





“The influence of social support and mindfulness on job burnout of ground handling employees in the aviation sector”

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THE INFLUENCE OF SOCIAL SUPPORT AND MINDFULNESS ON JOB BURNOUT OF GROUND HANDLING EMPLOYEES IN THE AVIATION SECTOR

Abstract

This paper aims to examine the influence of social support and mindfulness on job burnout of ground handling employees, using data from 197 employees in Tan Son Nhat International Airport, which is the busiest aviation hub in Vietnam. Partial least squares structural equation modeling (PLS-SEM) was utilized to explore this complex relationship. The study demonstrates that enhanced social support and strengthened mindfulness can substantially mitigate burnout among ground handling employees. The findings indicate that social support significantly reduced job burnout and strongly increased mindfulness, while mindfulness also exerted a substantial negative effect on burnout. An important effect of mindfulness partially mediated the relationship between social support and burnout. These results collectively suggest that social support operates as a critical organizational resource that enhances psychological resilience, while mindfulness serves as an internal coping mechanism that strengthens employees' capacity to regulate stress and mitigate burnout. The study concludes that both social support and mindfulness play essential roles in reducing job burnout among ground handling employees and may offer effective strategies for reducing burnout in the aviation ground services context.

Keywords

social support, mindfulness, burnout, aviation sector,
aviation employees

JEL Classification

J81, J24, I31, L93

INTRODUCTION

Ground handling employees play a central role in ensuring the continuity, safety, and efficiency of global aviation operations, yet they work in environments characterized by highly demanding physical, cognitive, and emotional demands. As air transport systems expand and operational requirements intensify, these employees face escalating work pressures that make them particularly susceptible to job burnout, a prolonged psychological response to persistent stressors characterized by emotional exhaustion, depersonalization, and diminished personal accomplishment (Maslach et al., 2001). Burnout is not merely an individual reaction to workload but a manifestation of tensions in aviation workplaces, characterized by constant time pressure and strict safety standards (Halbesleben & Buckley, 2004; Mijakoski et al., 2022). Although burnout is widely recognized as a key threat to occupational well-being and organizational performance, its antecedents remain insufficiently understood within aviation, which requires interpersonal interaction and real-time decision-making. These challenges are particularly pronounced in countries experiencing rapid aviation growth, such as Vietnam, where passenger traffic has consistently exceeded the designed capacity of major airports. For instance, Tan Son Nhat International Airport served 42 million passengers in 2023 – one

and a half times its maximum intended capacity – creating operational environments marked by congestion, noise, and heightened emotional demands (Phuong, 2024). In these contexts, ground handling employees must navigate a complex interplay of tasks ranging from check-in and customer interaction to aircraft servicing and baggage operations, each of which carries significant implications for on-time performance, safety compliance, and customer experience (Wandelt & Wang, 2024). The accumulation of these pressures intensifies, making burnout an increasingly problematic issue with direct repercussions for service quality and workforce retention. The aviation sector demands high adaptability and constant responsiveness, but the infrastructure has not expanded proportionally. For ground handling employees, insufficient supervisory guidance, weak coworker collaboration, and inconsistent communication magnify the risk of emotional exhaustion and disengagement.

Social support has been widely theorized as a critical protective factor that helps employees cope with demanding work environments (Giao et al., 2020), as it provides emotional reassurance, informational clarity, and instrumental assistance that can mitigate the harmful psychological effects of stressful job conditions (Vuong et al., 2022). Yet in aviation operations where hierarchical communication patterns, performance pressures, and cross-departmental dependencies are pervasive the adequacy of such support remains uncertain. Supervisor support may be limited by managerial workload and operational constraints, while coworker support may vary depending on team composition and work schedules (Liaw et al., 2010; Mack & Rhineberger-Dunn, 2019). This creates a gap between the level of social support employees receive and the support actually available to them. Mindfulness enables individuals to sustain psychological balance in environments dominated by urgency and unpredictability (Baer et al., 2004). The extent to which mindfulness can compensate for deficits in social support influence burnout remains unclear, especially in the aviation sector, where employees must maintain both interpersonal composure and operational precision. As the Vietnamese aviation sector continues to expand and pressure on ground service operations intensifies, resolving the problem becomes even more urgent.

