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Exploring staff and procedural factors affecting patient safety in the operating room

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Abstract

Background: Patient safety in the operating room is a critical concern in healthcare delivery. While the Surgical Safety Checklist (SSC) improves safety outcomes, variability persists due to workforce characteristics, work motivation, and adherence to Standard Operating Procedures (SOP).
Purpose: To examine associations between staff characteristics, motivation, and SOP compliance with patient safety quality in the operating room, and to identify the most influential factor.
Method: A cross-sectional study of all 42 operating room healthcare workers (total sampling). Data were collected through Likert-scale questionnaires and analyzed using Chi-Square tests and multiple logistic regression.
Results: Education level (p = 0.024), motivation (p = 0.000), and SOP compliance (p = 0.000) were significantly associated with patient safety quality. SOP compliance was the strongest determinant (OR = 234.770; p = 0.001).
Conclusion: Adherence to SOP—especially the SSC—is the dominant factor influencing patient safety quality. Interventions should prioritize continuous SOP education, oversight, and cultivation of a robust patient safety culture.

Keywords: Operating Room; Patient Safety; SOP Compliance; Surgical Safety Checklist; Work Motivation.

INTRODUCTION

Improving patient safety in the operating room is essential due to its complex and high-risk nature. Comparative studies in Indonesia indicate that patient safety incident reporting remains ineffective (Denton, Evans, & Xu, 2021), even though many incidents—such as adverse events (AEs)—are potentially preventable (Rajasekaran, Ravi, & Aiyer, 2016). Compliance with the Surgical Safety Checklist (SSC), which serves as a critical tool to guide surgical procedures, also remains inconsistent and below expected standards (Chrismilasari, Sutikno, & Mujiono, 2022). Additional issues, such as electrocautery-related burns (Chlouchi, Andaloussi, Bensghir, & Baite, 2023) and incomplete surgical instruments, further underscore gaps in adherence to Standard Operating Procedures (SOPs) that require closer scrutiny (Ciğerci & Yılmaz, 2022).

This study investigates the factors influencing patient safety quality in the operating room—specifically healthcare worker characteristics, motivation, and SOP compliance—with an emphasis on SSC implementation at Cilegon City General Hospital. The aim is to identify effective interventions to strengthen patient safety practices.

To date, initiatives to enhance patient safety quality in operating rooms remain limited, with most research concentrating narrowly on SSC compliance. Previous studies highlight the importance of senior surgeon support, pre-implementation training, and performance monitoring to overcome barriers to SSC adoption (Kilbane, Oxtoby, & Tivers, 2020), as well as the need

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to improve staff knowledge and motivation to increase adherence (Muara & Yustiani, 2021). However, broader aspects of patient safety quality in the operating room have received insufficient attention. Addressing this gap, the present study analyzes how healthcare worker characteristics, motivation, and SOP compliance collectively relate to patient safety quality in the operating room (Gomes, Martins, Tronchin, & Fernandes, 2019).

RESEARCH METHOD

A non-experimental quantitative design with a correlational approach, utilizing a cross-sectional framework. Ethical clearance was obtained prior to data collection, as documented under approval number 1621/F.9-UMJ/XI/2026. The research was conducted in the operating room of Regional Public Hospital Cilegon City. Data were collected between October and December 2024 through the distribution of structured questionnaires. The study population consisted of 42 operating room healthcare workers, all included through a total sampling technique. This study examined three independent variables: (1) demographic characteristics, which included gender, age (categorized as ≤ 35 years and > 35 years), educational level (categorized as Vocational and Professional [Nursing degree, specialist, or subspecialist]), and length of employment (categorized as ≤ 5 years and > 5 years); (2) work motivation, categorized as low if the score was below the mean value of 66.07, and high if the score was equal to or above the mean; and (3) compliance with standard operating procedures (SOPs), categorized as non-compliant if the score was below the mean value of 121.05, and compliant if the score was equal to or above the mean. The dependent variable was the quality of patient safety in the operating room, categorized as poor if the score was below the mean value of 90.74, and good if the score was equal to or above the mean.

