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Beyond Psychological Safety: Organizational Infrastructure and Knowledge Drive Patient Safety Reporting in a Developing Country Hospital

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ABSTRACT
Patient safety incident reporting is crucial for identifying issues within patient safety programs, yet underreporting remains a significant challenge in many hospitals. Understanding the factors influencing reporting behavior is essential for developing strategies that enhance a culture of patient safety. This study examines the impact of organizational and individual factors on incident reporting behavior among nurses in an Indonesian public hospital, using a robust regression analysis approach. A cross-sectional study was conducted with 143 nurses at Tenriawaru Public Hospital in Bone, Indonesia. Data were collected through validated questionnaires assessing seven enabling factors: leadership, policies and resources, group cohesiveness, psychological safety, knowledge, sense of control, and commitment. To ensure reliable estimates amid potential outliers and heteroscedasticity, robust regression with Huber's M-estimation was applied. The analysis identified policies and resources as the most influential factor in incident reporting (β=0.3357, t=12.0238), followed by knowledge (β=0.1226, t=2.8175), commitment (β=0.0855, t=4.2705), and leadership (β=0.0577, t=2.2421). All factors showed t-values exceeding the critical threshold of 1.656, indicating statistical significance. The model exhibited a Root Mean Squared Error (RMSE) of 3.94915, indicating relatively low prediction error. Group cohesiveness, psychological safety, and sense of control were not found to significantly impact reporting behavior. This study underscores the complex interaction of factors shaping incident reporting behavior. The findings highlight the importance of robust policies, resource allocation, staff commitment, and knowledge in fostering a safety culture. These insights provide practical guidance for hospital administrators and policymakers, especially in developing countries, on improving incident reporting practices. Future research could employ longitudinal designs to observe changes over time and investigate the potential of digital tools and reporting systems to further enhance reporting behaviors.
Keywords: patient safety, incident reporting, nurse reporting behavior, enabling factors, developing countries healthcare.

INTRODUCTION

Patient safety is a critical concern in healthcare systems worldwide, with incident reporting serving as a cornerstone for improving quality and reducing risks. Despite its importance, underreporting of safety incidents remains a persistent challenge in many healthcare settings, particularly in developing countries (Dhamanti et al., 2020). In Indonesia, for example, only about 5% of hospitals consistently report patient safety incidents, highlighting a significant gap between the occurrence of incidents and their formal documentation (Sari et al., 2018; Kurnia et al., 2021).

The process of delivering healthcare services in hospitals inherently carries various risks that can lead to patient safety incidents. Recognizing this, the development of systems specifically designed to enhance patient safety and foster positive staff attitudes towards safety has become paramount (Abuosi et al., 2022). Incident reporting is a vital strategy in this endeavor, serving as the initial step in improving patient safety and developing programs focused on safety-related issues (Mjadu & Jarvis, 2018).

Organizations with strong safety cultures create environments where incident reporting is encouraged and valued as a means of learning and improvement. Such cultures enable staff to report potentially threatening events without fear of negative consequences. However, the success of implementing patient safety culture, including incident reporting, depends on the collective responsibility of all hospital elements, both medical and non-medical personnel (Wake et al., 2021).

Nurses, as the healthcare professionals with the most direct patient interaction, play a crucial role in this process (Alquwez et al., 2018; Biresaw et al., 2020). They spend more time caring for patients than any other staff in hospitals, making them key transmitters of the organization's service values to patients. Nurses' perceptions of patient safety culture provide valuable insights that can serve as comprehensive safety indicators, reflecting both adherence to safety protocols and the overall effectiveness of patient safety measures in healthcare organizations (Jang et al., 2021; Lee & Dahinten, 2021).

Despite the recognized importance of incident reporting, healthcare staff awareness remains inadequate, leading to numerous incidents going unreported (Dhamanti et al., 2020; W. Lee et al., 2018; Mourd et al., 2020). Research indicates that approximately 76% to 82% of patient safety incidents are not reported by staff (Gunawan et al., 2015). In certain contexts, up to 76.5% of nurses have encountered incidents that were not reported (W. Lee et al., 2018).

The study aimed to address this critical issue by examining the factors influencing incident reporting behavior among nurses in an Indonesian public hospital. By employing a robust regression analysis approach, we seek to provide a more detailed understanding of how organizational and individual factors impact reporting behavior. This research is particularly significant in the context of developing countries like Indonesia, where patient safety practices may be less established and face unique challenges. Developing countries like Indonesia, patient safety practices may face distinctive challenges that set them apart from those in more developed healthcare systems. These include limited resources, inadequate staff training, and a lack of well-established reporting systems.

