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EXAMINING THE EFFECT OF SAFETY LEADERSHIP TOWARDS SAFETY BEHAVIOUR AMONGST DOMESTIC WASTE COLLECTING WORKERS IN MALAYSIA

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ABSTRACT

Safety leadership is increasingly being championed as the preeminent strategy for mitigating workplace injuries through the improvement of safety behaviour. This research rigorously investigates the interplay between supervisory leadership and safety behaviour among employees involved in domestic waste collection. Drawing on the Social Exchange Theory (SET), the study elucidates how these three aspects of safety leadership function as pivotal mechanisms in fostering safer workplace behaviours within this high-risk sector. A quantitative cross-sectional survey, targeting 224 domestic waste collecting workers, was utilized, and data analysis was conducted using Partial Least Squares Structural Equation Modelling (PLS-SEM). This results uncover the profound influence of safety leadership dimensions, namely safety coaching, safety concern, and safety monitoring, on safety behaviour among domestic waste collecting workers in Malaysia. This illuminates the vital role of multifaceted safety leadership in reducing workplace accidents and injuries. This study contributes valuable insights for industry practitioners, safety leaders, and policymakers, supporting their efforts to enhance safety standards in the waste collection sector. The findings pave the way for improved safety practices of the workforce within high-risk industries.

Keywords: Safety leadership, safety behaviour, supervisor, Malaysia

INTRODUCTION

The trend of escalating workplace accidents and fatalities in Malaysia necessitates immediate attention, specifically within the public cleansing services sector. This sphere, inclusive of utilities and cleaning, has seen a disturbing rise in mortality rates, with eight fatalities recorded over 2015 and 2016. Similarly, sewerage service companies witnessed an upsurge in accident cases in 2012, underlining the industry's increasing susceptibility to workplace hazards (Zulkifly et al., 2020). Subsequent data from 2018 indicates the utility sector, encompassing public cleansing services, reported 484 accidents (Dosh, 2018). Moreover, recent statistics from the Department of Occupational Safety and Health (DOSH) underscores the gravity of the situation, highlighting the utility and cleaning services sector as one of the industries registering the highest accident incidences in the country. In 2019 alone, the sector marked a troubling tally of 244 work-related accidents, coupled with four fatalities (Department of Occupational Safety and Health, 2020). In the aftermath of the COVID-19 pandemic, A total of 207 industrial accidents and eight fatalities were reported in 2021 (Jabatan Keselamatan dan Kesihatan Pekerjaan, 2021), followed by 189 incidents and nine fatalities in 2022 (Jabatan Keselamatan dan Kesihatan Pekerjaan, 2022), underlining the persistent challenges in ensuring safety within this sector. These figures underscore the urgent need for effective safety management strategies within the public cleansing and utility services sector in Malaysia. The alarming rise in both accidents and fatalities serves as a stark reminder of the inherent risks within this industry, emphasizing the importance of comprehensive safety measures and robust leadership to mitigate these hazards.

PROBLEM STATEMENT

Workplace accidents are predominantly precipitated by unsafe conditions and unsafe actions (Gyekye, 2010; Hussin et al., 2009; Mansur et al., 2011; Zakaria et al., 2012). In an effort to mitigate these conditions, prior researchers have undertaken comprehensive and rigorous examinations of the determinants influencing safety behaviour. From the studies, safety climate has been found as the leading factor (Flin et al., 2000; Kundu, 2015; Oah et al., 2018), besides safety management practice (Subramaniam et al., 2016; Vinodkumar & Bhasi, 2010), and safety leadership (Karthega, 2018; Lu & Yang, 2010; Zulkifly et al., 2017, 2023). Promotion of safety leadership is increasingly recognized as a paramount strategy for enhancing safety performance, particularly in the context of minimizing workplace injuries. (Beus et al., 2016). Safety leadership has been studied within Malaysia's SME manufacturing and has been found to significantly influence safety behaviour (Zulkifly et al., 2017). On one hand, safety leadership has also been found to predict safety performance of manufacturing firms in Malaysia (Chua & Wahab, 2017). Safety role played by the supervisors is also an essential element towards safety performance. Literature shows a significant effect of supervisor safety on overall safety performance (Lu & Shang, 2005; Lu & Tsai, 2008; Misch, 2015; Shang et al., 2015). Khoo et al. (2016) affirmed that supervisors need to play their important roles in ensuring safety performance of SME manufacturing in Malaysia. This is further supported by a study conducted by Fang et al. (2015), who discovered that supervisors' reactive and supportive actions are connected with worker safety behaviour. In firms providing public cleansing services, field workers routinely face potential hazards. Their duties often place them in the vicinity of moving vehicles or machinery, expose them to sharp objects, and subject them to noise and vibration among other risks. As such, the nature of their occupation involves a level of injury risk that parallels those encountered in other high-risk industries (Zulkifly et al., 2020). There are several fatality accidents reported in the newspaper involving domestic collecting workers in southern and northern region of Malaysia, but empirical studies in this sector are limitedly found. In accordance with the Social Exchange Theory, employees are likely to reciprocate these actions with enhanced safety behavior. When workers perceive that their leadership is genuinely invested in their safety, they are more likely to adhere to safety protocols and practices, as a form of reciprocation in this

social exchange process (Blau, 1964). Given the high-risk environment in the domestic waste collection sector, it is paramount to understand and foster safety behaviours to mitigate potential accidents and injuries. Implementing safety leadership practices, such as safety coaching, concern, and monitoring, may yield significant improvements in workers' safety behaviors, as posited by the Social Exchange Theory. However, the unique challenges faced in this sector necessitate a specific study to apply and assess these principles in this particular context. Thus, this research is of utmost importance to inform effective safety leadership strategies tailored for the domestic waste collection sector. By doing so, we aim to significantly contribute to enhancing workplace safety and, consequently, safeguarding the wellbeing of these essential workers.

METHODOLOGY

This section delves into the study methodology, including the research design, framework, and measurement.

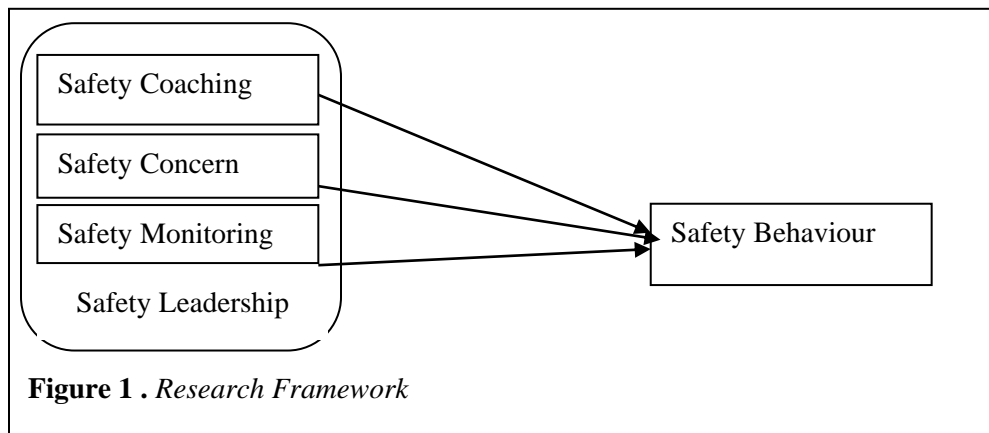
Research Design, Population and Sampling

This investigation employs a quantitative, cross-sectional research design, utilizing self-administered questionnaires to accumulate the requisite data. The research focuses on a specific demographic: domestic waste collecting workers operating in the southern region of Malaysia. With a target population calculated to encompass approximately 1700 individuals, a statistically sound sample size of 313 respondents was deduced in accordance with the Kjerchie & Morgan Table (Krejcie & Morgan, 1970).

Research Instrument

This research applied a self-administered questionnaire to measure safety leadership variables (safety coaching, safety monitoring, and safety concern), and workers's safety behaviour. All utilized survey items were methodically adapted from precedential research, ensuring their relevance and applicability (Zulkifly et al., 2021, 2022). Further, these items have been subjected to rigorous validation in previous scholarly contributions, lending robust credibility and reliability to the measures employed in this investigation (Zulkifly et al., 2021).

Research Model and Hypothesis Development



Safety coaching, safety concern, and safety monitoring are all essential aspects of safety leadership and each plays a significant role in fostering positive safety behaviour. Safety coaching refers to the proactive actions taken by leaders to guide, correct, and enhance the safety-related knowledge and skills of their employees. This can involve both formal and informal feedback and training (Zohar & Luria, 2005). A study by Barling et al. (2002) found that safety coaching can significantly improve safety compliance and participation, thereby leading to safer behaviour and fewer workplace accidents. Safety concern reflects the degree to which leaders demonstrate genuine care and concern for the safety and well-being of their employees. Leaders who prioritize safety and express concern for their employees' safety can significantly influence their employees' safety perceptions and behaviours (Hofmann & Morgeson, 1999). For example, research by Clarke (2013) has shown that leaders who express a high level of safety concern can significantly influence employee safety behaviour, leading to a decrease in accidents and injuries. Safety monitoring is the ongoing observation and assessment of safety performance, including recognizing and correcting unsafe behaviour (Zohar & Luria, 2005). Safety monitoring can influence safety behaviour by ensuring that safety procedures are adhered to and that unsafe behaviours are corrected promptly (Conchie et al., 2013). Zohar (2002) noted that effective safety monitoring is associated with higher levels of safety compliance and participation, and a lower incidence of accidents. Overall, each of these aspects of safety leadership plays a significant role in shaping safety behaviour. By employing effective safety coaching, demonstrating genuine safety concern, and engaging in diligent safety monitoring, leaders can significantly influence safety behaviour and contribute to a safer workplace (Zulkifly, 2020; Zulkifly et al., 2022).

Based on the research model and previous literature, research hypotheses have been developed and summarised as below:

Research Hypotheses

H₁: "Perceived safety coaching will significantly influence safety behaviour among domestic waste collecting workers."

H₂: "Perceived safety concern will significantly influence safety behaviour among domestic waste collecting workers."

H₃: "Perceived safety monitoring will significantly influence safety behaviour among domestic waste collecting workers."

Data Analysis Technique

In this research, Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed as the methodological framework for data analysis. Initially, the integrity of the measurement model was evaluated via PLS Algorithms analysis to establish model reliability, construct validity, and discriminant validity. Subsequently, the structural model was scrutinized through a bootstrapping technique, utilizing a 5000-resample data set, with the aim of determining the path-coefficient values pertinent for hypothesis testing. The outcomes of these rigorous analytical procedures, along with their implications, are comprehensively dissected in the ensuing sections of this paper.

RESULTS

This section reports the overall data analyses for this research.

Respondents' Demographic Profile

While Krecjie and Morgan (1970) guidelines initially suggested a sample size of 313 for this study, the research was ultimately conducted with a total of 224 respondents who agreed to participate. This final count aligns with the standards articulated by (Sekaran, 2003) who asserted that an adequate sample size for survey research could feasibly range between 30 and 500 respondents. Therefore, the adopted sample size of 224 respondents is deemed sufficient to ensure the statistical validity and reliability of the study's findings. The demographic reports begin with a greater representation of males (60.7%) than females (39.3%). The ethnic diversity is primarily Malay (60.7%), followed by Indian (34.8%), with a lesser percentage of Chinese (3.1%) and other ethnicities (1.3%).

Concerning marital status, a majority of the participants are married (71.4%), while 20.1% are single, and 8% are either divorced or widowed. There is a singular missing response in this category (0.4%). The respondents predominantly fall within the 21 to 30 years age bracket (48.7%), followed by those 20 years and below (26.3%), 31 to 40 years old (17%), and 41 years and above (8%). In terms of educational background, a significant number of respondents hold an MCE/SPM/SPMV qualification (44.2%). Those who completed primary school constitute 27.7%, LCE/SPR/PMR holders account for 23.2%, while a smaller portion hold an HSC/STPM qualification (1.3%) or other qualifications (3.8%).

Assessment of Measurement Model

For the assessment of the measurement model, it is necessary to ascertain the values of the Average Variance Extracted (AVE) and the Composite Reliability (CR) of the items involved in the study (Henseler et al., 2009; Ramayah et al., 2018). Subsequently, the discriminant validity was established by employing the Heterotrait-Monotrait ratio (HTMT) as the evaluation criterion (Franke & Sarstedt, 2019; Henseler et al., 2014), with the cut-off value of 0.90 or less.

Table 1

Reliability and Construct Validity

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Safety Behaviour	0.859	0.895	0.556
Safety Coaching	0.921	0.941	0.760
Safety Concern	0.910	0.933	0.735
Safety Monitoring	0.796	0.857	0.548

Initially, a Partial Least Squares Algorithm (PLS-Algorithm) was implemented to scrutinize the measurement model. The derived results indicated that the Average Variance Extracted (AVE) for safety monitoring stood at 0.489, falling short of the established threshold value of 0.5. Consequently, one of the safety monitoring items was omitted, prompting a subsequent reiteration of the PLS-Algorithm. In the

ensuing analysis, both the reliability and construct validity of the measurement model were acknowledged as satisfactory, given that the Composite Reliability (CR) values surpassed the 0.7 benchmark, and the AVEs uniformly exceeded the minimum criterion of 0.5 (Hair et al., 2020). The results are as summarised in Table 1 above.

Table 2

HTMT Ratio

Variables	Safety Behaviour	Safety Coaching	Safety Concern	Safety Monitoring
Safety Behaviour				
Safety Coaching	0.799			
Safety Concern	0.799	0.927		
Safety Monitoring	0.822	0.871	0.926	

The Heterotrait-Monotrait ratio (HTMT) value for the pairings of safety concern and safety coaching, as well as safety monitoring and safety concern, both exceed the threshold of 0.9. Other HTMT values are less than 0.9, passing the lenient requirement (Franke & Sarstedt, 2019; Henseler et al., 2014). The results of the HTMT are summarised in Table 2. Despite the presence of Heterotrait-Monotrait ratio (HTMT) values exceeding 0.9, discriminant validity is nonetheless established, provided the HTMT inference via bootstrap confidence interval yields values that lie within the range of -1 to 1 (Ramayah et al., 2018)

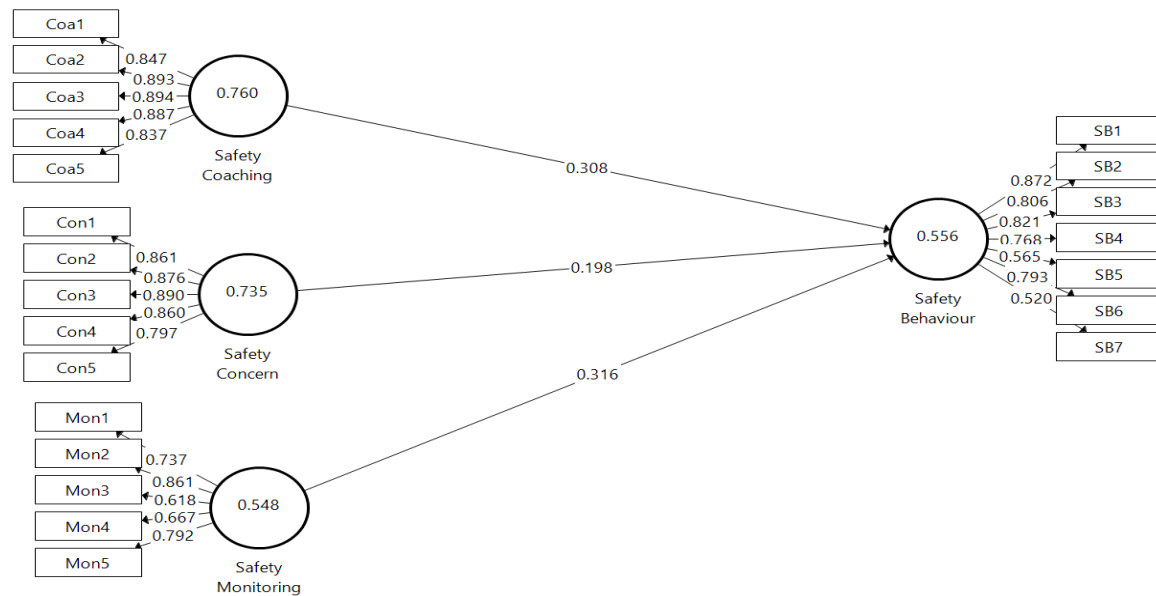


Figure 2 . Measurement Model

Assessment of Structural Model (Hypotheses Testing)

Following the evaluation of the measurement model, attention was shifted to the analysis of the structural model. This was accomplished by implementing a bootstrapping procedure with a resample size of 1000. The purpose of this step was to ascertain the influence of the respective factors on the independent variable. Details such as path coefficients, standard errors, t-values, and p-values integral to the structural model were subsequently recorded and reported (Benitez et al., 2020; Joseph F. Hair et al., 2019; Ramayah et al., 2018). Besides, the effect size and R^2 values are also presented in this section. The results of the direct influence of all factors are shown in Table 3, 4, and 5.

Table 3

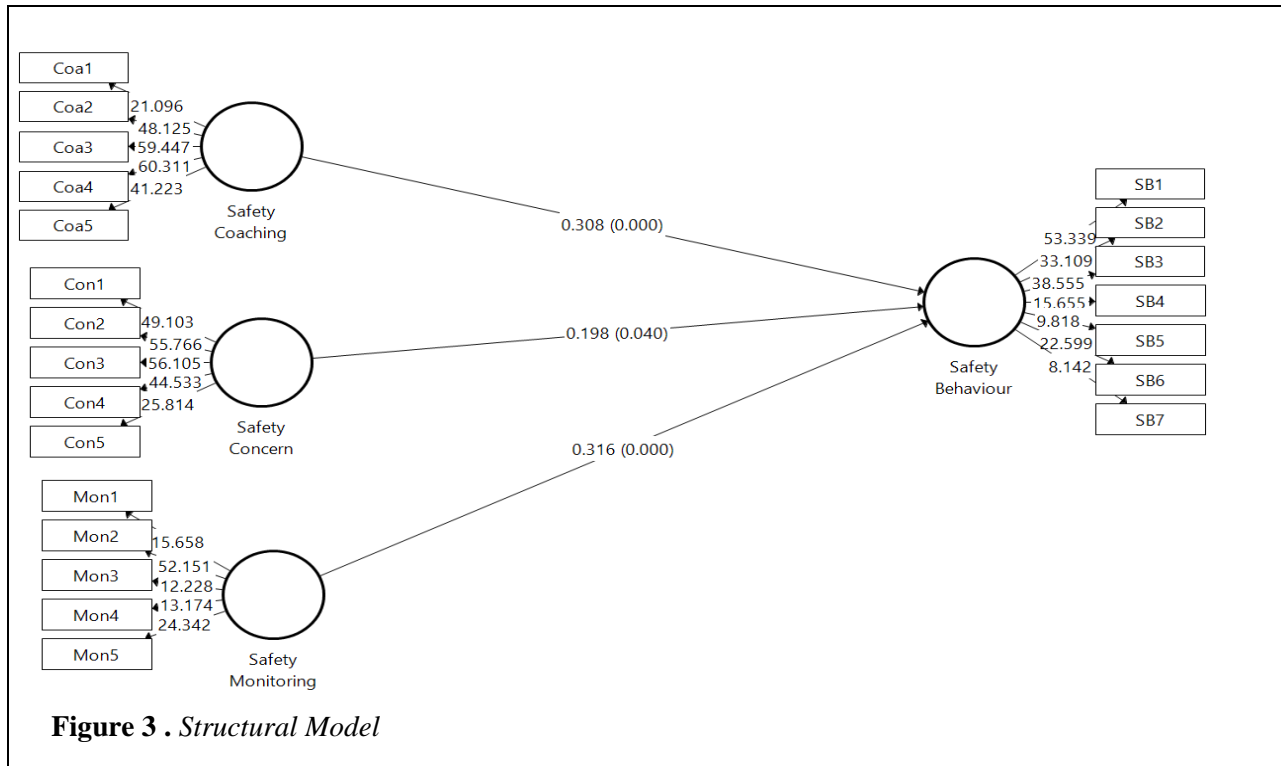
Path Coefficient (Direct Effect)

	β	T Statistics	P Values
Safety Coaching -> Safety Behaviour	0.308	3.699	0.000
Safety Concern -> Safety Behaviour	0.198	2.055	0.040
Safety Monitoring -> Safety Behaviour	0.316	3.967	0.000

The results of the structural model analysis provide illuminating insights into the role of various safety management strategies in influencing worker behaviour. Safety coaching emerges as a critical factor, with a statistically significant positive effect on safety behaviour, demonstrated by a path coefficient (β) of 0.308. The t-statistics value of 3.699 and the p-value of 0.000 further emphasize the centrality of safety coaching in promoting a culture of safety at the workplace.

On a similar note, there is a discernible positive effect of safety concern towards safety behaviour, with a path coefficient (β) of 0.198. Though slightly less influential than safety coaching, its significance remains, as suggested by the t-statistics value of 2.055 and a p-value of 0.040. This suggests that addressing safety concerns can indeed lead to tangible improvements in safety practices among workers.

Moreover, safety monitoring stands out as the most impactful among the strategies studied, boasting the highest path coefficient (β) of 0.316. This compelling figure is an indicator that vigilant safety monitoring is paramount in steering enhanced safety behaviour. The robustness of this relationship is further buttressed by the t-statistics value of 3.967 and a p-value of 0.000. In essence, while all three strategies – safety coaching, safety concern, and safety monitoring – play a significant role, safety monitoring distinctly overshadows the others in its ability to boost safety behaviour. Figure 3 illustrates the results of structural model evaluation.



Effect Size

The analysis of the effect sizes, represented by f^2 values, offers further insights into the strength of the influence exerted by the safety leadership on safety behaviour. Safety coaching, with an effect size of 0.057, is shown to have a modest yet substantial effect on safety behaviour. This is indicative of the relevance of safety coaching in moulding positive safety habits among workers. Additionally, safety concern, although carrying a relatively smaller effect size of 0.021, continues to have a noticeable impact on safety behaviour. This suggests that even subtle alterations in addressing safety concerns can lead to observable changes in workers' adherence to safety norms. Among the three strategies, safety monitoring proves to have the most pronounced effect on safety behaviour, as demonstrated by the highest effect size of 0.083. This underscores the role of rigorous safety monitoring in significantly amplifying safe practices among workers. Overall, the f^2 values provide a more nuanced understanding of the contributions of safety coaching, safety concern, and safety monitoring, confirming their tangible impact on safety behaviour, albeit to varying degrees (Cohen, 1998). Overall, while all three variables show small effect sizes, all are non-trivial and indicate that safety coaching, concern, and monitoring have a noteworthy impact on safety behaviour.

Table 4*Effect Sizes (f^2 value)*

	Safety Behaviour	Intepretation Cohen, 1998)
Safety Behaviour		
Safety Coaching	0.057	small
Safety Concern	0.021	small
Safety Monitoring	0.083	small

R² Values

The R² value indicates the proportion of variance explained by the independent variables in relation to the criterion variable (Hair et al., 2014). According to Cohen et al. (1998), R² degree of the independent variables' predictive ability on the dependent variable. If the values is 2%, the variance is considered small; 13% indicates a medium variance; whilst, R² of 26% is considered large. An R-Square value of 0.585 suggests that approximately 58.5% of the variance in safety behaviour can be predicted from the independent variables. This indicates a reasonably high level of predictive power. In other words, safety coaching, safety concern, and safety monitoring together explain a substantial portion of the variations in safety behaviour among the workers. The R² values for this study are summarised in Table 5 .

