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THE ROLE OF NURSES IN PATIENT SAFETY CULTURE IMPLEMENTATION IN THE NEONATAL AND PEDIATRIC INTENSIVE CARE UNIT

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ABSTRAK

Patient safety culture plays a vital role in improving the quality of health services, especially in the Neonatal and Pediatric Intensive Care Unit that serves critically ill patients. Evaluation of patient safety culture in NICU and PICU nurses at RSUD X is essential to understand the extent of compliance and challenges in its implementation. This study analyzed patient safety culture in the NICU and PICU of RSUD X from the perspective of nurses using the Hospital Survey on Patient Safety Culture (HSOPSC) version 2.0, developed by the Agency for Healthcare Research and Quality (AHRQ). This study used a descriptive cross-sectional design involving 52 nurses. Data were collected by filling out the HSOPSC AHRQ 2.0 questionnaire, which consisted of 12 composites that described different aspects of patient safety culture. The HSOPSC 2.0 (AHRQ) instrument was used because its validity and reliability have been tested in measuring patient safety culture globally. The data were analyzed descriptively to identify the dimensions with the highest and lowest values. The survey results suggested that the patient safety culture in nurses working in the NICU and PICU had several strong aspects, including teamwork (77.54%), communication about errors (72.43%), and managerial support (71.15%). However, other elements must be considered more intensively, which are responses to errors (56.24%) and staffing (42.9%). Although the patient safety culture in the NICU and PICU of RSUD X has proven good in some aspects, improvement in incident reporting and workload management is required.

Keywords: hospital; NICU and PICU nurses; patient safety culture; workload

INTRODUCTION

Patient safety is the foundation for high-quality healthcare (Komalawati & Triswandi, 2022). Efforts to improve patient safety in hospitals have become a major concern in many countries, including Indonesia. Hospitals are responsible for ensuring that every medical procedure benefits the patients with minimal risks. Patient safety culture holds the values and norms that support safe practices in hospitals, and all hospital departments, from staff to management, are responsible for its implementation. A survey of patient safety culture by The Agency for Healthcare Research and Quality (AHRQ) version 2.0 includes relevant dimensions of patient safety, such as leadership, communication, incident reporting, and learning from errors (Paripih et al., 2023). This survey provides comprehensive data for an in-depth evaluation of the hospital's patient safety culture. The survey can be an evaluation tool and a first step for continuous improvement efforts. The survey results identify specific areas requiring increased attention, and training programs can be designed accordingly. Furthermore, the survey explores communication and incident reporting and the lessons learned from errors in the hospital.

The AHRQ survey version 2.0 offers several advantages over version 1.0, especially improved question design and enhanced data management techniques. Version 2.0 combines refined screening questions that increase respondent eligibility for follow-up questions for improvements in patient experience scores across multiple measures (Beckett et al., 2019).

Furthermore, the integration of unique survey IDs facilitates better organization and communication during survey administration. It reduces costs and minimizes response tracking errors. This version also supports survey revisions to adapt to the established methodology for bias mitigation (Liang et al., 2023). These improvements contribute to an effective assessment of patient experience (Quigley et al., 2022). Some previous studies suggested that patient safety in hospitals faces obstacles to overcome. In Indonesia, Puspitasari et al. (2022) advised open communication and management support in building a strong safety culture in intensive care units. However, several obstacles, such as the ineffectiveness of the patient safety incident reporting system, a culture of blame, and a shortage of healthcare workers, challenge the implementation of a patient safety culture (Sari & Mulyono, 2023).

The Indonesian government has regulated patient safety through the Indonesian Minister of Health Regulation No. 11 of 2017 concerning Patient Safety, which emphasizes that every healthcare facility must implement a patient safety culture, focusing on incident reporting, effective communication, and patient safety leadership. Furthermore, the 2024 Ministry of Health Accreditation Standards also emphasize the importance of a patient safety culture as part of improving service quality (Sagita et al., 2023). Based on the initial survey at RSUD X, the level of reporting of patient safety incidents remained low, and nurses' workload was one of the factors influencing compliance with patient safety protocols. Thus, this study aimed to evaluate the patient safety culture in the Neonatal Intensive Care Unit (NICU) and Pediatric Intensive Care Unit (PICU) at RSUD X using the HSOPSC questionnaire version 2.0. The finding is expected to inspire strategies for improving the patient safety culture in the NICU so that the quality of service and the safety of the babies and children are improved.