This study builds upon existing theoretical frameworks, including the organizational safety culture model (Reason, 1997) and the theory of planned behavior (Ajzen, 1991), while also considering the specific cultural and organizational context of Indonesian healthcare settings. By integrating these established models, the research aims to create a comprehensive understanding of how safety culture and behavioral intentions influence incident reporting practices within the unique socio-cultural environment of Indonesia. Such an approach acknowledges that cultural norms and organizational values significantly impact healthcare professionals' attitudes towards reporting, which is critical for fostering a proactive safety culture (Schein, 2010; Wu, 2008).

HYPOTHESIS DEVELOPMENT

Patient safety incident reporting is essential for the effective implementation of patient safety programs. This process involves the documentation and analysis of events that could have the potential to cause, or have already caused, unnecessary harm to a patient. By establishing effective reporting systems, healthcare organizations can learn from mistakes, identify underlying systemic issues, and implement preventive measures to enhance patient safety (Stavropoulou et al., 2015; Waring & Currie, 2009; Hesselink et al., 2012). Despite its importance, underreporting remains a significant challenge globally. Studies have shown that only a fraction of incidents are reported, with estimates suggesting that up to 96% of adverse events go unreported (Kingston et al., 2004). This gap in reporting hinders the ability of healthcare systems to improve safety and quality of care.

Leadership

Leadership plays a pivotal role in shaping the culture of incident reporting within healthcare organizations. Effective leaders foster an environment that prioritizes patient safety and encourages incident reporting as a means of continuous improvement rather than punishment (Gampetro et al., 2024). Leaders who demonstrate commitment to safety and provide necessary resources can significantly influence staff attitudes toward incident reporting (Abuosi et al., 2022) . In developing countries like Indonesia, where hierarchical structures often prevail,

strong leadership is essential to overcoming incident reporting barriers (Dhamanti et al., 2020). The promotion of a just culture by leaders, allowing staff to report incidents without fear of retribution, can bridge the gap between incident occurrence and formal documentation (Lee et al., 2018). Aligning organizational policies with safety priorities and fostering a learning-oriented approach to incident analysis enables leaders to cultivate a sustainable culture of safety that enhances incident reporting practices and improves patient outcomes (Mjadu & Jarvis, 2018).

Hypothesis 1: Positive leadership is positively associated with higher levels of incident reporting behavior.

Policies and Resources

To achieve the effectiveness and success of effective incident reporting systems, it is crucial to implement robust policies and provide adequate resources, including well-defined reporting procedures, accessible tools, and sufficient time for reporting activities (Archer et al., 2017; Mitchell et al., 2016). Clear and supportive policies create a safe environment for reporters, fostering a culture that encourages both reporting and learning from incidents. However, policies that instill fear of negative consequences can hinder reporting. Adequate resources, such as appropriate equipment and infrastructure, along with effective support and training for healthcare providers, enhance the feasibility and quality of incident reporting (Fernando, et al., 2023). Ultimately, these measures ensure efficient reporting and effective analysis of incident data.

Hypothesis 2: The presence of supportive policies and resources is positively associated with increased incident reporting behavior

Group Cohesiveness

Group cohesiveness refers to the degree of unity and bond within a team. In healthcare settings, cohesive teams may be more likely to prioritize patient safety and encourage reporting (Mannion & Thompson, 2014). Moreover, dynamics within a group, including cohesion and the social processes involved, can facilitate or hinder incident reporting. Cohesion within a group is related to the internalization of organizational values and norms, which can influence the likelihood of incident reporting. Cohesive groups are more likely to align with organizational goals, reduce deviant behavior, and enhance reporting practices (Wijaya et al, 2022). However, the dynamics of cohesion can also obstruct reporting, particularly if individuals feel bound by strong group loyalty. In this context, group cohesion dynamics can either encourage or deter whistleblower actions, depending on the affiliation of the wrongdoer and the nature of the group involved (Bergemann & Aven, 2022). Therefore, understanding the dynamics of group cohesion is crucial for improving incident reporting in patient safety and fostering a better safety culture.

Hypothesis 3: Higher levels of group cohesiveness are positively associated with increased incident reporting behavior.

Psychological Safety

Psychological safety refers to the belief that one can speak up without fear of negative consequences. In healthcare, it is crucial for creating an environment where staff feel comfortable reporting incidents (Appelbaum et al., 2016). Increased psychological safety enhances the likelihood of reporting near misses, particularly those close to negative outcomes (Jung et al., 2020). Moreover, it also leads to higher reporting of incidents that result in patient harm. Conversely, low psychological safety negatively impacts patient safety and team outcomes, highlighting the importance of a psychologically safe environment in preventing errors and fostering innovation (Grailey et al., 2021).

Hypothesis 4: Higher levels of psychological safety are positively associated with increased incident reporting behavior.

