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Enhancing Workplace Road Safety through the Work-Related Road Safety Support Program

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Abstract
Work-related road safety is a critical concern in Malaysia, with crashes affecting employee welfare and organizational performance. This study evaluates the effectiveness of the Work-Related Road Safety Support Program (WRRSP) in 40 organizations, comprising 20 with the intervention and 20 without. The program, delivered through expert consultations and tailored recommendations, aimed to strengthen management practices and reduce risks. Using a pre- and post-program questionnaire and univariate general linear model analysis, significant improvements were observed in safety management, communication, and employee induction among intervention organizations, confirming the positive impact of WRRSP in enhancing workplace road safety.

Keywords: Road Safety; Work-Related; Malaysia;

DOI:

1.0 Introduction

Work-related road safety is a critical concern in Malaysia, where traffic crashes involving employees cause serious injuries, deaths, and significant interruptions for organizations. These events impact not only employee health, but also business productivity and reputation (Darus, 2024). Recent data from the Social Security Organization (SOCSO) reported over 41,000 work-related accident cases in mid-2025, with commuting incidents contributing heavily to workplace mortality (Sim, 2024). Such outcomes highlight the urgent need for organizations to address road safety proactively.

The Malaysian government has shown strong commitment to reducing road traffic fatalities and injuries through initiatives led by various agencies. One key milestone was the launch of the Malaysia Road Safety Plan 2022–2030 at the national level, which aligns with the World Health Organization's agenda to halve global road traffic deaths by 2030 compared to 2019 levels (Ministry of Transport Malaysia, 2022). Despite these efforts, the majority of interventions have concentrated on public education, while workplace-specific

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road safety programs remain underdeveloped (SOCSO, 2023). Furthermore, many small organizations lack systematic procedures to assess and mitigate road risks, limiting progress towards achieving both national and global safety targets (Ministry of Transport Malaysia, 2022).

2.0 Literature Review

Structured workplace road safety interventions are increasingly recognized worldwide for their effectiveness in reducing crashes and fatalities. International initiatives such as Sweden's Vision Zero and the European PRAISE project show that employer-led strategies, including leadership commitment, systematic risk assessments, and targeted employee training, can significantly reduce incident rates (Evenson et al., 2023; ETSC, 2025). Previous studies also emphasize that successful programs integrate road safety into broader occupational health systems, with continuous monitoring and active involvement from management (Vision Zero, 2019; Jilcha, 2023).

Despite global progress, research and practice on workplace road safety in Malaysia remain limited. Local studies and initiatives have mostly emphasized general road safety awareness rather than tailored organizational programs, leaving notable gaps in practice (Rusli, 2014; Darus, 2024). These gaps are particularly evident among small organizations, which often lack access to evidence-based tools and resources needed to manage road risks effectively.

In response to this need, the Work-Related Road Safety Support Program (WRRSP) was introduced in Malaysia to provide tailored safety assessments, expert consultations, and practical recommendations covering management, systems, monitoring, driver and vehicle practices, and journey planning. Early evaluations indicate that WRRSP's holistic design aligns well with international best practices, moving beyond short-term compliance toward the development of sustainable safety cultures. The program was formulated through stakeholder engagement during a series of workshops conducted by the researchers, ensuring that its content reflected organizational realities. Furthermore, the final WRRS module and assessment framework were reviewed and validated by experts in the field, reinforcing its credibility and applicability.

The aim of this study is to evaluate the effectiveness of the WRRSP by comparing 20 organizations that implemented the program with 20 organizations that did not receive the intervention. The findings provide a basis for organizations, with support from relevant agencies, to strengthen work-related road safety within their operations and to reduce the risk of road traffic crashes involving their fleets or vehicles.

3.0 Methodology

3.1 Data Collection

The study employed a structured self-assessment questionnaire to examine work-related road safety (WRRS) management practices in participating organizations. The instrument was designed to capture both organizational characteristics and the extent of WRRS practices across management domains. It consisted of three sections. Section A collected background information, including industry type, workforce size, commuting patterns, and the availability of basic road safety infrastructure such as zebra crossings, signage, designated parking areas, and traffic calming facilities. Section B gathered details on the person responsible for WRRS, including their role, responsibilities, and years of experience, as well as data on fleet size and composition, the number of official drivers and riders by age group, and records of crash involvement in the previous 12 months (property damage, injuries, fatalities, and near-misses). Section C assessed WRRS management practices across six domains: management commitment, systems and processes, communication, monitoring and assessment, driver management, vehicle management, and journey management. Responses were recorded in a "Yes/No/Don't know" format, with space for remarks or supporting evidence such as policies, reports, and meeting documentation. For the purpose of this study, only Section C was analyzed and discussed.

