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A PRELIMINARY STUDY EXPLORING THE INFLUENCE OF MANAGEMENT COMMITMENT, RISK MANAGEMENT, WORKER INVOLVEMENT, SAFETY COMMUNICATION, AND SAFETY RESOURCES ON SAFETY PERFORMANCE AMONG DISTRICT HEALTH OFFICES (DHOS) STAFF IN MALAYSIA

Noor Arzahan IS*

Department of Human Resource Management, School of Business Management,

College of Business, Universiti Utara Malaysia, 06010 UUM Sintok, Kedah, Malaysia

Abstract: Ensuring workplace safety is a crucial aspect of healthcare management, particularly for DHOs staff, who are exposed to various occupational risks. This study examines the relationships between management commitment, risk management, worker involvement, safety communication, safety resources, and safety performance in Malaysian DHOs. A preliminary study was conducted using a PLS-SEM to analyze survey data from respondents (n =105). The findings indicate that worker involvement and safety resources significantly enhance safety performance, while risk management and safety communication show weaker or marginal effects. Management commitment showed no direct effect but influenced safety performance indirectly through other variables. The model explained 48.3% of the variance in safety performance (R^2 = 0.483), emphasizing the critical role of leaders involvement, proactive worker engagement, and resource availability in workplace safety outcomes. The study highlights the need for enhanced safety strategies, participatory risk management practices, and structured safety communication to further improve safety performance in healthcare settings. These insights offer valuable guidance for policymakers and healthcare administrators aiming to strengthen safety culture, particularly within District Health Offices.

Keywords: occupational safety, safety performance, healthcare services, Malaysia, PLS-SEM

Introduction

Occupational injuries and diseases remain a critical global concern, particularly in healthcare settings where workers face multiple hazards daily. In 2023, Malaysia has recorded a 13.8% increase in occupational injury cases compared to the previous year, reaching 38,950 incidents (Department of Statistics Malaysia, 2024). The healthcare sector injuries have seen a worrying rise, reflecting suboptimal safety performance across multiple roles. A review of occupational disease trends between 2016 and 2021 identified hospitals and healthcare facilities as the main settings for reported occupational diseases, underscoring ongoing gaps in safety practices and performance (Awaluddin et al., 2023). DHOs play a crucial role in Malaysia's healthcare delivery and public health programs, employing a diverse workforce including environmental health officers, vector control workers, and

*Corresponding Author's Email: *intansuraya@uum.edu.my

frontline staff responsible for community health initiatives. However, studies have highlighted that these staff are particularly vulnerable to specific occupational hazards that compromise their safety performance. Recent studies on vector control workers in DHOs have revealed high rates of noise-induced hearing loss, with 45.5% prevalence among exposed workers and a 12.8 times higher risk linked to prolonged noise exposure and chemical hazards from fogging equipment (Kamarudin et al., 2022). These data highlight significant gaps in safety practices and performance in DHOs, suggesting an urgent need to understand how organizational factors such as management commitment, risk management, worker involvement, safety communication, and safety resources influence safety performance.

Safety performance in healthcare settings is influenced by a combination of leadership commitment, risk management, communication and safety resources (Al-Bsheish et al., 2022; Noor Arzahan et al., 2022; Saleem & Malik, 2022). Research has established that management's dedication to safety significantly impacts workplace culture, risk mitigation, and compliance with safety regulations. Additionally, effective risk management enhances workplace safety by systematically identifying and addressing potential hazards before they escalate into serious incidents. Communication and resource availability are also fundamental in shaping workplace safety. Safety communication ensures that employees are well-informed about protocols, emergency procedures, and best practices, thereby reducing the likelihood of errors. Adequate safety resources, including training programs and protective equipment, further contribute to adherence to safety standards and risk reduction.

This study aims to comprehensively examine the factors influencing safety performance among DHOs staff in Malaysia. Despite the growing body of research on workplace safety, there remains a gap in understanding how these factors interact to influence safety performance in DHOs. While studies have explored individual aspects such as management commitment and risk management, few have examined their combined and interrelated effects within a healthcare administrative context using a robust statistical modeling approach. Moreover, there is limited empirical evidence specifically focusing on District Health Offices, which play a crucial role in community healthcare but are often underrepresented in safety performance research. To address this gap, this study applies Partial Least Squares Structural Equation Modeling (PLS-SEM) to assess the relationships among management commitment, risk management, worker involvement, safety communication, safety resources, and their impact on safety performance among DHOs staff in Malaysia.

