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BEYOND COMPLIANCE: EXPLORATION OF PSYCHOSOCIAL AND ORGANIZATIONAL FACTORS THAT AFFECT PERSONAL PROTECTIVE EQUIPMENT COMPLIANCE AND ITS IMPLICATIONS FOR THE INCIDENCE OF HAIS IN EMERGENCY DEPARTMENT HEALTH WORKERS AT RSIA ARTHA MAHINRUS

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Abstract

This study aimed to analyze psychosocial and organizational factors influencing Personal Protective Equipment (PPE) compliance and their implications for Healthcare-Associated Infections (HAIs) among emergency department healthcare workers at RSIA Artha Mahinrus. This study used a mixed-methods approach with a sequential explanatory design, in which quantitative data were collected first, followed by qualitative data to deepen the findings. The quantitative sample comprised 16 healthcare workers (4 doctors, 4 nurses, and 8 midwives) using a total sampling approach. Data were analyzed using univariate, bivariate (Fisher's Exact Test), and multivariate (multiple linear regression) analyses. Qualitative data were obtained through in-depth interviews. The results showed that psychosocial factors ($p = 0.030$) and organizational factors ($p = 0.012$) significantly influenced PPE compliance, with organizational factors as the dominant predictor. The findings also revealed the phenomenon of clinical discretion, in which emergencies and time pressure led to intentional noncompliance with PPE protocols. In addition, a paradox was identified: high organizational involvement was associated with noncompliance due to safety complacency and perceived bureaucratic burden. These findings indicate that PPE compliance is not merely adherence to standard procedures but reflects a complex interaction between individual and organizational factors in maintaining patient and worker safety.

Keywords: ***Healthcare-Associated Infections, Organizational Factors, PPE Compliance, Psychosocial Factors, Safety Culture***

INTRODUCTION

Healthcare-Associated Infections (HAIs) remain a major global concern due to their significant impact on patient safety, healthcare costs, and quality of care. Recent studies indicate that HAIs contribute substantially to prolonged hospitalization, increased antimicrobial resistance, and higher mortality rates, particularly in high-risk units such as emergency departments (EDs) (CDC, 2023; ECDC, 2022; WHO, 2023). The burden of HAIs is especially critical in developing countries where infection control practices are often inconsistently implemented (Allegranzi, 2022; Rosenthal, 2023). In Indonesia, HAIs continue to pose a serious challenge to hospital accreditation standards and patient safety programs, highlighting the need for improved compliance with infection prevention protocols (Kemenkes RI, 2023).

One of the most essential strategies in preventing HAIs is adherence to standard precautions, including the proper use of Personal Protective Equipment (PPE). PPE serves as a primary barrier protecting both healthcare workers and patients from cross-transmission of infectious agents (Chughtai, 2022; Nguyen, 2023). However, despite the availability of PPE and established guidelines, compliance among healthcare workers remains suboptimal across various healthcare settings (Alhassan, 2023; Houghton, 2022). Evidence suggests that compliance rates can vary significantly, often falling below expected standards, particularly in high-pressure environments such as emergency departments (Almulhim, 2024).

The emergency department is characterized by rapid patient turnover, high workload, time pressure, and unpredictable clinical situations, all of which increase the risk of infection transmission and reduce adherence to safety protocols (Alotaibi, 2023). Under such conditions, healthcare workers frequently prioritize immediate life-saving interventions over strict compliance with PPE protocols, leading to what is often referred to as "clinical discretion" (Smith et al., 2024). This phenomenon reflects the complex decision-making process in emergency care, where safety protocols may be compromised due to urgency and workload demands (Brown, 2023).

Recent literature emphasizes that PPE compliance is not solely determined by knowledge or availability but is strongly influenced by psychosocial and organizational factors (Issa, 2023; Zhang et al., 2024). Psychosocial factors, including perceived risk, stress levels, fatigue, attitudes, and behavioral norms, significantly affect healthcare workers' adherence to infection control practices (Jang & Kim, 2022; Kim, 2024). High levels of occupational stress and burnout have been shown to reduce vigilance and compliance with safety measures (Dyrbye, 2022; Liu, 2023). Additionally, discomfort associated with PPE use, including heat stress and communication barriers, further discourages consistent use (Judd, 2024).