Knowledge

Knowledge about patient safety and reporting procedures is fundamental to effective incident reporting. Staff with better understanding of what constitutes a reportable incident and how to report it are more likely to engage in reporting behavior (Bagenal et al., 2016). This knowledge plays a crucial role in incident reporting as it directly influences healthcare professionals' ability

to recognize, disclose, and manage incidents effectively. Moreover, a strong foundation of knowledge correlates with improved patient care and a reduction in safety incidents (Biresaw et al., 2020).

Hypothesis 5: Higher levels of knowledge about patient safety and reporting procedures are positively associated with increased incident reporting behavior.

Sense of Control

Sense of control relates to an individual's perception of their ability to influence overcome challenges or obstacles that may arise in achieving their goals (Lachman et al., 2015). In the context of patient safety, a higher sense of control may lead to increased proactive behaviors, including incident reporting. When staff feel in control of the situation and the reporting process, they are more likely to report incidents as they arise. Perceived behavioral control is positively associated with the intention to report incidents, meaning that the greater the sense of control felt by an individual, the more likely they are to report incidents (Lee et al., 2016). This sense of control also enhances individuals' confidence in recognizing and addressing issues, as well as encourages them to communicate openly about mistakes or adverse events (Bisbey et al., 2021).

Hypothesis 6: A stronger sense of control is positively associated with increased incident reporting behavior.

Commitment

High professional commitment among healthcare workers, particularly nurses, plays a crucial role in enhancing patient safety in hospitals (Nasiri et al., 2024). Nurses with strong commitment tend to be more active in reporting patient safety incidents, including near misses and medication errors, as they understand the importance of transparency in improving service quality (Al-Hamdan et al., 2017; Hasrul et al., 2018). Furthermore, they strive to uphold professional values, especially in reducing medication errors (Nasiri et al., 2024). These findings align with the views of Hasrul et al. (2018), which state that personnel with good organizational commitment have higher rates of reporting patient safety incidents. Thus, enhancing professional commitment can significantly contribute to patient safety and the quality of healthcare services.

Hypothesis 7: Higher levels of organizational commitment are positively associated with increased incident reporting behavior.

By employing robust regression analysis, we seek to address potential issues of outliers and heteroscedasticity often present in healthcare data, thereby offering a more reliable assessment of these relationships. Through this comprehensive examination of both organizational and individual factors, we aim to contribute to the growing body of knowledge on patient safety culture and provide practical implications for improving incident reporting practices in healthcare settings, particularly in developing countries.

METHOD

Research Design and Setting

This study employed a cross-sectional design to examine the factors influencing patient safety incident reporting behavior among nurses. The research was conducted at Tenriawaru Public Hospital in Bone, Indonesia, a setting that provides a unique perspective on patient safety practices in a developing country context.

Data Collection

The study population consisted of all nursing staff working in the inpatient units of Tenriawaru Public Hospital, totaling 147 nurses. A total sampling technique was used, with inclusion criteria specifying nurses who directly interact with patients, have worked at the hospital for at least one year, and were willing to participate voluntarily. Exclusion criteria included nurses on leave, study assignments, or in training positions. After applying these criteria, the final sample size was 143 nurses.

Data were collected using self-administered questionnaires distributed to eligible participants. The researchers visited each work unit to introduce the study, explain its purpose, and obtain informed consent. Participants were assured of confidentiality and given time to complete the

questionnaires independently. The study utilized validated instruments to measure the variables (Table 1).

Table 1. Variable measurement

Variable	Measurement	Source
Leadership	Coaching Behavior Scale	Chegini et al. (2020)
Policies and resources	WHO customized survey	Dhamanti et al. (2019)
Group cohesiveness	Group Environment Questionnaire	Carron et al., (2018)
Psychological safety	Survey questionnaire	O'Donovan & McAuliffe (2020)
Knowledge	Customized questionnaire (knowledge dimension)	Krathwohl (2002)
Sense of control	Sense of Control Scale	Lachman & Weaver (1998)
Commitment	Nurses' Professional Commitment scale	Chang et al., (2015)
Incident reporting	Composite questionnaire	Wanda et al. (2020)

Data Analysis

Data analysis was performed using SPSS version 24 and R Studio. The analysis proceeded in three stages; univariate, bivariate, and multivariate analysis. At the univariate analysis, descriptive statistics were computed for all variables. At the bivariate analysis, Chi-square tests were conducted to examine relationships between two variables—in this case, individual factors (such as knowledge, commitment, etc.) and the outcome of interest, which is incident reporting behavior. This step allows for the identification of significant associations between independent and dependent variables before accounting for other confounding factors. In this study, the bivariate analysis helps to simplify complex relationships by initially isolating the effect of individual predictors on the reporting behavior. Furthermore, this step is essential for guiding the multivariate analysis by identifying which factors warrant further investigation.