Objectives

1. To examine the effect of management commitment, risk management, worker involvement, safety communication, and safety resources on safety performance among District Health Offices (DHOs) staff in Malaysia.
2. To apply Partial Least Squares Structural Equation Modelling (PLS-SEM) to analyze the interrelationships among these organizational factors and their combined effect on safety performance.

Literature Review

Occupational safety performance in healthcare organizations is shaped by several organizational factors, including management commitment, risk management, worker involvement, safety communication, and the provision of safety resources (Noor Arzahan et al., 2022). These elements are well documented in prior studies as influential drivers of safety behavior and compliance, particularly in (Kalteh et al., 2021). However, their application within healthcare services like District Health Offices (DHOs) is comparatively underexplored. Drawing on the Social Exchange Theory (Homans, 1958a), this study posits that when employees perceive organizational support such as leadership commitment, access to resources, and open communication, they are more likely to reciprocate with positive safety behaviors, including compliance and participation in safety initiatives. SET thus provides a suitable theoretical foundation to explain the mechanisms through which organizational inputs are exchanged for employee commitment to safety performance.

While previous studies have examined the individual effects of these factors, few have explored their combined and interrelated influence on safety performance within the healthcare sector. Moreover, there is a limited body of research employing robust multivariate analysis techniques such as Structural Equation Modeling (SEM) to investigate these relationships. Most healthcare safety studies have relied on descriptive statistics or multiple regression, which may not adequately capture the complexity of interdependent safety factors (Akwaowo et al., 2022; Ali et al., 2025; Kim et al., 2024; Lu et al., 2024; Zaheer et al., 2021) despite the highlights regarding suitability of Partial Least Squares Structural Equation Modeling (PLS-SEM) for exploratory models involving small to medium sample sizes, complex constructs, and predictive frameworks (Hair Jr et al., 2021). Although PLS-SEM has been increasingly applied in industrial and construction safety research, its adoption in healthcare occupational safety remains minimal (Aghimien et al., 2024; Alhammadi et al., 2024; Ofori et al., 2023; Oni et al., 2024). This gap highlights the need for studies that not only examine safety determinants comprehensively but also apply advanced modeling techniques in underrepresented healthcare contexts such as Malaysian DHOs. By addressing these gaps, the present study contributes both theoretically and methodologically to the occupational safety literature in healthcare.

Materials and Methods

Instrument development and validation

The instrument was developed through a structured process to ensure validity and reliability before its implementation in the main study. The development stages included initial item construction, content validity assessment through expert evaluation, modification of items, determination of measurement scales, pilot study testing, reliability analysis, and final review of all components. The questionnaire was structured into three major sections: Section A: Captured respondents' background and demographic information, including job title, years of work experience, age, gender, and incident history in the workplace. Section B: Focused on safety-related factors, including management commitment, risk management, worker involvement, safety communication, and safety resources. Respondents rated their perceptions using a Likert scale. Section C: Assessed perceptions of how these safety factors influence overall safety performance in their workplace.

The questionnaire was adapted from validated safety research instruments and utilized a Likert-scale format, ranging from 1 (strongly disagree) to 5 (strongly agree). The constructs measured in the study included 50 items to assess management commitment, risk management, worker involvement, safety communication, safety resources, and safety performance. Management commitment (MC) assessed leadership dedication to safety policies and enforcement, while risk management (RM) focused on the identification and mitigation of workplace hazards. Worker involvement (WI) measured the extent of employee participation in safety initiatives and decision-making processes. Safety communication (SC) examined the effectiveness of safety-related information dissemination within the workplace. Safety resources (SR) evaluated the availability of safety tools, training programs, and protective measures provided to employees. Lastly, safety performance (SP) assessed compliance with safety standards and the effectiveness of measures taken to prevent workplace incidents.