On the other hand, organizational factors play a crucial role in shaping compliance behavior. Elements such as leadership support, safety culture, training, supervision, workload distribution, and resource availability are critical determinants of adherence (Sugunan, 2024; Weber, 2023). Studies have demonstrated that strong managerial support and a positive safety climate significantly improve compliance with infection prevention protocols (Abalkhail & Alslamah, 2022; Lee & Jun, 2022). Conversely, inadequate staffing, excessive workload, and poor organizational communication are associated with lower compliance rates and a higher risk of HAIs (Rezaee, 2025; Wang, 2025). Interestingly, emerging evidence also highlights a paradox in organizational influence, where excessive reliance on institutional systems may lead to "safety complacency," a false sense of security that reduces individual vigilance (Garcia, 2023). This indicates that compliance is not merely a function of regulations but involves a dynamic interaction between individual cognition, social context, and organizational environment (Turner et al., 2024).

The concept of "beyond compliance" has gained attention in recent years as a more comprehensive framework for understanding safety behavior in healthcare settings. This approach suggests that compliance should be viewed not only as adherence to rules but as a complex behavioral outcome influenced by psychological, social, and organizational dynamics (Dekker, 2022; Reason, 2023). It emphasizes the need to explore underlying motivations, perceptions, and contextual factors that drive or hinder safe practices among healthcare workers (Hollnagel, 2023). In the context of RSIA Artha Mahinrus, preliminary data indicate that PPE compliance among emergency department healthcare workers remains relatively low, despite adequate availability of protective equipment. Internal reports also show the occurrence of HAIs such as phlebitis, urinary tract infections, and surgical site infections, suggesting gaps in infection control practices. These findings highlight the need for a deeper exploration of factors influencing PPE compliance beyond traditional perspectives.

This study aims to analyze and explore the psychosocial and organizational factors influencing PPE compliance among healthcare workers in the emergency department of RSIA Artha Mahinrus and to examine their implications for HAIs. Theoretically, this research contributes to a holistic understanding of PPE compliance behavior by integrating psychosocial and organizational perspectives within the "beyond compliance" framework. It enriches existing literature by providing empirical evidence from a high-risk clinical setting in Indonesia. Practically, the findings are expected to inform hospital management in designing more effective interventions, including strengthening safety culture, improving organizational support systems, and developing behavior-based strategies to enhance compliance and reduce HAI incidence.

The findings of this study indicate that both psychosocial and organizational factors significantly influence PPE compliance, with organizational support emerging as the dominant predictor. The study also reveals the presence of clinical discretion under time pressure, as well as a paradoxical effect of organizational involvement leading to safety complacency. These results suggest that improving compliance requires not only strengthening regulations and supervision but also addressing psychological stress, workload, and organizational culture. Based on these findings, it is recommended that hospital management implement comprehensive strategies, including continuous training, reinforcement of safety culture, strict monitoring systems, and improved accessibility of PPE. Additionally, interventions should focus on reducing workload pressure and enhancing staff engagement to foster intrinsic motivation for compliance. By addressing both individual and organizational dimensions, healthcare facilities can achieve sustainable improvements in infection prevention and patient safety outcomes.