At the multivariate analysis, we comprehensively examine the interplay between multiple independent variables and the dependent variable of patient safety incident reporting behavior. This approach is particularly relevant in healthcare research, where various organizational and individual factors can interact to influence outcomes (Tabachnick & Fidell, 2013; Field, 2018). By utilizing robust regression analysis, the study can control for confounding variables, allowing for a clearer understanding of each factor's unique contribution while also assessing potential interactions (Hosmer et al., 2013). This analytical framework not only enhances the interpretability of the findings but also provides actionable insights for improving patient safety culture, making multivariate analysis necessary for deriving meaningful conclusions from complex healthcare data (Kleinbaum et al., 2013; Jang et al., 2021; Lee & Dahinten, 2021).

The choice of robust regression in this study is driven by several factors unique to patient safety research in healthcare settings. First, the non-normal distribution of errors is a common issue; incident reporting data often violate the assumption of normally distributed errors required by traditional ordinary least squares (OLS) regression. Robust regression is less sensitive to these violations, yielding more reliable estimates in the presence of non-normal error distributions (Huber, 1981; Wilcox, 2017). Second, the presence of outliers is significant in-patient safety studies, where rare but crucial incidents may skew results. While these events are essential for understanding safety issues, they can disproportionately influence OLS regression result. Robust regression minimizes the impact of these outliers without excluding them from the analysis, thereby preserving important information (Maronna et al., 2006). Third, heteroscedasticity – where variability in incident reporting behaviors is not constant across levels of independent variables – can violate the homoscedasticity assumption of OLS regression. Robust regression techniques are less affected by heteroscedasticity, providing more accurate standard errors and inference (Fox, 2015). Fourth, small sample sizes are common in healthcare settings, particularly in specialized units or smaller hospitals, making robust regression a suitable choice as it provides more reliable estimates compared to traditional methods in these contexts (Stevens, 2002). Finally, the complex interrelationships

among factors influencing incident reporting behavior necessitate an analytical approach that can handle multicollinearity effectively. Robust regression offers more stable estimates of the relationships between variables, accommodating the intricate dynamics present in healthcare data (Belsley et al., 1980).

By using Huber's M-estimation, a form of robust regression, we can address these challenges more effectively than conventional OLS regression. This method iteratively reweights the observations, giving less weight to observations that would otherwise exert a large influence on the parameter estimates. This process results in estimates that are more resistant to outliers and influential observations.

The use of robust regression in this study represents a methodological advancement in patient safety research. It allows for a more nuanced and accurate understanding of the factors influencing incident reporting behavior, even in the presence of data irregularities common in healthcare settings. This approach enhances the reliability and validity of our findings, providing a stronger foundation for developing interventions to improve patient safety practices. The robust regression model is specified as:

$$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \beta 6X6 + \beta 7X7 + \varepsilon$$

Y represents incident reporting behavior, X1 to X7 represent the seven enabling factors under study, and ε is the error term. The model parameters are estimated using iteratively reweighted least squares, with the weighting function determined by Huber's method (Damayanti & Susanti, 2024). This advanced analytical approach allows us to capture the complex dynamics of incident reporting behavior more accurately, providing insights that may have been obscured or distorted by traditional regression techniques. The results of this analysis offer a robust foundation for understanding and improving patient safety practices in the unique context of Indonesian healthcare settings.

Ethical Considerations

This study was conducted in strict adherence to ethical principles and guidelines for human subject research. Ethical approval was obtained from the Health Research Ethics Commission, Faculty of Public Health, Hasanuddin University on 19 February 2024, with the approval number: 468/UN4.14.1/TP.01.02/2024

The research protocol was designed and implemented in accordance with the Declaration of Helsinki, ensuring the protection of participants' rights, safety, and well-being throughout the study. This methodology was designed to provide a comprehensive and rigorous examination of the factors influencing incident reporting behavior, with particular attention to the unique challenges and contexts of healthcare delivery in a developing country setting

RESULT

Descriptive Statistics

The description of the respondents' characteristics was analyzed using frequency distribution analysis. The results can be seen in Table 2.

Table 2: Frequency Distribution based on Respondent Characteristics

Respondent Characteristics	Research Sample	
	n	%
Age (years)		
< 30	9	6,3%
30-40	10	7,0%
41-50	107	74,8%
> 50	17	11,9%
Total	143	100,0%
Gender		
Male	8	5,6%
Female	135	94,4%
Total	143	100,0%
Unit		
Anggrek	9	6,3%
Asoka	11	7,7%
Kenanga	14	9,8%
Lavender	14	9,8%
Matahari	17	11,9%
Melati	20	14,0%
Palem	11	7,7%
Sakura	13	9,1%
Tulip	12	8,4%
Vip Asalea	11	7,7%
Vip Bougenville	11	7,7%
Total	143	100,0%
Length of work in Hospital		
<= 5 years	23	16,1%
6-10 years	19	13,3%
> 10 years	101	70,6%
Total	143	100,0%
Employment Status		
Civil Servant	63	44,1%
Non- Civil Servant	80	55,9%
Total	143	100,0%
Education Level		
Associate's degree	42	29,4%
Bachelor's degree	39	27,3%
Professional Degree	59	41,3%
Magister Degree	3	2,1%
Total	143	100,0%
Training		
Ever	124	86,7%
Never	19	13,3%
Total	143	100,0%