Data Collection and Analysis

This study employed a non-probability purposive sampling strategy, targeting safety personnel and upper management staff within DHOs across Malaysia. The selection criteria focused on individuals who were directly involved in organizing, implementing, or overseeing workplace safety practices. This approach was chosen to ensure that responses came from knowledgeable participants with relevant safety oversight experience. The questionnaire was sent together with a cover letter describing the study and the respondent's criteria to each of these organizations via their email address, where it is available on the institution's website, and WhatsApp® medium to send the google form link with the consent from each of their top management. The email includes a cover letter inviting upper management personnel or safety person in charge of the organization that leads or organizes all safety practices to participate. The researcher informed every respondent that this was a preliminary study (Oppenheim,

1992). Also, they were encouraged to give any feedback, including problems that they might encounter while completing the survey. Respondents also were encouraged to add any additional comments about the questionnaire. A follow-up call is made to inform the respondents regarding the due date to complete the questionnaire submission. Data was then analyzed using PLS-SEM via SmartPLS 4.0. The measurement model was assessed for reliability and validity, while the structural model was evaluated using path coefficients, R^2 values, and effect sizes (f^2). Bootstrapping with 5,000 resamples was conducted to test the statistical significance of relationships.

Results

Demographic of respondents

Table1: Demographic data of the respondents

Demographic variable	Frequency (n=105)	Percentage (%)
Location of working		
North Zone/ *Zon Utara*	36	34.3
East Coast Zone/ *Zon Timur*	18	17.1
Central Zone/ *Zon Tengah*	25	23.8
South Zone/ *Zon Selatan*	22	21
Sabah Zone/ *Zon Sabah*	2	1.9
Sarawak Zone/ *Zon Sarawak*	2	1.9
Sex		
Male/ *Lelaki*	56	53.3
Female/ *Perempuan*	49	46.7
Highest Degree Qualification		
SPM/equivalence	9	8.6
Diploma	56	53.3
Degree	28	26.7
Master	12	11.4

The study included 105 respondents from various health district offices across Malaysia. A significant proportion of respondents (70.5%) were members of the workplace health and safety committee, indicating strong involvement in occupational safety governance. In terms of work experience, all respondents (100%) reported having more than one year of work experience. Formal health and safety training was also prevalent among the respondents, with an overwhelming 94.3% having received formal safety training, while only 5.7% reported not having undergone any structured health and safety education. When asked about their workplace incident experiences, 30.5% of respondents reported no incident occurrences, while the remaining respondents had encountered various types of workplace incidents. Lost Time Injuries (LTI) were reported by 11.4% of respondents, while minor injuries (31%) and first aid-level injuries (13%) were also noted. Additionally, 17% reported experiencing near-miss incidents.

Measurement Model Assessment

The measurement model was evaluated to ensure reliability, validity, and model fit. Based on Table 2, composite reliability (CR) values for all constructs were above the recommended threshold of 0.70, indicating strong internal consistency. The factor loadings for all items exceeded 0.70, confirming adequate indicator reliability. Average Variance Extracted (AVE) values for each construct were above 0.50, demonstrating sufficient convergent validity. Discriminant validity was assessed using the Fornell-Larcker criterion, where the square root of each construct's AVE was higher than its correlation with other constructs.

Table 2: Summation of reflective measurement model

Indicator	Loadings	Composite Reliability	AVE	Fornell-Larcker	Cross-loadings
MC1	0.710				0.710
MC2	0.700				0.600
MC3	0.785				0.685
MC4	0.780				0.780
MC5	0.795	0.911	0.508	0.847	0.695
MC6	0.772				0.772
MC7	0.687				0.687
MC8	0.737				0.737
MC9	0.760				0.760
MC10	0.682				0.682
RM1	0.763				0.763
RM2	0.779	0.813	0.523	0.723	0.779
RM3	0.715				0.615
RM4	0.725				0.725
WI1	0.838				0.838
WI2	0.854	0.814	0.598	0.773	0.854
WI3	0.703				0.603
SC1	0.833				0.833
SC2	0.869	0.884	0.717	0.713	0.869
SC3	0.838				0.838
SR1	0.797				0.797
SR2	0.831	0.870	0.576	0.759	0.831
SR3	0.720				0.720
OUT1	0.829				0.829
OUT2	0.775				0.775
OUT3	0.850	0.911	0.632	0.795	0.850
OUT4	0.643				0.643
OUT5	0.826				0.826
OUT6	0.829				0.829