The instruments in this study were divided into several categories, namely: 1). Motivation was measured using a modified *Work Motivation Scale for Health Workers* (WMSHW) Likert-scale format (Li, Yahang, Yu, & Yuan, 2021). 2). SOP Compliance was measured using a Likert-scale questionnaire referencing the SSC SOP of Cilegon City General Hospital. 3). Patient Safety Quality was measured using a Likert-scale questionnaire based on patient safety quality indicators in the operating room. The statistical analyses employed in this study include the Chi-Square test and multiple logistic regression. Chi-Square tests were applied for bivariate analysis to assess associations between categorical variables using a 2x2 contingency table, while multiple logistic regression was conducted for multivariate analysis to identify predictors of patient safety outcomes. All data were processed using the Statistical Package for the Social Sciences (SPSS) version 20.

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RESEARCH RESULTS

Table 1. Characteristics of the Respondents (N=42)

Variable	Results	p-value
Age (Mean±SD)(Range)(Years)	(38.1±3.4)(30-45)	
<35	10/23.8	0.128
≥35	32/76.2	
Gender (n/%)		
Male	24/57.1	0.209
Female	18/42.9	
Education (n/%)		
Vocational	17/40.5	0.024
Professional	25/59.5	
Length of Service (n/%)		
<5	18/42.9	0.178
≥5	24/57.1	
Motivation (n/%)		
Low	21/50.0	0.000
High	21/50.0	
SOP Compliance (n/%)		
Noncompliant	17/40.5	0.000
Compliant	25/59.5	
Patient Safety Quality (n/%)		
Poor	15/35.7	
Good	27/64.3	

Table 1 describes the characteristics of the respondents and the analysis of the relationship between independent variables and patient safety quality. The average age of the respondents was 38.1 with an SD ±3.4, ranging from 30 to 45 years, and most were in the ≥35-year age group. The majority of respondents were male and had a professional educational background. Most had worked for ≥5 years, while motivation levels were evenly distributed between low and high categories. SOP compliance was higher among those classified as compliant. The statistical results indicate that education, motivation, and SOP compliance have a significant relationship with patient safety quality ($p<0.05$), whereas age, gender, and length of service did not show a significant association.

Table 2. Final Multiple Logistic Regression Model

Variable	B	Wald	p-value	OR	95% CI
Gender	3.452	4.146	0.042	31.554	1.138-875.146
Age	3.120	3.647	0.056	22.643	0.921-556.672
SOP compliance	5.459	11.729	0.001	234.770	10.326-5337.516

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Table 2 presents the results of a logistic regression analysis examining factors associated with the outcome. Gender shows a significant effect (p = 0.042), with an odds ratio of 31.554, indicating that gender substantially increases the likelihood of the outcome. Age demonstrates a borderline significance (p = 0.056), suggesting a potential but not definitive influence, with an odds ratio of 22.643. SOP compliance is the strongest predictor (p = 0.001), with an odds ratio of 234.770, showing that individuals who comply with SOPs are far more likely to achieve the desired outcome compared to those who do not.

DISCUSSION

This study revealed several key findings regarding patient safety quality in the operating room. First, there was a significant association between healthcare workers' education level and patient safety quality. Personnel with professional educational backgrounds—such as physicians and registered nurses—demonstrated better patient safety quality (80%) than those with vocational education (41.2%). This disparity is likely attributable to professional education providing more in-depth training on patient safety standards, clinical decision-making, and understanding of safety protocols within complex work environments such as operating rooms. In contrast, vocational programs tend to emphasize basic technical skills without sufficient focus on managerial and analytical competencies that are critical for maintaining patient safety. Higher and more specialized professional education—such as surgeons or perioperative specialist nurses—aligns with competency standards in the operating room that prioritize technical expertise and professionalism (Pfandler, Stefan, Mehren, Lazarovici, & Weigl, 2019). Other studies similarly indicate that higher levels of education, particularly in medical fields, enhance skills and capabilities for managing complex surgical procedures (Belchenko, Chantyr, & Zavgorodnev, 2024).