Patient safety culture among nurses in NICUs and PICUs is shaped by multiple factors that influence the quality of care and outcomes. Studies show that a strong safety culture could improve neonatal care, with key dimensions including management commitment, organizational support, and professional development. In the NICU, constructive interactions among staff and a focus on developmental care can advance safety culture (Babaie et al., 2023). Furthermore, challenges such as staff shortages and increasing patient acuity complicate the optimal safety culture (Hu et al., 2024). A comparative analysis revealed that nurses across regions reported varying perceptions of safety culture; common areas for improvement included teamwork and communication during patient handovers. Therefore, patient safety culture in these critical care settings is crucial for reducing adverse events and improving patient outcomes (Saleh et al., 2024). This study aims to analyze patient safety culture in the NICU and PICU of RSUD X from the nurses' perspective using the Hospital Survey on Patient Safety Culture (HSOPSC) version 2.0. By conducting a comprehensive study of patient safety culture, hospitals can identify healthcare workers' perceptions, attitudes, and behaviors regarding patient safety, which help design data-driven improvement strategies. Survey results can also guide management in developing effective policies, training, and interventions to create safer NICU and PICU units for patients and healthcare staff.

METHOD

This study used a descriptive cross-sectional design to evaluate patient safety culture in the NICU and PICU at RSUD X, North Jakarta. The respondents were 52 nurses working in the NICU and PICU units. Data collection was conducted using the Hospital Survey on Patient Safety Culture (HSOPSC) questionnaire version 2.0, developed by the Agency for Healthcare Research and Quality (AHRQ). The AHRQ HSOPSC questionnaire version 2.0 consists of 12 composites that reflect various aspects of patient safety culture, with a total of 40 questions. Each composite is grouped into four main domains:

Table 1.
The details of the HSOPSC version 2.0 questionnaire

Domain	Composite	Item Number
Unit-Level Safety	Safety culture in the unit level	4
	Feedback and communication about errors	3
	Open communication	3
	Workload balance	3
Hospital-Level Safety	Processes to improve patient safety	3
	Coordination among units	3
	Management support for patient safety	3
Response to errors and incident reporting	Non-punitive response to errors	3
	Patient safety incident reporting	2
Work environment and staff support	Staff involvement in patient safety	2
	Leadership in patient safety	3
	Adequate staff and resources	3

Respondents were asked to rate each statement in the questionnaire using a 5-point Likert scale: 1 = Strongly Disagree/Never, 2 = Disagree/Rarely, 3 = Neutral/Sometimes, 4 = Agree/Often, 5 = Strongly Agree/Always. The collected data were analyzed descriptively to see the distribution of respondents' answers on each patient safety culture composite. The results of this analysis provided an overview of nurses' perceptions of patient safety culture in the NICU and PICU of RSUD X.

RESULT

The following are the results of the Patient Safety Culture Survey with AHRQ ver 2.0:

Table 2.

Characteristic	Number of Respondents (52 respondents)
Sex	
Men	7(13,46%)
Women	45 (86,53%)
Age	
27 – 31 years old	16
32 – 36 years old	18
37 – 41 years old	6
42 – 46 years old	6
47 – 51 years old	5
Over 56 years old	1
Respondents' characteristics	
Length of work at the hospital	0
< 1 year	6
1 – 5 years	25
6-10 years	21
>11 years	
Length of work at the unit level	
< 1 year	0
1 – 5 years	15
6-10 years	27
>11 years	10
Work frequency (in a week)	
<20 hours	3
30 – 40 hours	21
>40 hours	28
Number of reported incidents	
None	6
1–2	26
3-5	9
6-10	8