Structural Model Assessment

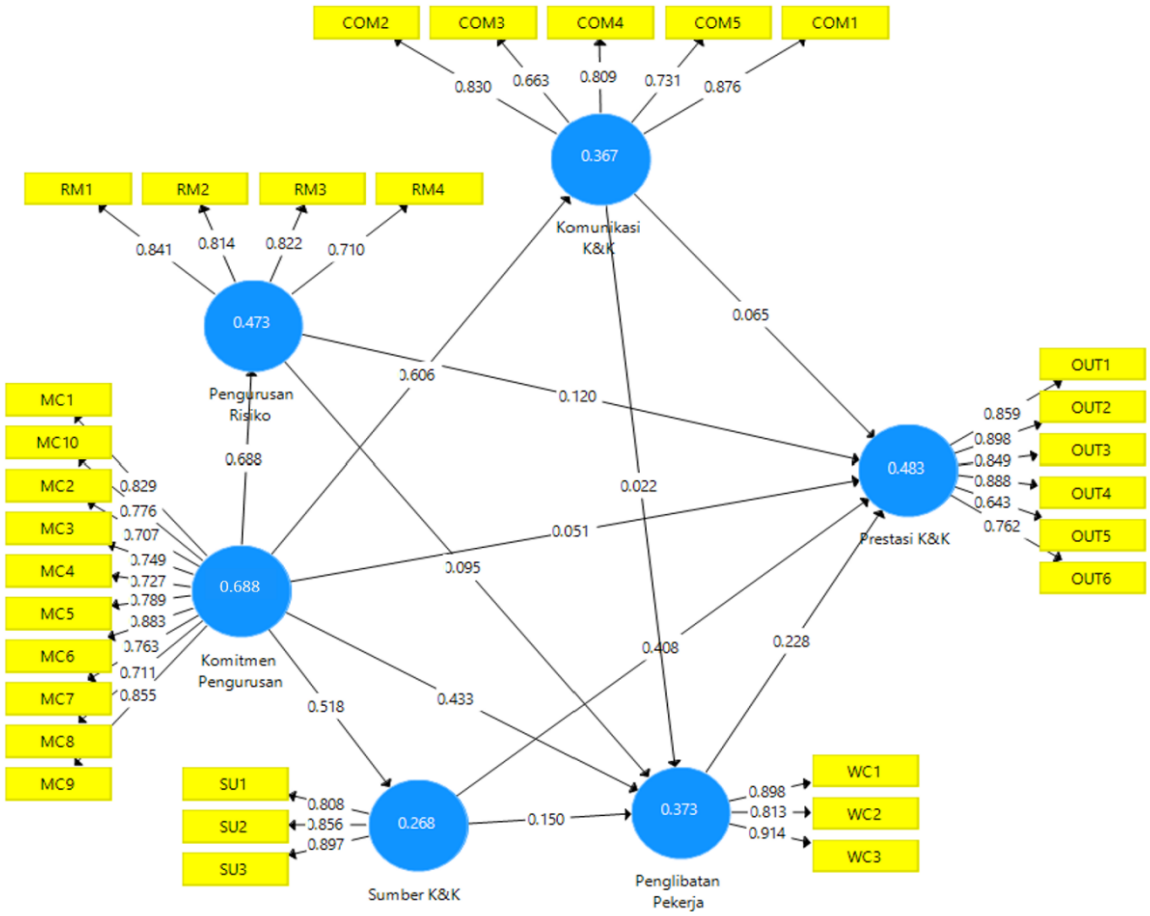

Figure 1: PLS-SEM Path Model of Factors Influencing Safety Performance

The structural model measurement was evaluated to determine the significance of hypothesized relationships among management commitment, risk management, worker involvement, safety communication, and safety performance. The model's explanatory power was assessed using R^2 values, while the strength of individual relationships was measured through path coefficients (β values) and statistical significance (p-values). The effect size (f^2) was also considered to evaluate the practical impact of each predictor on the dependent variables.

The results from Figure 1 indicate that management commitment has a strong positive effect on risk management (β = 0.688, $p < 0.001$, 95% CI [0.562, 0.784]), worker involvement (β = 0.433, $p < 0.01$, 95% CI [0.295, 0.561]), and safety resources (β = 0.518, $p < 0.01$, 95% CI [0.376, 0.637]). These findings suggest that when management demonstrates a strong commitment to safety, risk management procedures improve, employees become more engaged in safety practices, and organizations allocate

more resources toward safety initiatives. These relationships highlight the pivotal role of leadership in shaping the workplace safety culture.

