

Risky Driving Behaviors and Severity of Commuting Accidents in Malaysia

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ABSTRACT – Commuting accidents, occurring during travel to or from the workplace, remain a critical contributor to Malaysia's road accident statistics. This study investigates how risky driving behaviors influence the severity of commuting accidents, specifically in car-to-motorcyclist collisions, a commonly overlooked crash type in occupational safety research. Using a quantitative design, data were collected from 58 respondents via structured questionnaires, and Spearman's correlation was applied to assess the relationships between four risky driving behaviors and accident severity. Results indicate that commuting accidents are most common among female workers aged 31–50 in manufacturing, education, and retail sectors, with cars more frequently involved than motorcycles. Aggressive behaviors, particularly running red lights, showed the strongest association with accident severity. The study offers new insight into how demographic factors and unsafe commuting behaviors intersect to shape accident outcomes, emphasizing the need for targeted interventions in workplace commuting safety programs. These findings contribute to the field of commuting accidents and represent a significant part of Malaysia's commuting accident statistics, highlighting the importance of improving occupational and public safety.

KEYWORDS: Car, commuting accidents, human factor, motorcyclist, road accident, violation

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1. INTRODUCTION

Accidents can happen on the way between the employee's residence and their place of work or from the place of work to their home. This is possible when an accident occurs while commuting (commuting accident). According to the International Labor Organization (ILO), a traffic accident while commuting to work was defined as an accident on a regular route, whether between workplaces or training places, which was related to the occupation and the location of the main residence, the location where workers buy their food, or the place where workers receive wages, that causes death or injury (ILO, 2010). According to the Malaysian Institute of Road Safety Research (MIROS), about 80% of road accidents were caused by human error rather than environmental conditions (MIROS, 2016).

Although commuting accidents are a growing concern, current research remains fragmented and sector-specific. Underreporting in formal statistics was highlighted by a study of nurses in Selangor, which found a significant discrepancy between officially recorded and self-reported commuting accidents without injury. According to Selamat & Surlenty (2014), studies have investigated commuting accidents among healthcare workers, but not enough has been done on other areas where commuting

accidents may also occur frequently, such as manufacturing or construction, to provide targeted solutions. Further research is required on the behavioural components of commuting accidents, such as driver weariness, stress, and risky behaviors, which are often overlooked in Malaysian commuting studies. A previous study conducted by Hoe (2014) found that the majority of commuting accidents occurred during travel to and from work, involved less than five kilometers of distance, occurred during morning shifts, and involved many motorcyclists.

Research indicates that commuting accidents were strongly influenced by travel patterns, including travel distance and time. Manufacturing workers, often traveling shorter distances, face higher risks on a per-kilometer basis. This risk stems from congested urban routes and reduced vigilance during routine commutes. Programs like the Social Security Organisation (SOCSO)'s Commuting Safety Support Program (CSSP) have shown promise in addressing these risks by promoting safety education and implementing workplace-level interventions. This initiative has improved riding behaviors and reduced accident rates, highlighting the importance of targeted safety programs (Jamaluddin et al., 2015).

There is a lack of studies on accident scenarios, accident severity, and risky driving behaviour among Malaysian drivers and riders, especially related to commuting accidents. Therefore, the aim of this study was to determine the relationship between risky driving behaviour and the severity of commuting accidents among Malaysians. By focusing on behavioural risk factors across diverse occupational groups, this research offers new insights that support targeted safety interventions for commuting safety strategies.

2. METHODOLOGY

2.1 Participant

About 58 participants participated in this study. The inclusion criteria for the participants were that they had experienced a commuting accident within the past ten years (2016-2025) and that the commuting accident involved a car and a motorcycle.

2.2 Questionnaire

The questionnaire used in this study was adapted to the specifics of this research from the Reason et al. (1990) tool. In addition, this questionnaire was also adapted from a study conducted by Gupta et al. (2021). The questionnaire was designed with three parts. The first part gathered demographic information, including sociodemographic characteristics, health status, commuting accident information, and occupational information. The second part covered accident scenario, followed by the third part which focused on risky driving behavior by four main constructs, which were aggressive violation, errors, slips and ordinary violation, responses were on a 5-point Likert scale, ranging from 1= 'never' to 5 = 'always' Consequently, in this research, three subject matter experts were chosen to assess the questionnaire items for their validity. The pilot study was conducted with 20 samples, followed by normality and reliability tests.

This research was conducted by distributing questionnaires to Malaysian drivers and riders. Participants were selected from among those who had experienced commuting accidents. The respondents also experienced accidents over the 10-year period (2016-2025).

2.3 Data Analysis

Descriptive statistics, such as frequencies, percentages, and means, were appropriate for summarizing responses regarding risky driving behaviors and identifying the severity of commuting accidents. This approach helps identify the dangerous behaviors that participants most commonly describe. Furthermore, table-based representations of data can provide a concise overview of the prevalence of specific behaviors.