Characteristic	Number of Respondents (52 respondents)
Assessment of hospital safety ratings	
Fair	0
Good	25
Very good	19
Excellent	6

This study was participated in by 52 nurses in the hospital. Based on their characteristics, the majority of them, 45 individuals, are female (86.53%), while only 7 are male (13.46%). This reflects the general trend that female health workers dominate the nursing sector. In terms of age range, most respondents are aged 32-36 years (34.62%) and 27-31 years (30.77%), indicating that the health workers in this unit are in the productive age range. Meanwhile, only 1.92% of the respondents are over 56 years old, indicating that the majority of health workers in this unit are young to middle-aged. Based on the length of work in the hospital, 48.08% of them have been working for 6-10 years, followed by 40.38% who have been working for more than 11 years. Therefore, most of the health workers in this unit are well-experienced in the hospital. However, regarding length of service in the current unit, those with 6-10 years of experience dominate at 51.92%, followed by those with 1-5 years (28.85%), while those with more than 11 years make up only 19.23%. The absence of healthcare workers with less than 1 year of experience in this unit indicates that the hospital has rarely conducted recruitment or staff rotations.

In terms of working hours per week, the majority of respondents, 53.85%, worked more than 40 hours per week, while 40.38% worked between 30 and 40 hours per week, and only 5.77% worked less than 20 hours per week. The high percentage of healthcare workers working over 40 hours per week indicates a high workload, which can impact healthcare workers' well-being and the quality of patient care. In terms of the number of reported patient safety incidents, 50% of respondents reported 1-2 incidents, while 17.31% reported 3-5 incidents, and 15.38% reported 6-10 incidents. However, 11.54% of them did not report any incidents at all, which could indicate barriers to the culture of reporting patient safety incidents, such as fear of consequences or a lack of awareness of the importance of incident reporting. Meanwhile, in terms of hospital safety assessment, the majority of respondents rated the hospital as "Good" (48.08%) and "Very Good" (36.54%), while 11.54% rated it as "Excellent" and none rated it as "Fair." This indicates that, in general, healthcare workers have a positive perception of patient safety in the hospital, although there is still room for improvement, especially in the aspects of incident reporting and workload management.