In term of relationship between independent variables to dependent variables as in Table 3, risk management was found to have a weak but statistically significant relationship with safety performance ($\beta = 0.120$, $p = 0.022$, 95% CI [0.018, 0.222]), suggesting that while risk management plays a role in reducing workplace hazards, it may not be the primary driver of safety performance. This finding implies that risk management strategies alone may not be sufficient unless complemented by strong leadership commitment, effective communication, and active worker participation. However, contrary to expectations and findings from other studies, management commitment did not exhibit a significant direct effect on safety performance ($\beta = 0.051$, $p = 0.243$, 95% CI [−0.034, 0.137]). This result suggests that while leadership may influence safety indirectly such as through enabling risk management, worker involvement, or allocating safety resources, it may not translate directly into improved safety performance unless accompanied by consistent, visible actions that are perceived as credible by employees. This underscores the importance of not only having committed leadership but also ensuring that their commitment is experienced by staff in tangible ways at the operational level.

Worker involvement exhibited a moderate and significant effect on safety performance ($\beta = 0.228$, $p < 0.01$, 95% CI [0.108, 0.341]), reinforcing the idea that employee engagement in safety initiatives enhances workplace safety outcomes. This result suggests that fostering a participatory safety culture where employees actively contribute to hazard identification, incident reporting, and compliance can lead to substantial improvements in safety performance. Safety communication, while positively correlated with safety performance, yielded only a marginally significant effect ($\beta = 0.065$, $p = 0.051$, 95% CI [−0.001, 0.138]). This suggests that while safety communication is important, its effectiveness may depend on factors such as message clarity, frequency, and the degree of employee engagement. Organizations should ensure that safety messages are not only disseminated but also actively discussed and reinforced through feedback mechanisms.

Additionally, safety resources were found to significantly influence worker involvement ($\beta = 0.150$, $p < 0.05$, 95% CI [0.042, 0.258]), indicating that providing employees with necessary safety tools, training, and support enhances their participation in safety-related activities. This reinforces the idea that safety interventions should be supported with tangible resources to ensure active employee engagement.

Table 3: Summary of Hypotheses and Key Findings

	Hypothesis	β (Beta)	p-value	95% Confidence Interval	Supported
H1	Management commitment has a significant effect on safety performance.	0.051	0.243	[−0.034, 0.137]	No
H2	Risk management has a significant effect on safety performance.	0.120	0.022	[0.018, 0.222]	Yes (weak)
H3	Worker involvement has a significant effect on safety performance.	0.228	< 0.01	[0.108, 0.341]	Yes
H4	Safety communication has a significant effect on safety performance.	0.065	0.051	[−0.001, 0.138]	Marginal
H5	Safety resources have a significant direct effect on safety performance.	0.408	< 0.05	[0.290, 0.526]	Yes

The model's overall explanatory power, as indicated by R^2 values, was 0.483 for safety performance, meaning that 48.3% of the variance in safety performance can be explained by management commitment, risk management, worker involvement, safety resources, and safety communication. This suggests a moderate predictive ability, indicating that while the included predictors are significant, additional factors such as organizational culture, regulatory enforcement, and individual safety attitudes may also contribute to workplace safety outcomes. In term of the contribution, the effect size (f^2) analysis (Table 4) revealed that management commitment and worker involvement had the strongest practical impact on safety performance, while risk management and safety communication had relatively smaller but still meaningful effects. This suggests that organizations should prioritize leadership commitment and employee engagement to achieve significant improvements in workplace safety. Overall, the structural model assessment confirms that leadership involvement, active worker participation, and strategic resource allocation are critical components of an effective occupational safety framework. These findings provide valuable insights for healthcare administrators and policymakers in enhancing safety performance through targeted interventions and leadership-driven safety culture initiatives.

Table 4: Effect of the independent constructs on safety performance

Independent Construct	f^2 (Effect size on Safety Performance)
Management commitment	0.342 (large)
Risk management	0.012 (small)
Worker involvement	0.062 (small to medium)
Safety communication	0.006 (small)
Safety resources	0.250 (medium to large)

Discussion

This study aimed to investigate how five organizational factors namely management commitment, risk management, worker involvement, safety communication, and safety resources and their influence on safety performance among DHOs staff in Malaysia. The Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis revealed that worker involvement exerted the most substantial direct effects on safety performance, while risk management and safety communication demonstrated weaker but still significant influences. Safety resources, though not directly linked to safety performance, played a critical supporting role by enhancing worker involvement. This discussion section critically discusses the findings by comparing them with previous studies and theoretical frameworks.