Table 5*R²*

	R Square	R Square Adjusted
Safety Behaviour	0.585	0.580

SUMMARY AND DISCUSSION

This research underlines the significant influence of safety coaching, safety concern, and safety monitoring in shaping safety behaviour among domestic waste collecting workers. Accounting for an R-Square value of 0.585, our model elucidates 58.5% of the variance in safety behaviour. This echoes previous research, underscoring the crucial impact of a robust safety leadership on workers safety behaviour (Lu & Yang, 2010; Subramaniam et al., 2022; Zulkifly et al., 2017). Safety coaching surfaced as a prominent predictor of safety behaviour. It emphasizes the effectiveness of active coaching, mirroring the findings of Clarke (2013) who stressed the role of transformational and transactional leadership styles in fostering a culture of safety behaviour. Safety leaders are integral in nurturing positive safety attitudes, enhancing workers' motivation and commitment to adhere to safety regulations (Zulkifly et al., 2022). Despite a lesser, yet significant influence of safety concern, our findings are in line with previous studies (Karthega, 2018; Lu & Yang, 2010). Their work delineated the association between job demands and resources, burnout, engagement, and safety outcomes. An organization that exhibits genuine concern for safety often helps workers better manage job demands, reducing burnout and fostering a sense of

engagement with safety protocols. Most notably, safety monitoring emerged as the highest predictor, highlighting its role in maintaining safety practices, resonating with (Zohar & Luria, 2003; Zulkifly et al., 2022) assertion on the importance of constant monitoring in maintaining safety standards. With an R-Square Adjusted value of 0.580, our model's robustness is reinforced, demonstrating that the predictors genuinely account for the variance explained, eliminating the prospect of predictor inflation. In conclusion, this research reiterates the centrality of safety interventions in moulding safety behaviour, offering a significant contribution to the broader scholarship on workplace safety. Table 6 repopulates the findings of this study.

Table 6

Summary of Hypothesis Results

Items	Hypothesis Statement	Results
H ₁ :	“Perceived safety coaching will significantly influence safety behaviour among domestic waste collecting workers.”	Accepted
H ₂ :	“Perceived safety concern will significantly influence safety behaviour among domestic waste collecting workers.”	Accepted
H ₃ :	“Perceived safety monitoring will significantly influence safety behaviour among domestic waste collecting workers.”	Accepted

The findings from this study confirm all three of our initial hypotheses. The first hypothesis, which proposed that perceived safety coaching would significantly influence safety behaviour among domestic waste collecting workers, was supported by the data. Similarly, the second hypothesis, asserting that perceived safety concern would significantly influence safety behaviour, was also substantiated, although its effect was comparatively less potent than that of safety coaching. Finally, the third hypothesis positing that perceived safety monitoring would significantly influence safety behaviour among these workers was also verified. Notably, the data pointed to a particularly robust influence from this factor, reinforcing its crucial role in enhancing safety behaviour. In conclusion, all three hypotheses proposed in the study were accepted, underscoring the significant roles played by safety coaching, safety concern, and safety monitoring in shaping safety behaviour among domestic waste collecting workers.

CONCLUSION

In the first instance, this research makes significant contributions to the burgeoning literature on workplace safety in the utility and public cleansing sector, specifically among domestic waste collecting workers in Malaysia. With a focus on the factors of safety coaching, safety concern, and safety monitoring, this study elucidates the crucial role of safety leadership in promoting safer work behaviours. The findings underscore that these factors significantly influence safety behaviour, ultimately validating the hypotheses proposed at the outset. Secondly, the study's

implications for the industry are far-reaching. It not only brings to the fore the alarming surge in industrial accidents in this sector but also furnishes empirical evidence for the practical solutions to these issues. With its rigorous methodology and robust findings, the research underlines the indispensability of safety interventions, particularly those geared towards fostering a culture of safety awareness, genuine concern for worker safety, and regular monitoring of safety practices. In conclusion, the study's findings carry significant theoretical and practical implications. The results presenting a detailed, empirical investigation into the factors that influence safety behaviour among domestic waste collecting workers. It is hoped that these insights will inform policy-making and practices in the industry, thereby contributing to the ongoing efforts to curb workplace accidents and ensure worker safety.

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