1. LITERATURE REVIEW AND HYPOTHESES

Research on job burnout is drawing attention to occupational groups exposed to persistent operational pressures and high emotional demands. Ground handling employees in the aviation sector represent one such group, as their work environment is characterized by constant time pressure, exposure to unpredictable stressors, and responsibilities that directly influence service quality and operational safety (Bitner et al., 1994; Wandelt & Wang, 2024). Burnout, traditionally characterized by emotional exhaustion, depersonalization, and reduced personal accomplishment (Maslach & Jackson, 1981), has been documented across diverse sectors exposed to intense job demands (Cordes & Dougherty, 1993; Halbesleben & Buckley, 2004). In aviation, ground handling employees face particularly complex and high-risk work environments in which even minor errors can have significant operational implications. Their routines involve constant time pressure, irregular workloads, intermittent surges in pas-

senger volume, and responsibility for safety-critical processes such as baggage handling, aircraft preparation, and terminal-level customer interaction (Wandelt & Wang, 2024). These conditions intensify vulnerability to burnout, especially in contexts like Vietnam, where major airports frequently exceed designed capacity, creating chronic congestion and heightened performance expectations (Phuong, 2024; Kien, 2018; Le et al., 2021). As burnout research expanded, scholarly attention increasingly converged on the role of workplace resources in mitigating its adverse effects, with social support emerging as a particularly influential construct. Early organizational theories conceptualized social support as a buffer that moderates the relationship between job stressors and strain (Schwarzer, 1992). Subsequent empirical studies have reinforced this perspective, showing that workplace support, particularly from supervisors and coworkers, enhances employees' resilience, improves coping capacity, and reduces emotional exhaustion (Baruch-Feldman et al., 2002; Halbesleben & Buckley, 2004). Supervisor support often operates through improved communication,

clarity of expectations, and fair treatment, all of which contribute to reduced ambiguity (Lee et al., 1990; Liaw et al., 2010). Coworker support, in contrast, provides more immediate interpersonal resources rooted in empathy, shared workload burdens, and a sense of collective efficacy (Mayo et al., 2012; Fong et al., 2018). Together, these dimensions form the multidimensional construct of social support that has been shown to buffer against burnout across professions such as teaching, medicine, social work, law enforcement, and aviation (Xie et al., 2022; Cheng et al., 2018; Qiao, 2019; Chen & Kao, 2014).

Mindfulness, defined as nonjudgmental awareness of the present moment (Kabat-Zinn, 2003), promotes adaptive emotion regulation and cognitive clarity, enabling individuals to appraise stressors without excessive reactivity (Baer et al., 2004). Scholars show that employees with higher mindfulness experience reduced emotional exhaustion, improved psychological well-being, and greater work engagement (Brown & Ryan, 2003; Mesmer-Magnus et al., 2017). Moreover, mindfulness enhances cognitive flexibility, allowing individuals to reframe stressful events, an essential skill in jobs characterized by unpredictability and rapid decision-making demands (Garland et al., 2009). These benefits have been documented among teachers, nurses, first responders, and employees in high-pressure service roles, suggesting the broad applicability of mindfulness as a means of mitigating burnout risk (Cheng et al., 2022; Brekke, 2012). Besides, social support fosters emotional safety, positive affect, and interpersonal trust, conditions that facilitate mindful awareness and reduce the cognitive load imposed by stress (Chen, 2018; Chen et al., 2021). As a result, employees embedded in supportive workplace relationships are more likely to maintain present-focused attention and emotional regulation, mitigating the internalization of negative experiences. Thus, mindfulness partially mediates the relationship between social support and burnout, indicating that one of the pathways through which support exerts its protective effect is by enhancing employees' capacity for mindful engagement (Wilson et al., 2019; Huang et al., 2021).

In high-pressure service environments such as aviation, the interplay between social support

and mindfulness may be particularly salient. Ground handling employees routinely encounter fluctuating passenger demands, coordination challenges, and time-sensitive responsibilities that require emotional composure and cognitive clarity (Wang & Netemeyer, 2004; Romig, 2022). Under such conditions, mindfulness helps employees modulate their stress responses and maintain awareness of operational protocols, while social support provides the external resources necessary to navigate complex interpersonal and task-related demands. Despite the extensive literature on burnout, social support, and mindfulness across various industries, research examining social support and mindfulness jointly, particularly in relation to burnout among aviation ground handling employees, remains limited. Existing studies have primarily focused on flight attendants, pilots, or safety staff, leaving ground handling operations comparatively underexplored. This gap is striking, considering that ground staff often bear the brunt of operational disruptions, irregular passenger flows, and frontline conflict situations. In emerging markets such as Vietnam, where accelerated demand growth and infrastructural constraints amplify job stressors, the absence of context-specific research further limits managerial understanding (Phuong, 2024; Le et al., 2021).