The Significant Influence of Management Commitment on Risk Management, Worker Involvement, and Safety Resources

The results revealed a strong positive relationship between management commitment and risk management ($\beta = 0.688$, $p < 0.001$), indicating that when management is actively involved in safety initiatives, risk management practices improve significantly. This finding is consistent with the study by Prinsloo and Hofmeyr (2022), who reported that organizations with strong leadership commitment to safety tend to implement more effective risk assessment and control mechanisms. Similarly, Tangatarova and Gao (2021) emphasized that top management plays a crucial role in fostering a proactive safety culture by integrating safety into organizational decision-making.

Moreover, management commitment significantly influenced worker involvement ($\beta = 0.433$, $p < 0.01$), suggesting that when leadership prioritizes safety, employees are more likely to participate in safety-related activities. This finding aligns with the work of Wang et al. (2023) who found that transformational leadership in safety positively influences employees' safety participation and compliance. The Social Exchange Theory (Homans, 1958b) supports this relationship, as employees reciprocate management's commitment by engaging in safety initiatives. In contrast, other study suggest

that worker involvement may depend not only on management commitment but also on peer influence and organizational climate (Abun et al., 2021). This suggests that while management support is crucial, a multi-level approach involving both leadership and peer support may further enhance worker engagement.

Additionally, a significant relationship was found between management commitment and safety resources ($\beta = 0.518$, $p < 0.01$), emphasizing that organizations with higher managerial dedication allocate more resources toward safety initiatives. This finding supports the recent study by AlMarri et al. (2025) who found that investment in safety-related resources such as training, protective equipment, and emergency preparedness directly impacts safety compliance and performance. However, in some industries, resource allocation may not always translate to improved safety if employees lack adequate training or motivation to utilize the resources effectively (Fraboni et al., 2023). This suggests that management commitment must also focus on training and behavioral reinforcement alongside resource provision.

The Influence of Management Commitment, Risk Management, Worker Involvement, Safety Communication and Safety Resources on Safety Performance

Safety resources were found to have a direct effect on safety performance ($\beta = 0.408$, $p < 0.05$). This underscores the importance of investing in tangible resources such as personal protective equipment (PPE), training programs, and hazard control measures, which directly enhance safety outcomes in the workplace. This finding aligns with studies suggesting that the presence of adequate safety resources fosters a safer work environment by providing the tools and infrastructure necessary for safe practices (Al-Bayati et al., 2023; Iswoyo et al., 2022). Moreover, the availability of safety resources sends a clear message about the organization's commitment to safety, reinforcing a culture of safety compliance and performance. This also not only aligns wit SET but also fits with the (JD-R) theory (Bakker & Demerouti, 2007), which posits that the availability of resources reduces job demands and strain, thereby improving employee performance and well-being. Therefore, District Health Offices (DHOs) must ensure that safety resources are not only available but also fully integrated into daily workflows. This includes delivering practical training on how to use safety resources effectively and linking their provision to clear expectations for safety performance and continuous improvement.

Similarly, worker involvement also had a significant impact on safety performance ($\beta = 0.228$, $p < 0.01$). This highlights the importance of actively engaging employees in safety initiatives such as hazard identification, incident reporting, and safety planning rather than relying solely on top-down instructions. This finding reinforces the work of Yang et al. (2021), who emphasized that safety participation is essential for injury reduction. Social Exchange Theory provides further explanation: when employees feel valued and included in decision-making, they reciprocate with positive safety

behaviors. However, in some DHOs, hierarchical structures may limit employees' willingness to speak up or challenge unsafe practices. Therefore, they should foster a participatory safety culture by creating structured opportunities like safety committees and hazard reporting such as online reporting platforms where workers feel safe and encouraged to contribute ideas and concerns.