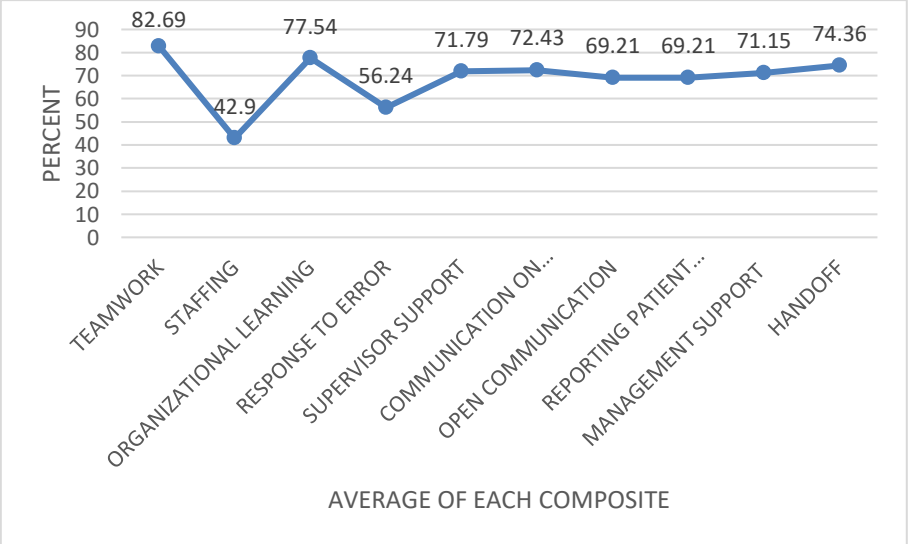

Figure 1. The percentage of positive responses according to the composite

The results of the Patient Safety survey are considered good if the positive word items (strongly agree and agree) and negative word items (strongly disagree and disagree) reach 75%. Areas that need improvement if the positive word items and negative items are <50%. There are 6 composites classified as good, which are Communication on Errors, Handover and Information Exchange, Hospital Management Support for Patient Safety, Organizational Learning-Continuous Improvement, Supervisors, Managers, or Clinical Leaders support patient safety and the teamwork domain. Composites that are classified as moderate consist of the domains of open communication, Reporting Patient Safety Incidents, and Response to errors. Meanwhile, there is 1 composite that is lacking, which is the staffing composite.

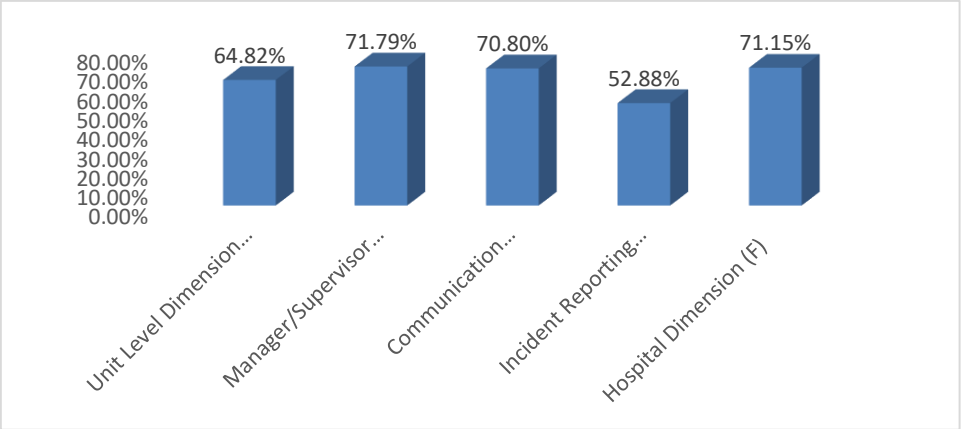

Figure 2. Graph of Each Dimension

Figure 2 illustrates the results of the AHRQ Patient Safety Culture Survey 2.0 across various dimensions, which include the Work Unit Dimension, the Manager/Supervisor/Inspector-Inspector Dimension, the Communication Dimension, the Incident Reporting Frequency Dimension, and the Hospital Dimension. The percentages for each dimension are as follows: Work Unit Dimension (A): 64.82%, Manager/Supervisor/Inspector-Inspector Dimension (B): 71.79%, Communication Dimension (C): 70.82%, Incident Reporting Frequency Dimension (D): 52.88%, and Hospital Dimension (F): 71.15%.

DISCUSSION

The results of the Patient Safety Culture Survey on nurses in the NICU Unit of X Regional General Hospital using the AHRQ 2.0 questionnaire for each dimension:

Unit Level Dimension (A) The unit level dimension had a percentage of 64.82%. It means that over half of the respondents felt the safety culture in their work unit was good. However, a room for improvement remained, especially in specific aspects such as training and support in dealing with patient safety incidents. Increasing awareness and involvement of all team members can help achieve better results in the future. Manager/Supervisor/INS Staff Dimension (B) The manager/supervisor/INS staff dimension received the highest score at 71.79%. It indicates that the role of managers and supervisors is crucial in supporting a patient safety culture. Effective communication, strong leadership, and support for staff in reporting safety incidents are key factors contributing to this high score. Pursuing leadership training and managerial development is crucial to maintaining and improving this score.

Communication Dimension (C) The communication dimension showed very positive results with a score of 70.82%. Good communication among medical team members is the foundation of a strong safety culture. However, ongoing efforts are required to ensure that all staff have adequate communication skills and that there are clear and open channels for reporting and discussing patient safety incidents. Incident Reporting Frequency Dimension (D) This dimension showed the lowest score at 52.88%, indicating challenges in the frequency of reporting patient safety incidents. Factors such as fear of negative consequences, lack of time,

and uncertainty about how to report incidents may contribute to this low score. The frequency of reporting can increase through a supportive environment, appropriate training, and a simple and hassle-free reporting system.

