perceptions.

The comparative analysis showed that gender, age, and educational level were not associated with statistically significant differences in work concentration, team communication, or environmental comfort. This suggests that the three outcomes did not differ significantly across these demographic groups in the present sample. However, occupational characteristics demonstrated significant differences in several outcomes. Length of employment was significantly associated with differences in environmental comfort ($p = 0.025$), whereas no significant differences were observed in work concentration or team communication. This finding may indicate that nurses with different levels of experience perceive the operating-room environment differently, although the cross-sectional design does not allow conclusions regarding the direction or cause of this difference. Surgical team role was significantly associated with differences in work concentration ($p = 0.044$) and environmental comfort ($p = 0.020$), but not team communication ($p = 0.392$). These differences may reflect variations in clinical responsibilities, task demands, and exposure to different aspects of the surgical workflow [19]. However, further analysis with larger samples would be necessary to determine which specific professional roles account for these differences.

An important finding was that frequency of intraoperative music exposure differed significantly across all three outcomes: work concentration ($p = 0.004$), team communication ($p = 0.003$), and environmental comfort ($p = 0.001$). Nurses with different levels of music exposure demonstrated significantly different outcome scores. These findings are consistent with Rubbi et al., who reported that exposure to music during surgery was associated with lower perceived stress and anxiety and a more positive working environment among multidisciplinary operating-room teams [9]. Nevertheless, the present findings should be interpreted cautiously. Because frequency of music exposure was examined using a cross-sectional design, it cannot be determined whether more frequent exposure contributes to more favorable work experiences or whether nurses with more favorable work experiences are more likely to report or experience music exposure.

The findings have several implications for perioperative nursing practice. Intraoperative music may represent a relatively simple and potentially feasible component of operating-room environmental management. However, implementation should be guided by institutional policies that consider music volume, timing, selection, surgical complexity, and the communication needs of the surgical team. Music should therefore complement rather than interfere with essential clinical communication. Recent reviews have emphasized that universal guidance for intraoperative music management remains limited and have recommended approaches that balance potential psychological benefits with communication and patient-safety requirements [13].

Several limitations should be considered when interpreting these findings. First, the cross-sectional design limits the ability to determine temporal or causal relationships between perceptions of intraoperative music and the three work-related outcomes. Second, the study involved a relatively small sample of 31 nurses from a single hospital, which may limit the generalizability of the findings to other operating-room settings. Third, the study relied on questionnaire-based self-reported measures, which

may be influenced by individual perceptions and reporting tendencies. Finally, although demographic and occupational characteristics were examined, other factors that may influence nurses' experiences, such as type and complexity of surgery, music genre and volume, duration of exposure, workload, and specific surgical-phase conditions, were not examined in the present analysis.

Overall, this study found significant positive associations between nurses' perceptions of intraoperative music and work concentration, team communication, and environmental comfort. Environmental comfort demonstrated the strongest association, followed by work concentration and team communication. The findings indicate that intraoperative music may be relevant to nurses' perceptions of their operating-room work environment. However, the results should be interpreted as associations rather than causal effects. Appropriately managed intraoperative music may be considered as one component of a supportive operating-room environment, provided that its use is balanced with the need for clear communication, concentration, and patient safety.

Conclusion

This study found significant positive associations between nurses' perceptions of intraoperative music and work concentration, team communication, and environmental comfort among operating room nurses. Environmental comfort demonstrated the strongest association, followed by work concentration and team communication. Frequency of intraoperative music exposure also differed significantly across all three work-related outcomes, whereas gender, age, and educational level showed no statistically significant differences. Length of employment was significantly associated with differences in environmental comfort, while surgical team role was significantly associated with differences in work concentration and environmental comfort.

These findings indicate that nurses with more favorable perceptions of intraoperative music tended to report more favorable work-related outcomes. However, because of the cross-sectional design, the findings should be interpreted as associations rather than causal effects. Appropriately managed intraoperative music may be considered as one component of operating-room environmental management, particularly when its use is adapted to music volume, timing, surgical complexity, communication needs, and patient-safety requirements. Further research involving larger samples and multiple healthcare settings is recommended to examine these associations and identify the most appropriate conditions for implementing intraoperative music in perioperative practice.

Limitations and Suggestions

This study has several limitations that should be considered when interpreting its findings. The research was conducted in a single hospital with a relatively small sample of 31 operating room nurses, which may limit the generalizability of the results to perioperative nurses working in hospitals with different organizational cultures, surgical specialties, and operating room environments. In addition, the study relied on self-reported questionnaires to assess nurses' perceptions, work concentration, team communication, and environmental comfort. Consequently, participants' responses may have been influenced by individual perceptions and response bias. Future research is recommended to include larger samples from multiple hospitals to enhance the generalizability of the findings. Further studies

should also examine specific characteristics of intraoperative music, including genre, volume, tempo, duration, and timing of music exposure during different phases of surgery. Incorporating objective assessments of the operating room acoustic environment and nurses' cognitive workload would provide a more comprehensive understanding of the role of intraoperative music in perioperative nursing practice and support the development of evidence-based guidelines for its use in surgical settings.

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Conflict of Interest

The authors declare no conflict of interest.

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