The second finding was a significant association between motivation and patient safety quality in the operating room. Motivation is a key determinant of healthcare worker performance, especially in high-pressure environments such as operating rooms. High motivation encourages adherence to safety protocols, increases awareness of potential risks, and strengthens commitment to maintaining patient safety. Conversely, low motivation can lead to negligence, reduced productivity, and insufficient attention to detail, all of which may adversely affect patient safety. A supportive work environment—including positive working relationships and managerial recognition—plays an important role in enhancing motivation and performance among healthcare workers (Zarei, Najafi, Rajaee, & Shamseddini, 2016). Non-financial factors such as performance appraisal, management quality, staff development, and promotion opportunities have also been identified as strong predictors of work motivation (Weldegebriel, Ejigu, Weldegebreal, & Woldie, 2016). Other studies have reported that motivation is closely related to patient safety implementation (Nurhanifah, Kamil, Syahrul, Marlina, & Marianthi, 2021). Has a direct, positive, and significant effect on patient safety (Rizkia, Girsang, Kusumapradja, Hilmy, Pamungkas, & Dewi, 2022). The third finding was a significant association between adherence to SOPs and patient safety quality in the operating room. SOP adherence is foundational to ensuring patient safety, particularly in operating rooms, which are high-risk work areas. Compliance with the SSC and complete documentation of each procedural step are important indicators of SOP adherence (Al Abbas, Sankaranarayanan, Polanco, Cadeddu, Daniel, Palter, & Zeh 2022). SOPs are designed to ensure that each action taken by healthcare workers is based on evidence-based best practices. Non-compliance frequently leads to procedural errors, neglect of safety protocols, or failure to identify risks, all of which can have a direct impact on patient safety quality (Nakata, Watanabe, & Otake, 2023).

The final finding indicates that adherence to Standard Operating Procedures—specifically the Surgical Safety Checklist—is the most dominant variable determining patient safety quality in the operating room of Cilegon City General Hospital. Comprises three processes: compliance (instrumental adherence), identification, and internalization. In the context of SSC adherence, instrumental compliance occurs when staff follow procedures due to monitoring systems and clear consequences. Identification-based compliance

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emerges when individuals follow procedures to maintain positive relationships with the surgical team or supervisors. Internalization occurs when healthcare workers comply with SOPs because they genuinely understand that SSC steps are essential for ensuring patient safety and align with their professional values (Gillespie & Ziemba, 2024).

The implications of this study emphasize that interventions to improve patient safety in the operating room should focus on enhancing SSC SOP adherence through SOP re-socialization, supervision, stringent oversight, and the establishment of a strong safety culture. Strategies grounded in Kelman's theory can be applied by integrating incentive and sanction systems (instrumental compliance), cultivating inspirational leadership to strengthen identification, and promoting deep understanding of the importance of patient safety to achieve internalized compliance (Zecevic, Li, Ngo, Halligan, & Kothari, 2017). Thus, improving SOP adherence should not be viewed merely as an administrative requirement but as an intrinsic component of professionalism for every healthcare worker (Prahadiani, Kuncoro, Hariyanti, Zuhriyah, Sarwiyata, & Pradina, 2024).

CONCLUSION

Most personnel complied with the SSC SOP, although some had not yet achieved full adherence. This variation affected patient safety quality: while most patients received care with good safety standards, a notable proportion still experienced suboptimal safety. Further analysis showed that education level, staff motivation, and SOP compliance were significantly associated with patient safety quality. Personnel with vocational education were more likely to provide lower safety quality than those with professional education, and staff with low motivation had a markedly higher risk of poor safety performance. The strongest finding was the clear, significant link between SOP adherence and patient safety quality, with non-compliance greatly increasing the likelihood of suboptimal outcomes. Overall, SOP adherence emerged as the dominant factor influencing patient safety quality in the operating room at Cilegon City General Hospital.

REFERENCES

Al Abbas, A. I., Sankaranarayanan, G., Polanco, P. M., Cadeddu, J. A., Daniel, W., Palter, V., & Zeh III, H. J. (2022). The operating room black box: Understanding adherence to surgical checklists. *Annals of Surgery*, *276*(6), 995-1001.

Belchenko, V. A., Chantyr, I. V., & Zavgorodnev, K. D. (2024). The in-patient substituting technologies in maxillofacial surgery: characteristics of organization and ways of further development. *Problems of Social Hygiene, Public Health and History of Medicine*, *32*(6).

Chlouchi, A., Andaloussi, M. R., Bensghir, M., & Baite, A. (2023). Burns in the Operating Room: A Case Report of an Electrosurgery Plate Hand Burn. *SAS J Med*, *5*, 572-574.