The present study addresses this research gap by examining both the direct relationships among social support, mindfulness, and job burnout, and the mediating role of mindfulness within this framework in the context of Vietnamese ground handling employees.

Accordingly, this study aims to investigate the causal relationships among social support, mindfulness, and job burnout, and to determine the extent to which mindfulness mediates the influence of social support on burnout among ground handling employees in Vietnam. Based on the literature review, the following hypotheses are proposed:

- H1: Social support has a negative effect on the job burnout of ground handling employees.*
- H2: Social support has a positive effect on the mindfulness of ground handling employees.*

H3: Mindfulness has a negative effect on the job burnout of ground handling employees.

H4: Mindfulness mediates the relationship between social support and job burnout of ground handling employees.

2. METHODS

This paper employs quantitative primary data from ground handling employees to investigate the relationship among social support, mindfulness, and job burnout. The ground handling employee sample is ideal for this study for two main reasons. Firstly, ground handling employees face inherent pressures due to the unstructured nature of their jobs, the diverse and sometimes unpredictable needs of passengers, and the service delivery standards they must meet (Wang & Netemeyer, 2004). Secondly, ground handling employees must contend with crowded terminals, noise pollution, and maintain high safety and on-time performance standards, particularly during peak seasons, especially when international airports have exceeded their designed capacities, leading to overcapacity and congestion. Data were gathered through a survey with closed-ended questions. Quantitative methods such as surveys and interviews are more frequently used (Saleh Alshebami et al., 2025) to illustrate relationships between variables. A convenience sampling technique was utilized. This method allows for obtaining a sufficient number of respondents in a time-efficient manner without disrupting airport operations.

The survey was distributed to employees working in check-in, baggage handling, and passenger support at the busiest aviation hub in Vietnam, Tan Son Nhat International Airport. All participants provided informed consent prior to accessing the questionnaire. The survey link contained an introductory statement explaining the aims of the research, the confidentiality measures implemented, and the participants' right to withdraw at any time.

The measurement scales were employed based on previous studies and adjusted to suit the actual conditions of aviation ground services in Vietnam. The scales are not only reliable but also relevant to the fields of management. The scales were ad-

justed in comparison to the original scale through a survey of experts with in-depth knowledge of the research field. The job burnout scale consists of five items (Cheng et al., 2018). The social support includes two main components: supervisor and coworker support, each measured using four items adapted from scales in previous studies (e.g., Mack & Rhineberger-Dunn, 2019). Finally, the mindfulness scale consists of four items, adapted from Tam (2024). To facilitate respondents' clear expression of their opinions and minimize potential confusion (Hien Nguyen et al., 2025), we used a 5-point Likert scale for all survey statements (ranging from 1 = "totally disagree" to 5 = "totally agree"). The survey was conducted in September 2025, and 241 questionnaires were collected. After data screening, 197 responses were retained for analysis, with 44 cases excluded due to missing or incomplete data. The demographic characteristics show that 54.8% of respondents were female, 45.2% were male, and the largest age group fell between 30 and 40 years. Participants were generally well educated, with the majority holding college or bachelor's degrees and having more than one year of professional experience.

3. RESULTS

According to Yuan and Charoensukmongkol (2024), social support is conceptualized as a higher-order construct that encompasses two distinct first-order constructs: supervisor support and coworker support. Each of these constructs is operationalized through its own set of specific measurement items and possesses unique conceptual meanings, which could be reflected in their respective measurements.