Hospital Dimension (F) The hospital dimension scored 71.15%, indicating that the overall safety culture at the hospital level is good. It reflects that the safety policies and procedures by the hospital management are effective. However, as with other dimensions, there is always room for improvement. Regular evaluation of policies and procedures and regular training for all staff are important to ensure that the safety culture continues to develop and improve. The AHRQ Patient Safety Culture Survey 2.0 in 2019 reported that each dimension provides a comprehensive overview of the strengths and weaknesses of hospital safety culture. By focusing on improvements in each dimension, hospitals can enhance patient safety and provide better and safer healthcare. Patient safety culture surveys significantly benefit intensive care unit nurses globally by improving their understanding of safety practices and fostering a supportive environment for error reporting.

These surveys inspire the dimensions of safety culture, such as teamwork, communication, and management support, which are essential for improving the quality of patient care. For example, nurses in Tehran reported high levels of positive response to non-punitive error reporting but identified management expectations as an area for improvement (Salamat et al., 2019). Similarly, another study suggested teamwork as a strength but recorded low scores in communication and error reporting, suggesting areas for targeted intervention (Farzi et al., 2017).The analysis of the average results from the domains and 10 composites of the 2019 AHRQ survey explicates the state of patient safety culture in hospitals. Each domain offers specific insights that help identify strengths and areas for improvement. The highest score in this survey is the teamwork composite. It shows excellent collaboration among team members. Some literature supports the idea that strong teams are more efficient with safer patient care. The Organizational Learning-Continuous Improvement composite (77.54%) indicates that the hospital is actively engaged in continuous improvement efforts. Continuous learning is a key element of a patient safety culture, which enables organizations to evaluate and improve their procedures and practices. A positive response score on the Handover and Information Exchange composite (74.36%) indicates that the information handover process between staff is running smoothly. An effective handover process reduces the risk of miscommunication, which can negatively impact patient safety. Literacy supports the importance of timely and accurate information transfer in preventing medical errors.

The Error Communication Composite (72.43%) indicates that there is a good system for reporting and discussing errors. However, there remains room for improvement to achieve expected standards. Literacy indicates that open communication about errors is a critical component in preventing recurrence. The composite score for Supervisor, Manager, or Clinical Leader Support (71.79%) reflects that clinical supervisors and managers provide adequate support for patient safety efforts. This support is crucial because supportive leaders create a safe and comfortable environment for staff to report incidents and share experiences without fear of negative repercussions. The composite result of Hospital Management Support (71.15%) indicates that hospital management also demonstrates strong support for patient safety. The Open Communication score (69.20%) indicates a level of openness in communication, but there is room for improvement. Openness in communication is important to ensure that all staff feel comfortable discussing safety issues without fear of negative consequences. There is a positive response on the Patient Safety Incident Reporting composite (69.20%). Although an electronic reporting system through E-MUTU is already in place, this score indicates that there is a need to improve the frequency and quality of patient safety incident reporting. Incident reporting is a key element in a patient safety system because it

allows organizations to learn from mistakes and prevent their recurrence.

The Error Response composite received a positive response of 56.24%. This domain resulted in one of the lowest scores, indicating that this composite required improvement. A prompt and appropriate response to errors is crucial as it mitigates negative impacts and prevents the recurrence of similar incidents. The composite with the lowest score, Staffing and Work Pace (42.90%), indicates that staffing and workload issues require immediate action. Understaffing and high workloads can increase the risk of errors and reduce the quality of care. The average results of this survey are largely consistent with findings in the literature. For example, strong teamwork, management support, and continuous learning are consistently cited as important factors in a successful patient safety culture. However, the composite of staffing and work pace indicates areas requiring special attention. This report only involved 52 respondents; a larger sample size is necessary for a more representative sample.