Chrismilasari, L. A., CN, S. M., Sutikno, S., & Mujiono, M. (2022). Pentingnya Kepatuhan Pelaksanaan SSC (Surgical Safety Ceklist) Sesuai SOP bagi Perawat Ruang Operasi. In *Prosiding Seminar Nasional Masyarakat Tangguh* (Vol. 1, No. 1, pp. 135-143).

Ciğerci, Y., & Yılmaz, M. A. (2022). Intraoperative Patient Care Knowledge Levels of Operating Room Nurses: A Case of Afyonkarahisar. *Kocatepe Tıp Dergisi*, *23*(2), 152-159.

Denton, J., Evans, D., & Xu, Q. (2021). Being an older nurse or midwife in the healthcare workplace–a qualitative descriptive study. *Journal of Advanced Nursing*, *77*(11), 4500-4510.

Gillespie, B. M., & Ziemba, J. B. (2024). Lost in translation: does measuring 'adherence' to the Surgical Safety Checklist indicate true implementation fidelity?. *BMJ Quality & Safety*, *33*(4), 209-211.

Gomes, J. A., Martins, M. M., Tronchin, D. M. R., & Fernandes, C. S. (2019). Validação de uma escala sobre indicadores de estrutura no bloco operatório: contributos para a enfermagem. *Aquichan*, *19*(1).

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DOI: https://doi.org/10.33024/minh.v8i10.1466

Kilbane, H., Oxtoby, C., & Tivers, M. S. (2020). Staff attitudes to and compliance with the use of a surgical safety checklist. *Journal of Small Animal Practice*, *61*(6), 332-337.

Li, H., Yahang, Y. U., Yu, M., & Yuan, B. (2021). MaiValidation the Chinese Version of Work Motivation Scale for Health Workers.

Muara, S. J., & Yustiani, M. (2021). Pengetahuan dan motivasi tim kamar bedah dengan kepatuhan pengisian Surgical Safety Checklist. *Adi Husada Nursing Journal*, *7*(1), 21-26.

Nakata, Y., Watanabe, Y., & Otake, H. (2023). Effect of surgeon experience on technical efficiency. *Health Services Management Research*, *36*(1), 34-41.

Nurhanifah, N., Kamil, H., Syahrul, S., Marlina, M., & Marianthi, D. (2021). The Relationship between Nurse's Characteristics and Motivation with the Implementation of International Patient Safety Goal. *Media Karya Kesehatan*, *4*(2).

Pfandler, M., Stefan, P., Mehren, C., Lazarovici, M., & Weigl, M. (2019). Technical and nontechnical skills in surgery: a simulated operating room environment study. *Spine*, *44*(23), E1396-E1400.

Prahadiani, S. R., Kuncoro, W., Hariyanti, T., Zuhriyah, L., Sarwiyata, T. W., & Pradina, F. (2024). Non-compliance of Hospital X Employee in Implementing Standard Operational Procedures of Instrument Decontamination and Chest X-Ray Services. *Jurnal Kedokteran Brawijaya*, 23-27.

Rajasekaran, S., Ravi, S., & Aiyer, S. N. (2016). Incidence and preventability of adverse events in an orthopaedic unit: a prospective analysis of four thousand, nine hundred and six admissions. *International orthopaedics*, *40*(11), 2233-2238.

Rizkia, D. G., Girsang, A. J., Kusumapradja, R., Hilmy, M. R., Pamungkas, R. A., & Dewi, S. (2022). The effect of Interprofessional Collaboration and Transformational Leadership on Patient Safety with Work Motivation as Intervening Variables. *Riset: Jurnal Aplikasi Ekonomi Akuntansi dan Bisnis*, *4*(2), 039-053.

Weldegebriel, Z., Ejigu, Y., Weldegebreal, F., & Woldie, M. (2016). Motivation of health workers and associated factors in public hospitals of West Amhara, Northwest Ethiopia. *Patient preference and adherence*, 159-169.

Zarei, E., Najafi, M., Rajaee, R., & Shamseddini, A. (2016). Determinants of job motivation among frontline employees at hospitals in Tehran. *Electronic physician*, *8*(4), 2249.

Zecevic, A. A., Li, A. H. T., Ngo, C., Halligan, M., & Kothari, A. (2017). Improving safety culture in hospitals: Facilitators and barriers to implementation of Systemic Falls Investigative Method (SFIM). *International Journal for Quality in Health Care*, *29*(3), 371-377.

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