Most of the latent constructs met the thresholds recommended by Hair et al. (2019), such as the four first-order constructs of social support (SS), mindfulness (MD), and job burnout (JBO). First, the assessments for composite reliability (CR) revealed that CR values ranged from 0.878 to 0.911 (from 0.7 to 0.95 thresholds). It is important to note that construct reliability should be assessed using CR rather than the alpha coefficient (Ton et al., 2023). Second, supervisor support (SupS) was measured, and the scale's reliability was assessed using Cronbach's alpha, which was 0.850, com-

Table 1. Reliability coefficients and validity of latent constructs

Constructs	Reliability		Convergent validity	
	CR	Cronbach's alpha	Factor loading	AVE
Social support*	0.895	0.866	–	0.516
Supervisor support	0.899	0.850	[0.786; 0.866]	0.690
Coworker support	0.878	0.814	[0.775; 0.822]	0.642
Mindfulness	0.911	0.878	[0.804; 0.841]	0.672
Job burnout	0.897	0.857	[0.758; 0.838]	0.636

Note: *Higher-order variable, AVE – Average variance extracted; CR – composite reliability.

pared with 0.89 for the original scale. The reliability of the scale measuring coworker support (CoS) was 0.814, compared with 0.79 for the original scale. Third, the study assessed convergent validity by employing factor loadings. As presented in Table 1, the minimum factor loadings for the constructs – supervisor support (0.786), coworker support (0.775), mindfulness (0.804), and job burnout (0.758) – surpassed the 0.6 threshold across all scale items, fulfilling the minimum requirement for indicator loadings. Additionally, the average variance extracted (AVE) values for these constructs fell between 0.516 and 0.690, all exceeding the 0.5 benchmark. This outcome verifies that the convergent validity aligns with the standards proposed by Yuan and Charoensukmongkol (2024). These findings establish the reliability of the measurement constructs. The higher-order construct of social support is represented by two dimensions, with elevated scores indicating increased social support. The factor loadings, alpha coefficient, and composite reliability (CR) for this higher-order construct are provided in Table 1.

Discriminant validity reflects the distinction among latent constructs and was assessed using the heterotrait-monotrait (HTMT) ratio, as outlined by Henseler et al. (2015). Additionally, the average variance extracted (AVE) for each latent variable exceeded its correlations with other variables, aligning with the recommendations

of Fornell and Larcker (1981). The HTMT ratios consistently fell below the recommended threshold of 0.9, and the square roots of the AVEs demonstrated strong discriminant validity, as shown in Table 2. These results highlight the reliability and validity of the measurement model employed. The study also presented the results of a variance inflation factor (VIF) analysis conducted to evaluate the presence of multicollinearity. High VIF values can lead to biased estimates and unreliable findings. However, the analysis revealed that all VIF values remained well below the suggested threshold of 3.3, as recommended by Hair et al. (2017) and displayed in Table 2. This finding confirms that multicollinearity was not a significant issue in the study's data, thereby reinforcing the model's reliability and enhancing the validity of the research outcomes. Furthermore, the study outlined correlations among the variables, as reported in Table 2. Both supervisor support and coworker support exhibited negative associations with job burnout, with correlation coefficients of $r = -0.525$ ($p < 0.001$) and $r = -0.570$ ($p < 0.001$), respectively. In contrast, supervisor support and coworker support were positively associated with mindfulness, showing correlation coefficients of $r = 0.505$ ($p < 0.001$) and $r = 0.500$ ($p < 0.001$), respectively. Additionally, mindfulness displayed a negative relationship with job burnout, with a correlation coefficient of $r = -0.671$ ($p < 0.001$). These correlations provided initial support for the

Table 2. Discriminant validity and correlation coefficient of first-order constructs

Constructs	Social support		Mindfulness	Job Burnout
	Supervisor support	Coworker support		
Supervisor support	(0.831)			
Coworker support	0.549**	(0.801)		
Mindfulness	0.505**	0.500**	(0.820)	
Job Burnout	-0.525**	-0.570**	-0.671**	(0.798)
Multicollinearity	1.000	1.000	1.000	1.490

Note: ** $p < 0.001$; values in parentheses are square roots of the AVE.

Table 3. Discriminant validity and correlation coefficient of social support as higher-order constructs

Constructs	Social support	Mindfulness	Job Burnout
Social support	(0.880)		
Mindfulness	0.571**	(0.820)	
Job Burnout	-0.621**	-0.671**	(0.798)
Multicollinearity	1.489	1.000	1.489

Note: ** $p < 0.001$, values in parentheses are square roots of the AVE.

hypotheses formulated in the study. In the first stage of the analysis, the two dimensions of social support were measured reflectively as first-order constructs.