The survey results suggested several areas of strength to maintain, such as teamwork and management support. However, some areas require immediate intervention, particularly in responding to errors and staffing issues. Identifying and addressing these areas could improve patient safety. The survey results revealed that the lowest composite score is staffing. The Fishbone (Ishikawa) diagram is an effective analytical tool for identifying the root causes of problems, including staffing issues in hospitals. In the context of human resources management, especially in high-stress units such as the NICU and PICU, staffing issues can impact patient safety, work efficiency, and the well-being of medical staff. Therefore, Fishbone analysis can help understand the factors contributing to staffing issues and design appropriate solutions. The following is the Fishbone diagram for staffing issues:

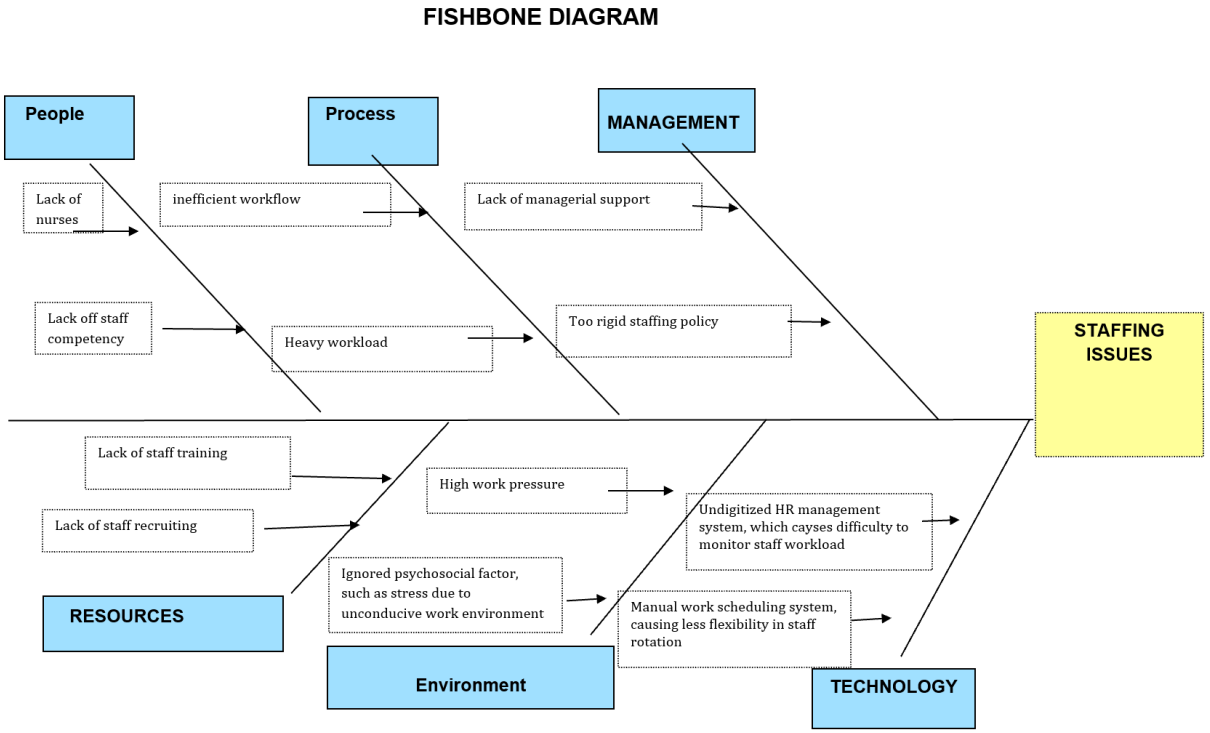

Figure 3. Fishbone Diagram of Staffing Issues

Addressing staffing issues in hospitals, particularly in high-pressure units such as the NICU and PICU, requires an evidence-based strategy. One key approach is strengthening human resource management, especially in digitalization and staffing policies. Inefficiencies in HR management systems often pose a major obstacle to equitable workload distribution. Implementing a Human Resource Information System (HRIS) can improve workforce management efficiency by simplifying scheduling, monitoring workloads, and ensuring

flexible and equitable staff rotation. Research by Yona et al. (2024) shows that the use of HRIS can improve employee performance. Besides, Atifah et al. (2025) state that implementing a Hospital Management Information System (HMIS) contributes to improving the efficiency and effectiveness of healthcare workers by reducing administrative burdens, improving coordination, and accelerating access and management of patient information (Atifah et al., 2025).