To assess the connection between risky driving behaviors and road accidents among Malaysian drivers and riders, the analysis employed correlation and regression analyses. The Spearman correlation test was used in this study to assess the association between risky driving behavior and road accidents among Malaysians.

3. RESULTS AND DISCUSSION

3.1 Demographic Background

Table 1 summarizes the demographic characteristics of the 58 respondents involved in commuting accidents. The findings indicate that female workers dominated the sample, aligning with Niu et al. (2024), who reported higher female participation in studies related to commuting safety awareness. Most respondents were within the productive age range of 31–50 years, suggesting that middle-aged workers face greater exposure to commuting-related risks due to consistent travel routines and time pressure. In terms of sectoral distribution, manufacturing, education, and retail emerged as the top three industries represented, reflecting sectors with structured shift schedules and high daily mobility. Although the construction sector showed a lower share in this sample, previous national data (Sukor et al., 2020) identified it as a key contributor to commuting accidents, underscoring variability in sectoral exposure over time.

TABLE 1: Demographic background of participants

Variable		Percentage
Gender	Male	31%
	Female	69%
Age	20-30 years	36%
	31-50 years	60%
	>50 years	4%
Industry	Agriculture	3%
	Mining and Quarrying	3%
	Manufacturing	22%
	Construction	14%
	Healthcare	9%
	Education	21%
	Retail and wholesale	19%
	Others	9%

3.2 Commuting Accidents Characteristics

Table 2 summarizes the characteristics of commuting accidents among respondents. The majority of incidents involved cars rather than motorcycles, highlighting the prominence of car-to-motorcyclist interactions in commuting crashes. Most respondents reported experiencing only one commuting accident, suggesting that such incidents are often isolated but still significant in frequency. Accidents were most common during medium-distance commutes (6-10 km), indicating a heightened risk for workers who travel neither too short nor too long distances, possibly due to routine complacency or moderate traffic exposure. The route analysis reveals that accidents predominantly occurred while traveling to work, reflecting increased morning-rush congestion and time pressure before working hours. Collectively, these patterns underscore that commuting accidents are influenced more by travel conditions and driver behaviour during morning commutes than by distance alone.

3.3 Commuting Accidents Severity

Table 3 summarizes the severity aspects of commuting accidents, including vehicle impact, injury distribution, body impact, and collision patterns. The analysis reveals that frontal and rear-end collisions were the most frequent, accounting for the majority of incidents. Injury severity analysis further shows that most drivers and riders sustained minor injuries, while a smaller proportion experienced major injuries. Although fatalities were rare, their occurrence highlights that commuting accidents can still result in severe physical consequences. Passenger injury data revealed a similar trend, with most reporting minor or no injuries, emphasizing that while many crashes are not life-threatening, they still pose significant safety risks that disrupt daily mobility and productivity. The examination of the first body impact showed that the legs were the most vulnerable body region, followed by the upper body and

head. This pattern reinforces the high exposure of motorcyclists' lower limbs to direct impact during collisions. Aligned with the study conducted by Sahak et al. (2020), which found that the majority of workers who survived commuting accidents were blue-collar workers, most of whom sustained fractures, with the impact primarily affecting the lower limbs.

Collision pattern analysis provides additional insight into crash dynamics. On the car driver's side, severe collisions most often occur when turning across the path of an oncoming motorcyclist or approaching a braking motorcyclist. Meanwhile, on the motorcyclist's side, severe collisions were commonly associated with approaching a braking car or changing lanes in the path of another vehicle. Turning across the path of an oncoming car was the least recorded case.

Overall, the predominance of frontal and rear-end impacts suggests that driver behavior and vehicle positioning play crucial roles in accident outcomes. The high occurrence of leg injuries further reflects the vulnerability of motorcyclists in mixed-traffic environments where physical protection is minimal. Although most accidents resulted in minor injuries, the presence of major and fatal cases demonstrates that even short-distance commutes can carry serious risks. These patterns collectively highlight the need for workplace and road safety initiatives that address human factors such as reaction time, hazard perception, and safe maneuvering practices, especially during high-density travel hours.

TABLE 2: Commuting accident characteristics

Variable		Percentage
Vehicle	Car	67%
	Motorcycle	33%
Frequency of commuting accident happened	1	48%
	2	28%
	3	12%
	>3	12%
Distance	< 5 km	27%
	6km – 10km	40%
	> 10 km	33%
Route	To work	52%
	Coming back from work	29%
	While commuting from and to a place where you usually have a meal	10%
	While commuting from and to the place where you need to do a formal job outside your current workplace	9%

TABLE 3: Commuting accidents severity

Variable		Percentage
Vehicle impact	Front	38%
	Rear	38%
	Left side	10%
	Right side	14%
Driver/Rider injury	No injury	38%
	Minor injury	48%
	Major injury	14%
Passenger injury	No passenger	24%
	No injury	35%
	Minor injury	36%
	Major injury	3%
	Dead	2%

Variable	Percentage
First body impact	
Head	22%
Upper body	28%
Pelvis	9%
Leg	41%
Colliding part area- