

ORIGINAL ARTICLE

Designing an Innovative Occupational Stress Risk Assessment Framework for Malaysian Workplaces

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ABSTRACT

Introduction: Psychosocial hazards remain underrepresented in conventional occupational safety and health (OSH) assessments, despite being key drivers of workplace stress. Existing matrix-based models often overlook culturally specific and relational dimensions of stress. This study addresses this gap with a focus on Malaysia. Occupational stress as psychological and physical strain resulting from the strain arising from work demands, instability in employment, organizational constraints, and pressures from customer expectations. **Methodology:** Risk Assessment Matrix of Occupational Stress (RAMOS), a semi-quantitative tool used that integrates four core psychosocial factors such as skilled work, job stability, organizational issues, and customer responses into a Likelihood x Severity framework. RAMOS assesses both Initial Risk (IR) and Residual Risk (RR) to prioritize actionable interventions. Data were collected from 80 employees involved in fabrication, blasting, and rigging activities using structured RAMOS-based group assessment. **Results:** Organizational issues emerged as the most prevalent stressor (52.8%), followed by skilled task pressure (42.6%), job instability (35.9%), and customer-driven stress (27.1%). Pearson correlation resulted significant associations ($r = 0.630$, $p < 0.01$), while regression model identified three emerging factors as the strongest predictors with a strong model fit ($R^2 = 0.443$). RAMOS also captured meaningful shifts between IR and RR phases, supporting its diagnostic value. This study validates RAMOS as a culturally adaptive, evidence-driven tool for assessing occupational stress. **Conclusion:** RAMOS offers a practical, scalable approach for identifying and managing psychosocial stress risks in industrial contexts. Its participatory design and adaptability enable real-time adjustments, making it suitable for continuous workplace surveillance.

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INTRODUCTION

Occupational stress has emerged as a significant concern in Malaysia, with growing implication for employee well-being, organizational productivity and national health cost. This critical challenge affects sectors such as healthcare, oil and gas, education, and manufacturing, highlighting the need for systematic assessment and management of occupational stress to ensure employees well-being and organizational safety (1,2,3). Organizational operations and processes ideally require a comprehensive framework to manage psychological risks, encompassing job content, work organization, management practices, environmental

and organizational conditions, as well as employees' competencies and needs. These factors can negative impact on employees' health and safety through their perceptions and experiences. Unlike physical hazards, core psychosocial stressors such as organisational inefficiencies, skilled task overload, job insecurity, and customer driven pressure remain insufficiently addressed, largely due to context-dependent nature (4,5,6).

Although international tools like the HSE Management Standards and COPSOQ provide structured approaches, their limited cultural adaptability constrains relevance in the Malaysian OSH context (7,8). The risk assessment of occupational stress (RAMOS) has previously been applied in several industries in Malaysia. These applications remain expanding in scope and still ongoing capture the culturally specific and relational dimensional of occupational stress. The novelty of this

study lies in extending the use of RAMOS by integrating key psychosocial factor within industries. This study advances a tailored which refers to the adaptation of the framework to the local cultural context and industry specific stressor, multidimensional framework to better capture and mitigate psychosocial risk within local occupational settings. Also, offering both theoretical contribution and practical implication for workplace safety management. RAMOS functions to assess occupational stress by identifying, rating, and prioritizing psychosocial risk factor in the workplace. Its general impact lies in providing industries with a systematic framework to recognize critical stressor, supported targeted intervention, and enhance employee well-being and organizational safety performance.

MATERIALS AND METHODS

A cross-sectional study was conducted to operationalise a semi-quantitative tool called Risk Assessment Matrix of Occupational Stress (RAMOS), unlike conventional matrices which that providing a culturally responsive and context-specific approach to assessing occupational stress and targeting four core psychosocial stressors such organizational inefficiencies, skilled task pressures, job instability, and customer-driven stress. The RAMOS framework conceptualizes the relationships between key risk factors, their Likelihood and Severity assessments, and the resulting workplace outcomes. Each risk factor including social support, exposure, organisational culture, task, skilled work, customer response, recognition, and stability. RAMOS systematically evaluated, and the combined influence of these factors informs targeted interventions to improve employee well-being and performance. Group based assessment were conducted using focus group discussion, with each group comprising 10 participants were purposively selected to represent critical job within the industry, ensuring that key occupational roles and responsibilities were adequately captured. The risk assessment matrix consisting of hazard identification, risk assessment and risk control, few novel components are incorporated in order to evaluate the occupational stress level.

Likelihood and severity were rated on a 5-point Likert scale to generate Initial Risk (IR) and Residual Risk (RR) scores. Conceptually, likelihood of each risk factor was given scale ranged from Rare (event is unlikely but potential exists) to Almost Certain (event will occur in most circumstances). Practically, the scores corresponded to the frequency of occurrence: 1 = not expected to occur but possible, 2 = likely once per month/6 months, 3 = likely twice, 4 = likely three times, and 5 = likely more than three times. The scale was applied consistently across various risk factors, including social support, exposure (environment and equipment), organisational culture, task, skilled work, customer response, recognition, and stability. Each score corresponded to predefined descriptive criteria to ensure

clarity and reproducibility of the assessment. Severity was also rated on a 5-point scale: 1 = minor concern, 2 = minor stress managed with local support, 3 = moderate stress over a considerable period without time off, 4 = major illness resulting in long-term incapacity or reduced effectiveness, and 5 = extreme ill health leading to major permanent incapacity or requiring counselling. Each score corresponded to predefined descriptive criteria to ensure consistency and reproducibility of the assessment. IR represent the risk level of each occupational stressor with current control measure implemented, calculated by multiplying its likelihood and severity scores. RR represents the remaining risk after applying modifying factor and control measures, indicating the effectiveness of intervention and guiding further risk management actions. The validity was established through expert review for content validity, ensuring that the items appropriately represent occupational stress dimensions. Reliability was examined using pilot testing with the small group, and internal consistency was confirmed through Cronbach's alpha values which the value 0.87. Data were gathered via structured, group-based assessments with purposively sampled employees, categorized by job function primarily involved in operational activities with varies years of experience that minimum six months, range in age 18-60 years, and included both male and female to ensure accurate represent data collection. This composition provides a clear context for interpreting the study findings. Participants collaboratively evaluated the most salient stressors before and after reviewing existing control measures. Descriptive statistics were used to determine prevalence. Pearson correlation and multiple linear regression analyses were employed to examine interrelationships and predictive associations (significance set at $p < 0.01$). Ethical clearance was obtained from the IIUM (IREC 2024-028), and informed consent was secured from all participants.

RESULTS

The results are presented in sequence, beginning with prevalence of occupational stressors (**Table I**), followed by correlation analysis (**Table II**) and regression outcomes (**Table III**). Organizational factors were the most reported (52.8%), followed by skilled task pressures (42.6%), job instability (35.9%), and customer-driven stress (27.1%), highlighting organizational inefficiencies as the leading source of stress as per **Table I**. The results showed a strong positive correlation between skilled work and organizational factors ($r = 0.630$, $p < 0.001$), indicating that high task demands are often linked to internal workplace issues.

A borderline significant negative correlation was found between skilled work and customer response ($r = -0.231$, $p = 0.050$), suggesting that increased workload may reduce tolerance to customer pressure as **Table II**. Other correlations, including those involving job stability,

Table I: Prevalence of Occupational Stress Level

Risk Factor	Percentage (%)
Organizational factors	52.8
Skilled task pressures	42.6
Job instability	35.9
Customer-driven stress	27.1

Table II: Correlation between Occupational Stress Risk Factors

Variables	r-value	p-value	Significance
Skilled Work & Organizational Factor	0.630	0.000	$p < 0.01$
Skilled Work & Response from Customer	-0.231	0.050	$p < 0.05$
Skilled Work & Stability	-0.310	0.008	$p < 0.01$
Stability & Organizational Factor	0.298	0.011	$p < 0.01$
Stability & Response from Customer	0.036	0.760	Not significant
Organizational Factor & Response	0.222	0.059	Not significant

were not significant, showing these stressors may act independently. The regression model significantly predicted occupational stress, ($p < 0.001$), explaining 44.3% of the variance. This R^2 value indicates that approximately 44% of the variance in the outcome is explained by the predictors in the model, reflecting a moderate level of predictive strength. In practical terms, this suggests that while the identified factors are important contributors to workplace outcomes, other unmeasured variables may also play a role, highlighting areas for further investigation and targeted interventions to improve employee performance and well-being. Skilled work and organizational factors were the strongest predictors ($p < 0.01$), followed by job stability ($p < 0.05$), while customer-related stress was not significant as shown in **Table III**.

Table III: Contributing Factor for Occupational Stress Risk Factors

Predictor Variables	Unstandardized Coefficient (B)	Standard Error	Standardized Coefficient (β)	t	p-value
Skilled Work	0.432	0.097	0.508	4.46	0.000**
Organizational Factor	0.301	0.091	0.385	3.31	0.001**
Job Stability	-0.215	0.083	-0.270	-2.59	0.012*
Response from Customer	0.118	0.075	0.143	1.57	0.121

DISCUSSION

These findings are consistent with emerging empirical evidence emphasizing the prominent influence of management shortcomings, excessive workload, and unstable employment as primary determinants of occupational stress. Prior research emphasized that Malaysian employees facing high cognitive and workload demands in poorly structured environments

exhibit higher psychological distress consistent with the stress amplification described by the Job Demands Resources model (9,10). Similar patterns were noted by (11,12) where organizational ambiguity and skill mismatch emerged as dominant stressors among technical personnel. Western models that often highlight customer-related stress as a major contributor (13), findings by (14) indicate that in collectivist cultures like Malaysia, such pressure weaker effects unless compounded by structural weaknesses within the organisation.

This study supports that view, as the weak correlation suggests customer-driven stress alone may not significantly impact workers without underlying management problems (15,16). Employment insecurity proved as a significant and context-dependent stressor in this Malaysian-based study, consistent with (17,18), who linked precarious jobs to poor mental health, especially without social support (19). Similar findings in previous studies (9,20,21) also workplace instability as the strongest predictor of presenteeism, particularly in Malaysian government-linked companies. Building on this concern, the study further highlights the limitations of traditional matrix-based assessments in capturing the complex and context-specific nature of psychosocial risks such relational nature of psychosocial stressors. It confirms growing calls for participatory and culturally grounded risk assessment models. Workplace settings in Malaysia, where organisational and cultural norms play a central role, significantly influence stress outcomes (22,23).

The RAMOS framework contributes to this discourse by embedding context-specific variables, offering a more responsive approach for assessing occupational stress in Malaysia (24). RAMOS has been applied in certain Malaysian industries; the originality of this study lies in demonstrating its effectiveness in accessing occupational stress through the integration of culturally specific of psychosocial factor. RAMOS overcomes the limitation of traditional tools by embedding context-specific psychosocial factors, applying participatory group-based assessment, and enabling dynamic monitoring of both initial and residual risks. This ensures a more accurate and responsive evaluation of occupational stress within Malaysian industries. The result highlight how RAMOS provides a novel, context sensitive framework for identifying priority stressors which has not been addressed in previous applications. These results are consistent with existing occupational stress measurement in Malaysia and related industries. For example, healthcare and port industry studies also identified organisational inefficiencies as the most critical stressor, while oil and gas sector research confirmed task overload and job instability as strong predictors of occupational stress. By aligning with these findings, RAMOS demonstrates its ability to capture known workplace stressors while advancing

the field by integrating culturally specific and industry-relevant psychosocial factors. This critical comparison underscores the validity of RAMOS in reflecting real-world workplace stress dynamics in Malaysia.

CONCLUSION

RAMOS provides a context-sensitive and adaptive framework for assessing occupational stress. By integrating psychosocial risk factors into a dynamic Likelihood $\times$ Severity framework, it enables clearer prioritisation of prioritization of workplace intervention. Its strong correlations and predictive demonstrate that RAMOS can guide mental health strategies, inform proactive risk management and support evidence-based intervention to enhance employee well-being and overall workplace settings. Practically, RAMOS can inform workplace health surveillance programs, support compliance with national OSH guidelines, and guide industry-specific interventions. At the policy level, it offers a foundation for integrating psychosocial risk management into Malaysia's OSHMS strengthening preventive approaches to mental health at work.

LIMITATION

This study has some limitations. First, the focus group discussions involved a limited number of participants, which may not capture the full range of employee perspectives. Second, the study was conducted within a restricted set of departments and industry contexts, which may limit the generalizability of the findings. Future research could involve larger, more diverse participant groups and explore multiple industries to enhance applicability and strength.

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