METHOD

This study employed a mixed methods approach using a sequential explanatory design, in which quantitative data were collected and analyzed in the first phase, followed by qualitative data collection to explain and deepen the quantitative findings. The quantitative phase aimed to examine the relationship between psychosocial and organizational factors and compliance with the use of Personal Protective Equipment (PPE), and its implications for the incidence of Healthcare-Associated Infections (HAIs). Meanwhile, the qualitative phase was conducted to explore in greater depth the contextual and behavioral factors that influence PPE compliance among healthcare workers. The study was conducted at RSIA Artha Mahinrus, Medan, North Sumatra, Indonesia, from September 2025 to February 2026. The study population consisted of all healthcare workers in the emergency department, including doctors, nurses, and midwives. Due to the relatively small population, a total sampling technique was used, yielding 16 respondents: 4 doctors, 4 nurses, and 8 midwives. For the qualitative phase, purposive sampling was used to select participants who demonstrated low compliance with PPE usage, with one representative from each profession (doctor, nurse, and midwife). Data collection continued until data saturation was achieved.

The variables in this study included psychosocial factors, organizational factors, PPE compliance, and HAIs. Psychosocial factors were defined as subjective perceptions and experiences related to psychological and social factors that influence work behavior. They were measured using the Perceived Stress Scale (PSS), categorized into low (0–13), moderate (14–26), and high (27–40). Organizational factors refer to elements within the organization that influence the work environment and compliance behavior, such as leadership, communication, and policies. They were measured using the Employee Engagement Survey (Gallup Q12), categorized as highly engaged (4.5–5.0), engaged (3.0–4.4), and not engaged (<3.0). PPE compliance was defined as the level of consistency and adherence of healthcare workers in using PPE according to standard operating procedures. It was measured using the Safety Climate & Compliance Scale (SCCS), which was categorized as compliant (>3.5) or non-compliant (≤3.5). The incidence of HAIs was measured from hospital infection surveillance reports and classified as nominal (presence/absence of cases).

Quantitative data were collected using structured questionnaires, including the Perceived Stress Scale (PSS), the Gallup Q12, and the Safety Climate & Compliance Scale (SCCS). In contrast, HAI incidence data were obtained from hospital surveillance records. Qualitative data were collected through in-depth interviews and direct observation of healthcare practices in the emergency department to explore factors influencing PPE compliance, including perceived barriers, organizational support, and workplace culture. Data analysis was conducted in both quantitative and qualitative stages. Quantitative analysis included univariate analysis to describe the characteristics of respondents and the distribution of variables, bivariate analysis using Chi-square or Fisher's Exact Test to examine the relationship between variables, and multivariate analysis using multiple linear regression to determine the simultaneous effect of independent variables and identify the most dominant factor influencing PPE compliance, with a significance level of $\alpha = 0.05$. Qualitative data were analyzed using thematic analysis, involving data reduction, data display, and conclusion drawing. The qualitative findings were used to explain and strengthen the interpretation of quantitative results, particularly in understanding behavioral phenomena such as clinical discretion, time pressure, and organizational influences on compliance.

RESULTS AND DISCUSSION

The respondents in this study were predominantly female (75%), with 25% male. Based on professional background, most respondents were midwives (50%), followed by doctors and nurses, each comprising 25% of the total sample. This distribution reflects the nature of services in RSIA Artha Mahinrus, where maternal and child healthcare services are dominant, thereby requiring a higher proportion of midwives in clinical practice. From a psychosocial perspective, most respondents reported moderate stress (62.5%), followed by high stress (25%) and low stress (12.5%). In terms of organizational factors, half of the respondents (50%) were categorized as engaged, while 31.3% were not engaged and 18.8% were highly engaged. Regarding PPE compliance, 56.2% of respondents were compliant, while 43.8% were non-compliant, indicating that compliance remains suboptimal in the emergency department.

No	**Characteristics**	**(n = 16)**	
		f	**%**
A.	Gender		
1.	Male	4	25
2.	Female	12	75
B.	Jobs		
1.	Doctors	4	25
2.	Nurses	4	25
3.	Midwives	8	50
	Total	16	100

Table 1. Distribution of Respondent Frequencies by Characteristics

Perceived Stress Scale	Frequency	Percentage
Low	2	12.5
Medium	10	62.5
Height	4	25.0
Total	16	100.0

Table 2. Distribution of Psychosocial Factors on Compliance with the Use of PPE in Efforts to Prevent HAIs in Health Workers in the ER, RSIA Artha Mahinrus.