In the second stage, supervisor and coworker support were used to create a higher-order construct of social support, with higher scores indicating greater social support. The model in which social support is treated as a higher-order construct was tested for discriminant validity. The overall test results, including the square roots of the Average Variance Extracted (AVE) and the Heterotrait-Monotrait (HTMT) ratios, were satisfactory, as presented in Table 3.

Social support was negatively associated with job burnout ($r = -0.621$, $p < 0.001$). Next, social support was positively associated with mindfulness ($r = 0.571$, $p < 0.001$). Lastly, mindfulness showed a negative relationship with job burnout ($r = -0.671$, $p < 0.001$). However, satisfactory discriminant validity for HTMT90 is revealed, with all values showing a satisfactory HTMT ratio value below 0.9 between social support and job burnout.

The research examines causal relationships, employing path coefficients, the coefficient of determination (R -squared), and effect size (f^2) as primary metrics, following Hair et al. (2019). The outcomes of the partial least squares structural equation modeling (PLS-SEM) analysis are detailed in Table 4. The model demonstrated a substantial

R -squared value of 0.539 for job burnout (JBO) and 0.328 for mindfulness (MD). This indicates that the explanatory variables within the model collectively account for 53.9% of the variability in burnout, thereby underscoring the model's robust predictive capability. Given that the R -squared values for both job burnout and mindfulness exceed 0.26, the model exhibits a good fit with the empirical data, in accordance with the criteria suggested by Hair et al. (2019). Additionally, the study assessed effect sizes (f^2), interpreting values less than 0.02 as indicating no effect, 0.02 as small, 0.15 as medium, and 0.35 as large, based on the established guidelines provided by Hair et al. (2019).

In the hierarchical component model, social support, as a higher-order variable, demonstrated significant relationships (p -value ≤ 0.001) with reflective first-order constructs, specifically, supervisor support ($\beta = 0.889$) and coworker support ($\beta = 0.872$). The statistical analysis conducted on ground handling employees explored the relationships among social support (SS), mindfulness (MD), and job burnout (JBO) across three hypotheses. For the first hypothesis, which proposed a negative effect between SS and JBO, the results indicated a beta coefficient of -0.355 and a p -value less than 0.001, offering significant support for this relationship. The second hypothesis, suggesting a positive effect between SS and MD, was substantiated by a beta coefficient of 0.573 and a p -value below 0.001, confirming its statistical significance. Lastly, the third hypothesis, which posited a nega-

Table 4. Hypotheses testing

Hypothesis	Path			Estimate	p-values	Decision	f-squared
H1	SS	→	JBO	-0.355	<0.001	Supported	0.184 (medium)
H2	SS	→	MD	0.573	<0.001	Supported	0.489 (large)
H3	MD	→	JBO	-0.471	<0.001	Supported	0.323 (medium)
	SS	→	SupS	0.889	<0.001	-	3.765 (large)
	SS	→	CoS	0.872	<0.001	-	3.162 (large)

Note: SS – social support; JBO – job burnout; MD – mindfulness; SupS – supervisor support; CoS – coworker support.

Table 5. Mediating effect of mindfulness

Hypothesis	Path	Direct effect	Indirect effect	Total effect	Result	Decision
H4	SS → MD → JBO	-0.355	-0.270	-0.625	Partial	Supported

Note: SS – Social support; MD – mindfulness; JBO – job burnout.

tive effect between MD and JBO, was supported by a beta coefficient of -0.471 and a p -value under 0.001 , reinforcing the presence of a significant relationship. This indicates that there were significant sequencing relationships among SS, MD and JBO, all showing positive effects. These findings are consistent with several previous studies (Chen, 2018; Chen et al., 2020; Cheng et al., 2022; Qiao, 2019; Xie et al., 2022).

Apart from the key findings, we tested whether the effect of social support on the job burnout of ground handling employees could be mediated by mindfulness. For H4, the results indicated that the indirect effect, using a 95% bootstrap confidence interval, did not include zero within the range ($\beta = -0.270$; $t = 6.055$; 95% CI $[-0.358, -0.185]$), suggesting that the mediating effect statistically supported this hypothesis. To determine whether the mediating effect was partial or full, we examined the direct relationship between social support and job burnout. Since the direct effect was statistically significant, we concluded that the effect of social support on job burnout was partially mediated by mindfulness, as shown in Table 5.