Source: Primary Data, 2024

The demographic profile of the respondent reveals notable patterns, despite the diversity in some characteristics. Most participants (74.8%) were aged between 41 and 50, indicating that the perspectives gathered predominantly reflect those of a productive, middle-aged cohort. A pronounced gender disparity was observed, with 94.4% of the respondents being female, suggesting a significant female representation in this context. The distribution of respondents across work units was varied, with the highest representation from Melati Unit (14.0%),

followed by Lavender and Tulip (11.9% each), offering a broad view of the organizational structure within the institution.

In terms of professional experience, 70.6% of the respondents reported over 10 years of service, reflecting a highly experienced workforce. In contrast, only 16.1% had less than five years of experience, further emphasizing the seniority of the sample. Employment status was relatively balanced between civil servants (44.1%) and non-civil servants (55.9%), providing a comprehensive perspective from both groups. Educational attainment was also high, with the most respondents holding either a bachelor's degrees (41.3%) or a diploma (29.4%), although the proportion of those with postgraduate qualification's remained modest (2.1%). Professional development appeared robust as 86.7% of the respondents had participated in training activities.

Overall, the sample is characterized by middle-aged, highly experienced women with substantial educational backgrounds and active engagement in professional development. These characteristics offer valuable insights into the workforce composition and may influence the interpretation and generalizability of the study's findings. The diversity in employment status and work units further enhances the scope and depth of the research.

Bivariate Analysis

Chi-square tests were conducted to examine the associations between individual factors and incident reporting behavior. Significant associations were found for several factors (Table 3). Based on the Table 3, employee commitment and understanding appear to be key factors in incident reporting behavior at the workplace. The research shows that strong affective commitment is statistically strongly associated with active reporting behavior, where 100% of respondents with high affective commitment actively reported incidents. Furthermore, employees' perceptions of adequate policies and resources also have a significant relationship with reporting behavior, with 96.15% of respondents who perceived policies and resources as sufficient demonstrating active reporting behavior

Table 3: Cross-Tabulation of Enabling Factors and Incident Reporting Behavior

Enabling Factors	Reporting Behavior				Total		*Chi Square*	*P-Value*
	Active		Passive					
	n	%	n	%	N	%		
Leadership								
Supportive	80	97,56%	2	2,44%	82	100%		
Non-Supportive	55	90,16%	6	6,98%	61	100%	3,6239	0,057
Total	135	94,41%	8	5,59%	143	100%		
Policies and Resources								
Adequate	125	96,15%	5	3,85%	130	100%		
Inadequate	10	76,92%	3	23,08%	13	100%	8,2755	0,004
Total	135	94,41%	8	5,59%	143	100%		
Group Cohesiveness								
High	27	93,10%	2	6,90%	29	100%		
Moderate	74	98,67%	1	1,33%	75	100%	6,5274	0,038
Low	34	87,18%	5	12,82%	39	100%		
Total	135	94,41%	8	5,59%	143	100%		
Psychological Safety								
High	79	92,94%	6	7,06%	85	100%		
Low	56	96,55%	2	3,45%	58	100%	0,851	0,356
Total	135	94,41%	8	5,59%	143	100%		

Enabling Factors	Reporting Behavior				Total		*Chi Square*	*P-Value*
	Active		Passive					
	n	%	n	%	N	%		
Knowledge								
High	82	96,47%	3	3,53%	85	100%		
Low	53	91,38%	5	8,62%	58	100%	1,692	0,193
Total	135	94,41%	8	5,59%	143	100%		
Sense of Control								
High	86	92,47%	7	7,53%	93	100%		
Low	49	98,00%	1	2,00%	50	100%	1,8807	0,17
Total	135	94,41%	8	5,59%	143	100%		
Commitment								
High	65	98,48%	1	1,52%	66	100%		
Low	70	95,89%	3	4,11%	73	100%	69,8842	0
Moderate	0	0,00%	4	100,00%	4	100%		
Total	135	94,41%	8	5,59%	143	100%		

Source: Primary Data, 2024

Both procedural and metacognitive knowledge were found to have significant association with active incident reporting behavior. However, other factors such as psychological safety and sense of control did not demonstrate significant relationships with reporting behavior, as indicated by the p-value in the bivariate analysis. This suggests that in this study, these factors may not play a central role in influencing reporting behavior. In conclusion, employee commitment, awareness of organizational policies and resources, and knowledge are critical factors to consider when aiming to enhance incident reporting practices in the workplace.