A total of 40 companies from across Malaysia took part in this study, representing industries where work-related road risks are common, such as manufacturing, logistics, and public services. Twenty of these companies were placed in the intervention group and introduced to the Work-Related Road Safety Support Program (WRRSP), which involved expert consultations, organizational visits, and tailored recommendations to strengthen road safety practices. The other 20 companies served as a control group and did not receive the program. To establish a baseline, all participating companies first completed the self-assessment questionnaire on their safety management practices. Following the implementation period, the same questionnaire was administered again to both groups. This pre- and post-assessment approach allowed meaningful comparisons to be made, providing clear evidence of WRRSP's effectiveness in enhancing organizational-level road safety practices.

3.2 Data Analysis

Data analysis was conducted using the Generalized Linear Model – Univariate procedure in SPSS Version 23. A one-way Analysis of Covariance (ANCOVA) was applied to examine the effects of the Work-Related Road Safety Support Program (WRRSP) between intervention and control groups. In this analysis, the independent variable was group type (intervention versus control), the dependent variables were the post-intervention scores across the six domains of WRRS practices, and the corresponding pre-intervention scores were included as covariates. This approach allowed for the assessment of post-intervention differences between groups while adjusting for baseline values.

The assumptions of ANCOVA were checked prior to analysis, including the scale of measurement, independence of observations, absence of significant outliers, normality of residuals, homogeneity of variances, and linearity between the covariates and dependent variables. Once the assumptions were met, the univariate analysis was performed to test for statistically significant differences. To further examine mean differences across groups, pairwise comparisons were conducted using the Bonferroni adjustment. Statistical significance was determined at the $p < .05$ level.

4.0 Findings

A univariate general linear model (ANCOVA) was conducted to compare organizations with and without intervention (see Table 1). The results showed that the intervention group reported higher scores in work-related road safety management (M = 2.15, SD = 0.67) compared to the control group (M = 1.60, SD = 0.82), F(1, 37) = 4.39, p = .043. Similarly, the intervention group reported higher scores in communication regarding WRRS (M = 2.05, SD = 0.61) than the control group (M = 2.00, SD = 0.92), F(1, 37) = 10.22, p = .003. For employee WRRS induction, the intervention group (M = 2.15, SD = 0.81) also showed higher scores than the control group (M = 1.65, SD = 0.81), F(1, 37) = 5.14, p = .029.

Table 1. Univariate analysis between intervention and control group

Work-Related Road Safety Practice	Control Group			Intervention Group			Degree of freedom (Between, Within) Groups	F	p-value
	Mean	SD	SE	Mean	SD	SE			
Management, System and Process									
Management Commitment	1.70	0.657	0.093	2.10	0.641	0.093	(1,37)	0.232	0.633
Work-Related Road Safety Management	1.60	0.821	0.136	2.15	0.671	0.136	(1,37)	4.391	0.043
Communication Regarding WRRS	2.00	0.918	0.082	2.05	0.605	0.082	(1,37)	10.223	0.003
Monitoring and Assessment									
Road Traffic Crash and Incident Investigation	1.95	0.686	0.073	2.25	0.716	0.073	(1,37)	1.058	0.310
Monitoring WRRS Performance	1.30	0.571	0.113	2.15	0.745	0.113	(1,37)	0.000	0.983
Performance Monitoring and Recognition	1.700	0.657	0.105	2.40	1.046	0.105	(1,37)	0.068	0.796
Driver Management									
Driver selection and assessment	1.65	0.813	0.123	2.05	0.759	0.123	(1,37)	0.458	0.503
Employee WRRS Induction	1.65	0.813	0.890	2.15	0.813	0.890	(1,37)	5.143	0.029
Driver Training	1.50	0.888	0.093	2.15	0.813	0.093	(1,37)	2.807	0.102
Vehicle Management									
Fleet Vehicle Selection	1.40	0.995	0.135	2.45	0.945	0.135	(1,37)	0.008	0.927
Fleet Vehicle Maintenance	2.55	0.826	0.000	1.80	0.894	0.000	(1,37)	0.000	1.000
Journey Management									
Journey Management	1.55	0.945	0.101	2.050	0.826	0.101	(1,37)	1.518	0.226

No significant differences were observed in management commitment, F(1, 37) = 0.23, p = .633; road traffic crash and incident investigation, F(1, 37) = 1.06, p = .310; monitoring WRRS performance, F(1, 37) = 0.00, p = .983; performance monitoring and recognition, F(1, 37) = 0.07, p = .796; driver selection and assessment, F(1, 37) = 0.46, p = .503; driver training, F(1, 37) = 2.81, p = .102; fleet vehicle selection, F(1, 37) = 0.01, p = .927; fleet vehicle maintenance, F(1, 37) = 0.00, p = 1.000; and journey management, F(1, 37) = 1.52, p = .226.

5.0 Discussion

This study found that organizations exposed to the Work-Related Road Safety Support Program (WRRSP) improved in three domains: safety management, communication, and employee induction. These gains are consistent with international evidence that employer-led, structured interventions elevate safety performance when management systems, clear messaging, and onboarding are addressed together (Evenson et al., 2023; ETSC, 2025). Programs such as Vision Zero and PRAISE report similar patterns, where codified processes and visible leadership support create the conditions for safer day-to-day behaviors (Vision Zero, 2019; ETSC, 2025). The present study reinforces that trajectory and adds Malaysian organizational data to a literature base that has been dominated by European and North American cases.

The improvement observed in safety management suggests that the WRRSP has enabled participating companies to move beyond policy statements and establish routines that can be actively monitored and improved. This is a meaningful shift, as earlier research has shown that clear, well-defined procedures often lead to lower incident rates by minimizing ambiguity in daily practices (Evenson et al., 2023). The findings from this study reinforce that connection. In the Malaysian context, past efforts have typically focused on general safety awareness campaigns, which, while useful, tend to overlook the operational realities within individual organizations. In contrast, the WRRSP's emphasis on structured self-assessments and organization-specific guidance appears to have addressed this gap, offering more practical, context-sensitive support to firms. This targeted approach not only helps companies identify their specific weaknesses but also encourages a more proactive and sustained engagement with safety management (Darus, 2024).

Improved communication on WRRS matters reflects a growing recognition in the literature that communication is not merely a support function but a core behavioral lever for shaping safety culture. Vision Zero resources, for instance, emphasize frequent, clear, and two-way communication as a defining trait of high-performing safety systems, with downstream benefits such as increased compliance and improved near-miss reporting (Vision Zero, 2019). This study reinforces that association in the Malaysian multi-industry context, showing that even simple and low-cost efforts such as targeted safety briefings or regular feedback loops can lead to noticeable shifts in organizational norms. Other scholars have also highlighted the importance of safety communication in influencing employee perceptions and engagement. Griffin and Neal (2000) found that open communication channels significantly predict safety motivation and participation. Zohar and Polachek (2014) similarly emphasized that supervisor-led safety communication reduces the underreporting of hazards by fostering a psychologically safe environment. The current findings suggest that when communication is approached as

an active and continuous process, rather than a one-off announcement, organizations are more likely to build trust, encourage proactive reporting, and promote shared ownership of safety outcomes within a relatively short timeframe.

Improvements in employee induction are significant, as onboarding is often underdeveloped in small and medium-sized organizations. The literature highlights that early, role-specific training enhances hazard recognition and establishes shared expectations before unsafe habits form (ETSC, 2025). Findings from this study support that perspective, indicating that WRRSP guidance helped companies deliver more consistent onboarding, particularly around journey management, vehicle use, and incident reporting. These early efforts contribute to individual preparedness and strengthen safety culture from the start. Prior studies, such as Saks and Gruman (2011), also show that structured onboarding improves employee engagement and promotes safer long-term behavior.

Several domains did not improve significantly: management commitment, crash and incident investigation, monitoring performance and recognition, driver selection and training, fleet maintenance, and journey management. This pattern both agrees with and diverges from prior work, which often shows that leadership and monitoring change more slowly than communication or induction. International evaluations note that visible leadership behaviors, resource allocation, and data-driven review cycles tend to require longer horizons and formal governance changes to take root (Evenson et al., 2023; Jilcha, 2023). In that respect, our short follow-up window likely constrained observable change. At the same time, some PRAISE case studies reported quicker wins in driver training and journey planning when companies had existing training vendors and route-planning tools in place (ETSC, 2025). The absence of similar quick gains here may reflect baseline constraints typical of Malaysian small organizations, including limited training budgets, outsourced fleets with fragmented responsibility, and less mature telematics or scheduling systems (Darus, 2024; PERKESO, 2025).