4. DISCUSSION

The findings of this study provide empirical evidence regarding the relationships among social support, mindfulness, and job burnout of ground handling employees in Vietnam. The analysis revealed that social support is a higher-order structure comprising supervisor and coworker support that positively predicts mindfulness and, concurrently, negatively predicts job burnout. The negative association between mindfulness and job burnout corroborates the relevance of mindfulness as a psychological resource capable of mitigating exhaustion among aviation ground employees.

This study contributes to the literature by revealing how mindfulness functions within the highly dynamic and interdependent environment of

ground handling workers, whose job characteristics involve unpredictable passenger interactions, fluctuating flight schedules, and high accountability for safety and punctuality. Such conditions amplify vulnerability to burnout, thereby heightening the relevance of mindfulness. By fostering emotional balance, mindfulness allows ground staff to maintain functional decision-making under pressure, reduce ruminative thought patterns, and sustain performance during peak operational periods.

The study also found a significant negative effect of social support on job burnout. This finding aligns with earlier research demonstrating that interpersonal support reduces emotional exhaustion and protects employees from the detrimental impact of prolonged occupational stress (Lee et al., 1990; Schwarzer, 1992). Yet the present study extends existing scholarship by highlighting that both supervisor and coworker support contribute meaningfully but not interchangeably to burnout reduction. The hierarchical modelling of social support shows that each subdimension plays a role: supervisor support provides clarity and problem-solving resources, while coworker support offers empathy, shared experience, and immediate emotional relief during operational challenges. In the context of ground handling operations, where tasks must be performed in tightly coordinated teams under strict time constraints, the synergy of these two support sources is crucial for fostering resilience.

A central contribution of this study lies in its examination of mindfulness as a mediating mechanism linking social support to job burnout. The partial mediation supports the argument that social support reduces burnout not only by providing emotional resources but also by enhancing psychological capacities that allow employees to process workplace stress more effectively. This pattern is aligned with findings reported by Xie et al. (2022), who similarly identified mindfulness as an intermediary process through which social support fosters resilience and reduces burnout.

In the present context, mindfulness appears to strengthen employees' ability to remain emotionally regulated and cognitively engaged despite the demanding and unpredictable nature of ground operations.

The study's results highlight the urgent need for aviation organizations to invest in supportive su-

pervisory structures, cultivate positive coworker relationships, and consider formal mindfulness-based training as part of their employee development programs. In environments characterized by operational volatility and constant public scrutiny, such initiatives can serve as strategic levers to enhance workforce resilience, reduce turnover intentions, and strengthen service consistency.

CONCLUSION

The present study aims to examine how social support and mindfulness contribute to explaining job burnout among ground handling employees in Vietnam. By estimating a hierarchical component model and integrating mindfulness as a mediating mechanism, the study provides insights through which interpersonal resources influence burnout. Mindfulness itself exhibits a strong inverse association with burnout (Bonifas and Napoli, 2014), suggesting that employees who maintain greater attentional awareness and emotional regulation are more resilient when facing the strains inherent in ground handling work. The mediating test further indicates that mindfulness explains a substantial portion of the relationship between social support and burnout, confirming that interpersonal support does not merely buffer exhaustion but also facilitates the development of adaptive cognitive and emotional capacities. These findings reinforce the notion that burnout emerges not solely from external pressures but also from the ways in which individuals internalize and respond to their working conditions.

AUTHOR CONTRIBUTIONS

Conceptualization: Dao Duy Tung, Vijayan Ramasamy.

Data curation: Dao Duy Tung.

Formal analysis: Dao Duy Tung.

Investigation: Dao Duy Tung.

Methodology: Dao Duy Tung.

Project administration: Dao Duy Tung.

Supervision: Vijayan Ramasamy.

Validation: Dao Duy Tung.

Visualization: Dao Duy Tung.

Writing – original draft: Dao Duy Tung, Vijayan Ramasamy.

Writing – review & editing: Dao Duy Tung, Vijayan Ramasamy.

ETHICS STATEMENT

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee of Malaysia University of Science and Technology, Malaysia (Reference #MREC/AS/19/25/008), dated August 19, 2025. Informed consent was obtained from all participants prior to their involvement in the study.

DECLARATION OF AI IN ASSISTED WRITING

The authors confirm that no generative AI tools were used in the initial preparation of this manuscript. During the revision stage, Grammarly was employed solely to enhance language fluency and readability. All content was carefully reviewed and edited by the authors, who take full responsibility for the integrity and accuracy of the published article.

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