Multivariate Analysis: Robust Regression Results

Robust regression analysis with Huber's M-estimation was employed to examine the factors influencing incident reporting behavior. The model demonstrated good fit with an R^2 value of 0.6935, indicating that approximately 69.35% of the variance in reporting behavior could be explained by the included factors.

These factors demonstrated t-values exceeding the critical t-table value of 1.656, confirming their statistical significance. Contrary to our hypotheses, group cohesiveness ($t = 0.1690$, $p > 0.05$), psychological safety ($t = -0.7744$, $p > 0.05$), and sense of control ($t = 0.5130$, $p > 0.05$) did not show significant effects on incident reporting behavior in this model.

Model Diagnostics

The use of robust regression techniques addressed potential issues with outliers and heteroscedasticity. Diagnostic plots (not shown here due to space constraints) confirmed the appropriateness of the model and the absence of significant violations of regression assumptions.

Table 4: Results of Partial t-Test Calculation on the Robust Regression Model with Huber Weighting

Variable	Coefficient	St. Error	t-value	t-table	Note
Leadership	0,0577	0,0257	2,2421	1,656	Significant
Policies and Resources	0,3357	0,0279	12,0238		Significant
Group Cohesiveness	0,0034	0,0203	0,169		Not Significant
Psychological Safety	-0,0195	0,0252	-0,7744		Not Significant
Knowledge	0,1226	0,0435	2,8175		Significant
Sense of Control	0,0144	0,0281	0,513		Not Significant
Commitment	0,0855	0,02	4,2705		Significant

Source: Primary Data, 2024

Summary of Hypothesis Testing

Based on these results, we can conclude that:

H1 (Leadership), H2 (Policies and Resources), H5 (Knowledge), and H7 (Commitment) are supported.

H3 (Group Cohesiveness), H4 (Psychological Safety), and H6 (Sense of Control) are not supported in this context. These findings highlight the complex nature of factors influencing incident reporting behavior in the studied hospital setting, with organizational factors (policies and resources, leadership) and individual factors (knowledge, commitment) playing significant roles.

DISCUSSIONS

This study examined the impact of organizational and individual factors on patient safety incident reporting behavior among nurses in an Indonesian public hospital, revealing a complex interplay of influences that both align with and challenge existing literature.

Organizational Factors and Their Implications

Our findings highlight the primacy of organizational factors in shaping incident reporting behavior. Policies and resources emerged as the strongest predictor ($\beta = 0.3357$, $t = 12.0238$, $p < 0.001$), underscoring the critical role of organizational infrastructure in facilitating incident reporting. This aligns with previous research (Archer et al., 2017; Dhamanti et al., 2019) and suggests that hospitals, particularly in developing countries, should prioritize the implementation of robust reporting policies and allocation of necessary resources.

Leadership also played a significant role, albeit with a smaller effect size ($\beta = 0.0577$, $t = 2.2421$, $p < 0.05$). This supports Bisbey et al.'s (2021) findings on the importance of leadership in shaping safety culture, while suggesting that in hierarchical healthcare systems, leadership's impact may be partially mediated through organizational policies and resources. Leaders might therefore be most effective by focusing on developing and supporting strong organizational systems and policies.

Interestingly, group cohesiveness did not show a significant effect, contrary to some previous studies (e.g., Mannion & Thompson, 2014). This unexpected result might be explained by the strong hierarchical structure often present in Indonesian hospitals, where individual relationships with authority figures might outweigh peer group dynamics in influencing behavior.

The findings suggest that individual relationships with authority figures may exert a more dominant influence on safety culture in hospitals with strong hierarchical structures. In the Indonesian context, where workplace culture often emphasizes respect for authority, decisions and behaviors related to incident reporting are likely shaped more by direct instructions from leadership than by peer group dynamics (Hofstede, 2001; Gelfand et al., 2017). This contrasts with findings from Western studies, where group cohesiveness has frequently been identified

as a significant factor in reporting behavior (Pronovost et al., 2006; Mannion & Thompson, 2014). Such differences highlight the importance of considering cultural and organizational contexts when examining the factors influencing incident reporting (Scott et al., 2019). Therefore, interventions aimed at strengthening safety culture in Indonesian hospitals may need to focus more on improving vertical relationships between staff and leadership, in addition to fostering group cohesiveness within teams (Archer et al., 2017).

Individual Factors and Their Significance

Among individual factors, knowledge ($\beta = 0.1226$, $t = 2.8175$, $p < 0.05$) and organizational commitment ($\beta = 0.0855$, $t = 4.2705$, $p < 0.001$) emerged as significant predictors of reporting behavior. These findings underscore the importance of education and training programs in improving incident reporting, aligning with Bagenal et al. (2016), and suggest that fostering organizational commitment could be an effective strategy for improving reporting practices (Hamed & Konstantinidis, 2022). In the Indonesian context, where formal training on patient safety and incident reporting may be limited, especially in remote areas, the significant impact of knowledge becomes particularly relevant.