In addition to digitalization, staffing policy reforms are also needed to improve work flexibility and staff satisfaction. The benefits of flexible work arrangements include improved work-life balance, higher job satisfaction, and increased healthcare worker engagement, which ultimately improves the quality of patient care. Furthermore, Flexible Work Arrangements (FWAs) can reduce burnout and improve staff retention (Ukachukwu, 2024). Also, the competency and well-being of healthcare workers require attention. Lack of ongoing clinical training often leaves healthcare workers unprepared to handle critical situations in the field. Therefore, implementing clinical simulation-based training programs and e-learning is an effective solution to improve nursing skills. Simulation-Based Learning (SBL) has proven to be an effective method for improving nursing students' clinical knowledge and skills. SBL is a potential teaching strategy in nursing education to improve clinical skills and healthcare workers' preparedness in patient care (Alharbi et al., 2024). Setianingrum et al. (2021) suggest that continuing education through e-learning can improve the competence of nurses in surgical inpatient wards (Setianingrum & Hariyati, 2021). In addition to strengthening technical skills, the psychosocial factors of healthcare workers also require attention, given the high levels of stress in intensive work environments. Providing psychosocial support through counselling sessions and work-life balance programs is effective in reducing stress levels among healthcare workers. Briliani (2024) noted that 35.88% of the total variability in work stress can be explained by the level of work-life balance. Therefore, the better the work-life balance, the lower the stress levels experienced by nurses.

Furthermore, optimizing workflows and operational processes can improve healthcare efficiency. Inconsistencies in the implementation of nursing protocols can increase the risk of procedural errors. Therefore, standardizing SOPs based on best practices, accompanied by regular supervision, is necessary to ensure compliance with patient safety standards. According to Hasanah (2024), as service quality improves, compliance with SOPs also tends to increase. This indicates that patient safety strategies are more effective when combined with comprehensive service quality improvements, including strengthening risk management systems, enhancing communication, and educating healthcare workers (Hasanah, 2024). High workloads are often a major cause of healthcare worker burnout, so implementing Workload Indicators of Staffing Need (WISN) can be a solution to ensure an equitable distribution of tasks. This approach has been recommended by the WHO (2020) as a strategy to improve the efficiency of workforce management in hospitals.

Strengthening infrastructure and technology is also necessary to support an efficient work system. A non-ergonomic work environment can exacerbate healthcare worker fatigue, so supporting facilities are needed, such as more comfortable break rooms and more ergonomic workplace designs. The better the work environment perceived by nurses, the higher their productivity (Harahap & Muflih, 2021). An ergonomic work environment can improve healthcare worker comfort, reduce work stress, and increase efficiency (Maryo & Muflih, 2021). In addition to physical aspects, digital transformation of reporting and workload monitoring systems is necessary to improve administrative efficiency and reduce the risk of human error. Rahmayanti et al. (2023) explain that SIMRS enables hospitals to manage patient data more quickly and accurately, thereby minimizing administrative errors.

CONCLUSION

This study identified several aspects of patient safety culture in the NICU and PICU, such as teamwork, error communication, and adequate managerial support. However, several challenges remain, such as low frequency of patient safety incident reporting and high workload and nursing staff shortages. These factors can impact the quality of healthcare services and patient safety. A strategic, data-driven approach is needed to address these issues. Several recommendations can be implemented to improve patient safety culture in hospitals. By implementing these strategies, hospitals can create a better patient safety culture and ensure that healthcare workers can perform optimally while providing quality healthcare services.

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