Two additional explanations merit attention. First, several non-significant domains involve costs or capital planning. Driver training, preventive maintenance, and journey optimization often require contracts, equipment, or software. Organizations may have needed more time to budget and procure. Second, management commitment and performance recognition depend on leadership routines, target setting, and consequence management. Prior research shows these elements change last because they touch incentives and accountability structures (Vision Zero, 2019). The present null findings therefore do not necessarily indicate ineffectiveness. They likely indicate sequencing: culture-building steps improved first, while investment-heavy and governance-heavy elements lagged.

Taken together, the results support a staged change model seen in the literature. Early wins occur in communication and onboarding, followed by consolidation of management systems, and later shifts in leadership behaviors, monitoring, and resourcing (Evenson et al., 2023; ETSC, 2025). The study contributes new evidence from Malaysia that WRRSP can catalyze the first two stages across diverse sectors, complementing national ambitions in the Malaysia Road Safety Plan 2022–2030 (Ministry of Transport Malaysia, 2022). Future evaluations with longer follow-up and process measures, such as leadership walk-arounds, near-miss analysis rates, telematics uptake, and maintenance compliance, would clarify the trajectory of the harder-to-shift domains.

Limitations include the quasi-experimental design, reliance on self-assessment, and a relatively short post-implementation interval. These are common in organizational safety research and can be mitigated in future work through independent audits, objective performance indicators, and longitudinal designs. Even with these limitations, the pattern of effects is coherent with international findings and offers practical direction for scaling WRRSP in Malaysia.

6.0 Conclusion and Recommendations

This study confirms that the Work-Related Road Safety Support Program (WRRSP) is effective in enhancing organizational practices related to road safety, particularly in strengthening safety management, improving communication, and ensuring systematic employee induction. These improvements demonstrate that the program not only supports better systems but also fosters a stronger safety culture within participating organizations. However, the absence of significant change in domains such as management commitment, driver training, vehicle maintenance, and journey management indicates that these areas require more time, resources, and sustained leadership to achieve meaningful transformation. To maximize the impact of WRRSP, organizations should focus on securing deeper engagement from senior management, as leadership commitment is essential to embed safety as a long-term priority. Expanding structured training programs tailored to both drivers and managers can address gaps in driver behavior and journey planning, while the adoption of digital monitoring tools such as telematics and structured reporting systems can provide organizations with practical means to track performance and drive continuous improvement. At the policy level, national agencies may strengthen support by introducing incentive schemes, recognition programs, or compliance frameworks that encourage wider adoption of WRRSP across industries, especially among small and medium enterprises that often lack resources. Furthermore, follow-up studies with longer timeframes will be important to evaluate the sustainability of the program's impact and to identify enabling factors for long-term success. Overall, WRRSP emerges as a promising and adaptable model for workplace road safety in Malaysia, and with continuous refinement, broader implementation, and supportive policy measures, it has the potential to contribute significantly to the achievement of Malaysia's Road Safety Plan 2022–2030 and the global commitment under the United Nations Sustainable Development Goals to reduce road traffic deaths and injuries.

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Paper Contribution to Related Field of Study

This study contributes to the growing body of knowledge on organizational-level road safety management through empirical evidence on the effectiveness of the Work-Related Road Safety Support Program (WRRSP) in Malaysia. The findings show that targeted interventions can significantly improve specific domains of WRRS practices, particularly road safety management processes, communication regarding WRRS, and employee induction programs. These outcomes emphasize the importance of structured organizational support in strengthening safety culture and indicate that interventions focusing on management systems and employee engagement are effective in reducing work-related road risks. The study also offers a validated framework for organizations to assess and monitor their road safety practices using a standardized self-assessment tool. The application of the Generalized Linear Model – Univariate with pre- and post-intervention data demonstrates a rigorous method for evaluating program effectiveness, which can serve as a reference for future intervention studies in occupational road safety. The inclusion of companies across different industries and regions in Malaysia enhances the generalizability of the results and provides insights that are valuable for policymakers, safety practitioners, and industry stakeholders. At a broader level, the research advances the understanding of how work-related road safety programs can be systematically implemented and evaluated within organizational contexts. The integration of WRRS strategies into occupational safety and health management systems is highlighted as essential for aligning organizational practices with national road safety objectives. The WRRSP emerges as a model that can be replicated or adapted in other countries facing similar challenges, contributing to regional and international discourse on workplace road safety management.

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