Surprisingly, psychological safety and sense of control did not show significant effects, contrasting with several previous studies (e.g., Appelbaum et al., 2016; Y. H. Lee et al., 2015). This unexpected finding warrants further investigation. The lack of significant effects for these factors in our Indonesian sample suggests that the determinants of reporting behavior may vary across cultural and organizational settings. The Indonesian healthcare system, characterized by a mix of public and private providers with strong hierarchical structures (Mahendradhata et al., 2017), may influence how healthcare professionals perceive and respond to patient safety initiatives.

Future research should examine how cultural dimensions, such as power distance and collectivism (Hofstede et al., 2010), and organizational characteristics specific to Indonesian healthcare institutions might moderate the relationship between psychological safety, sense of control, and reporting behavior. Additionally, the strong influence of knowledge and organizational commitment found in our study might overshadow the effects of psychological safety and sense of control, underscoring the need for more comprehensive models that account for potential interactions between individual, organizational, and cultural factors in shaping incident reporting practices (Pfeiffer et al., 2013).

The significance of knowledge and organizational commitment in shaping reporting behavior suggests that interventions aimed at improving patient safety should prioritize both educational and cultural dimensions. In settings where formal training on patient safety is limited, as in parts of Indonesia, targeted education programs are essential to equip healthcare workers with the necessary skills and understanding of reporting protocols (Ginsburg et al., 2010). Furthermore, the emphasis on organizational commitment reflects the cultural context of Indonesian healthcare, where loyalty and adherence to hierarchical structures play a crucial role (Hofstede et al., 2010). Strengthening this commitment, through recognition of reporting efforts or greater involvement in decision-making, could foster a deeper engagement with safety practices, leading to more consistent reporting behaviors (Pfeiffer et al., 2013). Therefore, addressing both knowledge gaps and organizational loyalty is vital for improving incident reporting systems in developing healthcare environments.

Theoretical Implications and Contributions

The findings of this study contribute to the ongoing debate regarding the universality of behavioral theories, particularly within safety culture frameworks, across diverse cultural settings. While Reason's (1997) organizational safety culture theory emphasizes psychological elements—such as communication, trust, and employee perceptions—as key drivers of safety behavior, the strong influence of structural factors observed in this study suggests that the foundations of safety culture may vary significantly in resource-constrained environments. Specifically, in developing countries, structural elements such as the availability of resources, clear policies, and leadership support appear to play a more central role in shaping incident reporting behavior.

This finding challenges the assumption of the universality of safety culture models, particularly those developed in Western, resource-rich contexts, and aligns with broader critiques in the literature regarding the applicability of behavioral theories, such as the theory of planned behavior (Ajzen, 1991), across diverse cultural and economic contexts. The study highlights the need for contextual adaptation of these theories, as organizations in developing countries may face distinct challenges that necessitate a greater emphasis on structural rather than psychological factors to foster an effective safety culture. Consequently, this research calls for a reconsideration of how safety culture models are applied in different regions, suggesting that tailored approaches may be required to better address the unique conditions present in resource-limited settings. This insight not only advances the theoretical understanding of safety culture but also provides practical implications for hospital administrators and policymakers in developing countries, where structural enablers may be prioritized over psychological factors to improve patient safety outcomes.

Practical Implications for Hospitals in Developing Countries

Based on our findings of this study, several key strategies are recommended to improve incident reporting practices within hospitals in developing country. First, hospitals should prioritize the development of clear and accessible reporting policies, coupled with the allocation of adequate resources to support these systems. Ensuring that staff have the necessary tools and guidelines will help facilitate a more effective reporting culture. Leadership also plays a pivotal role in shaping safety systems, and thus, leadership training programs should be enhanced to focus on developing leaders who can effectively foster a supportive safety culture.

In addition to leadership, comprehensive education and training programs should be developed. These programs should address both procedural and metacognitive aspects of patient safety and incident reporting, ensuring that staff are not only knowledgeable about the processes but also equipped with the critical thinking skills needed for effective reporting. Moreover, fostering a strong sense of organizational commitment among nursing staff is essential. This can be achieved by involving nurses more actively in safety initiatives and recognizing their efforts in reporting, which could increase their engagement and commitment to patient safety practices.

Finally, hospitals in hierarchical settings may need to consider alternative approaches to encourage reporting, such as implementing anonymous reporting systems and establishing clear protection policies for those who report incidents. These strategies recognize the hierarchical nature of many healthcare environments and aim to create a safer, more open environment for reporting, thus addressing common barriers in reporting behavior.

Implications for Global Patient Safety Initiatives

Our findings have significant implications for global patient safety initiatives, particularly those led by organizations like the World Health Organization. They underscore the need for safety improvement strategies tailored to the specific challenges of developing countries, rather than direct transplantation of Western models. Priority should be given to establishing basic safety infrastructure in resource-limited settings, and core concepts like 'psychological safety' may need adaptation to fit within existing cultural and organizational structures.

In conclusion, this study significantly contributes to our understanding of patient safety incident reporting in developing country contexts. By highlighting the primacy of structural and knowledge-based factors over psychological elements typically emphasized in Western literature, it provides a foundation for more effective, contextually appropriate interventions to improve patient safety in resource-constrained healthcare settings. Future research should focus on longitudinal and multi-site studies to further explore these dynamics across different healthcare settings and cultural contexts.

CONCLUSION

This study provides a comprehensive examination of factors influencing patient safety incident reporting behavior among nurses in an Indonesian public hospital, offering valuable insights into the complex dynamics of safety culture in a developing country context. Previous research has shown that organizational factors, particularly policies and resources, are crucial in shaping

reporting behavior in healthcare settings (Sexton et al., 2006). Our findings reaffirm this, underscoring the need for robust institutional support and infrastructure to foster a culture of safety in resource-constrained environments, where effective reporting mechanisms may be lacking (Squires et al., 2010).

The significant role of leadership, albeit with a smaller effect size than policies and resources, highlights the importance of management in cultivating safety practices. However, the impact of leadership appears to be more indirect in hierarchical healthcare systems, primarily influencing reporting behavior through the shaping of organizational policies and resource allocation. This supports earlier studies that emphasize the indirect influence of leadership on patient safety culture, especially through resource management and staff engagement (Manser, 2009).

Among individual factors, knowledge and commitment emerged as significant predictors of reporting behavior. This emphasizes the value of education and organizational allegiance in promoting patient safety practices. Interestingly, factors such as psychological safety, sense of control, and group cohesiveness did not show significant effects on reporting behavior in this context, challenging some assumptions derived from Western-centric models of safety culture (Pronovost et al., 2006). These findings suggest that safety culture frameworks may need to be adapted for different cultural and organizational settings, particularly in developing countries where the dynamics of incident reporting may differ significantly from high-income contexts.

Our research contributes to the growing body of literature on patient safety in several key ways. First, it provides empirical evidence from a developing country context, addressing a significant gap in the literature which has predominantly focused on Western healthcare settings. Second, the use of robust regression analysis offers a methodologically rigorous approach to examining these relationships, accounting for the complexities often present in healthcare data. Finally, our findings highlight the need for context-specific models of safety culture, as factors traditionally emphasized in Western literature may not have the same impact in different cultural and organizational contexts. Context-specific models of safety culture would consider unique factors such as local leadership structures, resource constraints, and cultural perceptions of authority and accountability. In developing countries, for example, hierarchical relationships and limited resources may influence safety behaviors in ways that are distinct from high-income settings. Such models would need to incorporate these elements to ensure relevance and effectiveness in improving patient safety outcomes.

Based on these findings, we recommend prioritizing the development and implementation of clear, accessible reporting policies and systems, ensuring adequate resources are allocated to support these initiatives. Leadership training programs should focus on how leaders can effectively shape and support safety systems and cultures. Comprehensive education and training programs addressing both procedural and metacognitive aspects of patient safety and incident reporting are crucial. Additionally, strategies to foster organizational commitment among nursing staff should be implemented, potentially through increased involvement in safety initiatives and recognition of reporting efforts.

Limitations and further research directions

While this study provides important insights, it is important to note that the research was intentionally conducted as a case study within a single Indonesian public hospital, allowing for an in-depth exploration of incident reporting behaviors in this specific context. Future studies should consider a multi-site approach across various healthcare settings in developing countries to enhance the understanding of incident reporting behaviors in diverse contexts. Longitudinal studies are needed to examine how these factors influence reporting behavior over time and to establish causal relationships. Multi-site studies across different healthcare settings in Indonesia and other developing countries would enhance the generalizability of these findings. In-depth qualitative studies could explore the reasons behind the unexpected findings, particularly regarding psychological safety and group cohesiveness. Finally, investigations into how cultural factors specific to Indonesia or Southeast Asia may influence safety culture and reporting behaviors would provide valuable insights for tailoring interventions to specific contexts.

In conclusion, this study highlights the complex interplay of factors influencing incident reporting behavior in an Indonesian public hospital. By emphasizing the importance of organizational support, knowledge, and commitment, it provides a foundation for developing targeted interventions to enhance patient safety practices. As healthcare systems in developing countries continue to evolve, such context-specific research will be crucial in shaping effective, culturally appropriate strategies for improving patient safety.

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