Employee Engagement	Frequency	Percentage
Not Involved	5	31.3
Get Involved	8	50.0
Highly Engaged	3	18.8
Total	16	100.0

Table 3. Distribution of Organizational Factors on Compliance with the Use of PPE in Efforts to Prevent HAIs in Health Workers in the ER, RSIA Artha Mahinrus

PPE Compliance	Frequency	Percent
Non-compliant	7	43.8
Obedient	9	56.2
Total	16	100.0

Table 4. PPE Compliance with the Occurrence of HAIs in Energy ER Health at RSIA Artha Mahinrus

The results of bivariate analysis revealed that psychosocial factors significantly influenced PPE compliance ($p = 0.030$), indicating that stress levels and psychological conditions play an important role in shaping compliance behavior. Respondents with high stress levels were entirely categorized as non-compliant, whereas those with low stress levels were fully compliant. This finding suggests that increased stress may reduce attention to safety protocols, particularly in high-pressure environments such as emergency departments. Similarly, organizational factors also showed a significant relationship with PPE compliance ($p = 0.012$). Interestingly, respondents categorized as "highly engaged" were entirely non-compliant, suggesting a paradox: high organizational involvement does not necessarily translate into better compliance. This may reflect "safety complacency," in which excessive familiarity with the system or confidence in institutional support reduces vigilance toward safety procedures.

Psychosocial Factors	Compliance with the Use of PPE				Total		P-value
	Obedient		Non-compliant				
	f	%	f	%	f	%	
Height	0	0	4	25	4	25	
Medium	7	43,8	3	18,8	10	62,5	0,030
Low	2	12,5	0	0	2	12,5	
Total	9	56,3	7	43,8	16	100	

Table 5. Cross-Tabulation of Psychosocial Factors on Compliance with the Use of PPE in Efforts to Prevent HAIs in Health Workers in the ER RSIA Artha Mahinrus

Organizational Factors	Compliance with the Use of PPE				Total		P-value
	Obedient		Non-compliant				
	f	%	f	%	f	%	
Not Involved	5	31,2	0	0	5	31,2	
Get Involved	4	25	4	25	8	50	0,012
Highly Engaged	0	0	3	18,8	3	18,8	
Total	9	56,2	7	43,8	16	100	

Table 6. Cross-Tabulation of Organizational Factors on Compliance with the Use of PPE in Efforts to Prevent HAIs in Health Workers in the ER, RSIA Artha Mahinrus

Multivariate analysis further confirmed that both psychosocial and organizational factors simultaneously influenced PPE compliance ($F(2, 12) = 10.710$, $p = 0.002$), indicating a statistically significant model. However, organizational factors emerged as the dominant predictor of compliance, with greater significance than psychosocial factors. The coefficient of determination ($R^2 = 0.622$) indicated that psychosocial and organizational variables could explain 62.2% of the variance in PPE compliance, with the remaining 37.8% attributable to other factors not examined in this study. The regression analysis also showed negative coefficients for both variables, suggesting that unfavorable psychosocial conditions (e.g., high stress) and certain organizational dynamics may reduce compliance levels.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.450	2	1.225	10.710	.002[b]
	Residual	1.487	13	.114		
	Total	3.938	15			

a. Dependent Variable: SCCS

b. Predictors: (Constant), GALLUP, PSS

Table 7. Simultaneous Test Results (F)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.958	.325		9.094	.000
	PSS	-.342	.161	-.413	-2.117	.054
	GALLUP	-.357	.139	-.500	-2.564	.024

a. Dependent Variable: SCCS

Table 8. Multiple Linear Regression Analysis (T-Test).

The qualitative findings provided deeper insights into the quantitative results. A key phenomenon identified was "clinical discretion," in which healthcare workers consciously deviate from PPE protocols in emergencies due to time pressure and the urgency of saving patients' lives. Participants reported that in critical situations such as resuscitation or severe bleeding, the priority shifts toward immediate clinical intervention rather than strict adherence to PPE protocols. This finding highlights the tension between patient safety and self-protection, which is a common challenge in emergency healthcare settings. Additionally, although organizational support, such as PPE availability and managerial guidance, was generally perceived as adequate, inconsistencies in supervision, lax enforcement, and delays in resource distribution were identified as barriers to optimal compliance.