In contrast, this study found a weak but statistically significant effect of risk management on safety performance ($\beta = 0.120$, $p = 0.022$), indicating that while risk management contributes to workplace safety, other factors may moderate its effectiveness. A possible explanation is that risk management alone may not be sufficient unless supported by active worker involvement and communication strategies. This finding differs from earlier studies who found a stronger link between risk management practices and safety outcomes in high-risk (AlNoaimi & Mazzuchi, 2021; Hao & Nie, 2022). One reason for this weaker-than-expected relationship could be the context of healthcare settings, where risk management procedures may be well-documented but not always effectively implemented due to staff workload and operational pressures (Noor Arzahan et al., 2022). Previous study also suggested a method to improve the risk management strategy to improve performance. Bahamid et al. (2022) found that risk management in construction settings is more effective when workers are actively involved in risk identification rather than when it is imposed by management. This suggests that for risk management strategies to be more effective, organizations should integrate participatory risk assessments where employees contribute to hazard identification and mitigation planning

Interestingly, management commitment was found to have only a weak direct effect on safety performance ($\beta = 0.051$, $p < 0.001$), despite being widely acknowledged as an important driver of safety culture. This suggests that while leadership support is crucial, its influence may be more indirect, primarily exerted through other pathways such as providing safety resources and fostering worker involvement. This finding is consistent with literature which posits that employees are more likely to reciprocate managerial dedication when they experience it through tangible actions such as receiving sufficient safety resources or being actively engaged in safety programs (Wagner & Koob, 2022; Xu et al., 2022). In hierarchical organizations like DHOs, visible leadership behaviors including allocating resources, facilitating communication, and encouraging participation showed that management puts safety with same importance as quality. However, when leadership support remains at the policy level without active implementation, its direct impact on safety performance can be limited. Therefore, DHOs should focus on translating managerial commitment into practical initiatives that directly engage employees and provide the necessary tools for safe work practices. This shift from policy-level support to visible, day-to-day leadership engagement can strengthen the indirect pathways through which management commitment ultimately shapes safety outcomes.

Finaly, safety communication also showed a marginally significant effect on safety performance (β = 0.065, p = 0.051), the results suggest that it plays a role in shaping employee perceptions and behaviors. This result is partially supported by Ajmal et al. (2022), who found that effective safety communication increases compliance with safety procedures and enhances safety awareness among employees. However, it differs from the findings of Bin Abdullah (2023) who argued that in general, communication is only effective when it is interactive and allows for two-way engagement. A possible reason for the weaker statistical significance is that safety communication alone may not directly impact safety performance but rather indirectly influence it through risk awareness and worker involvement. Another possible explanation is the nature of communication practices in hierarchical healthcare settings such as DHOs. In many government healthcare organizations, safety communication is often unidirectional top-down memos or circulars rather than participatory or dialogic in nature. The implication here is that simply disseminating safety information may not be sufficient; organizations must also ensure that employees actively engage with and internalize safety messages. Future research could explore the role of interactive communication methods, such as gamification or real-time feedback systems, in improving safety engagement.

Conclusion

This study provides valuable insights into the factors influencing safety performance in Malaysian DHOs, focusing on management commitment, risk management, worker involvement, safety communication, and safety resources. The findings confirm that worker involvement and safety resource availability play pivotal roles in fostering a strong safety culture and enhancing safety performance. While management commitment did not exhibit a significant direct effect on safety performance, it emerged as a critical indirect enabler, positively influencing other key factors such as risk management, resource allocation, and worker engagement. This highlights the importance of visible, consistent leadership support in building the foundations of an effective safety system. The weaker impact of risk management and safety communication suggests that these elements alone may not be sufficient to drive substantial safety improvements unless they are strategically supported by proactive leadership, two-way communication, and participatory employee involvement. The PLS-SEM analysis demonstrates that the model explains a moderate proportion (48.3%) of variance in safety performance, reinforcing the importance of multi-faceted safety interventions. While this study offers practical recommendations for healthcare administrators and policymakers, its preliminary nature necessitates caution in generalizing the findings.

Recommendations

Future studies may explore comparative models that assess differences in safety performance across urban and rural DHOs, or across different tiers of healthcare facilities such as district health offices,

public hospitals, and primary care clinics. These comparative approaches would help uncover context-specific safety challenges and facilitate the development of tailored interventions aligned with institutional needs and resource availability. To translate these findings into actionable strategies, healthcare policymakers could integrate mandatory safety leadership training for DHO supervisors, focusing on participatory engagement and risk communication. For example, structured programs could be developed to train top management (PKD) in leading regular safety briefings, co-developing hazard registers with staff, and using feedback mechanisms to enhance communication effectiveness. These initiatives could be embedded within Ministry of Health guidelines and linked to performance KPIs, ensuring leadership accountability and sustained safety culture improvements across all DHOs.

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