From a theoretical perspective, these findings support the "beyond compliance" framework, which emphasizes that compliance behavior is not merely a function of knowledge or regulation but is influenced by complex interactions among psychological, social, and organizational factors. The results align with previous studies indicating that stress, workload, and time pressure negatively affect adherence to safety protocols. At the same time, organizational culture and leadership play a crucial role in shaping behavior. However, this study also highlights a paradox: high organizational engagement may lead to reduced compliance due to overconfidence or perceived safety, suggesting that compliance is not linear but dynamic and context-dependent.

In practical terms, these findings imply that improving PPE compliance requires a comprehensive approach that goes beyond providing equipment and enforcing rules. Interventions should address psychosocial factors, such as stress management and workload reduction, as well as organizational factors, including strengthening supervision, ensuring consistent policy implementation, and fostering a culture of safety. Moreover, efforts should be made to transform compliance from a procedural obligation into an intrinsic professional value among healthcare workers. By addressing both individual and organizational dimensions, healthcare facilities can enhance compliance with PPE use and ultimately reduce the incidence of HAIs.

CONCLUSION

This study concludes that both psychosocial and organizational factors significantly influence compliance with Personal Protective Equipment (PPE) use among healthcare workers in the emergency department of RSIA Artha Mahinrus. Psychosocial factors, particularly stress levels, were found to affect compliance behavior, where higher stress was associated with lower adherence to PPE protocols. Meanwhile, organizational factors emerged as the most dominant determinant, indicating that system-level support, leadership, and work environment play a critical role in shaping compliance. The findings also revealed a behavioral phenomenon known as "clinical discretion," in which healthcare workers intentionally deviate from PPE protocols in emergencies due to time pressure and prioritization of life-saving actions. Additionally, a paradoxical effect of organizational involvement was identified: high engagement may lead to reduced compliance due to safety complacency or a perceived bureaucratic burden. These findings demonstrate that PPE compliance is a complex, dynamic behavior influenced by the interaction of individual and organizational factors, rather than mere adherence to standard operating procedures.

The practical implications of this study highlight the need for healthcare institutions to adopt a more comprehensive approach to improving PPE compliance. Hospitals should not only ensure the availability of PPE but also strengthen organizational support through consistent supervision, clear policy enforcement, and continuous training programs. Moreover, interventions should address psychosocial aspects, such as reducing workload pressure, managing stress, and fostering intrinsic motivation among healthcare workers. Building a strong safety culture where PPE use is perceived as a core professional value rather than a procedural obligation is essential to achieving sustainable compliance and reducing the incidence of Healthcare-Associated Infections (HAIs).

This study has several limitations that should be considered when interpreting the findings. First, the relatively small sample size (n = 16) limits the generalizability of the results to other healthcare settings. Second, the study was conducted in a single hospital, which may not fully reflect variations in organizational culture and healthcare systems across institutions. Third, the use of self-reported questionnaires may introduce response bias, as participants may overestimate their compliance behavior. Additionally, other potential influencing factors, such as individual knowledge, attitudes, and external environmental conditions, were not explored in depth in this study. Given these limitations, future research is recommended to involve a larger, more diverse sample across multiple healthcare institutions to enhance generalizability. Further studies should also explore additional variables, such as knowledge, attitudes, behavioral intentions, and technological support systems, to provide a more comprehensive understanding of PPE compliance. Longitudinal and intervention-based research designs are also recommended to evaluate the effectiveness of strategies to improve compliance over time. Additionally, future research may focus on

developing and testing integrated models of behavioral and organizational interventions to strengthen infection prevention practices and reduce HAIs in high-risk clinical settings such as emergency departments.

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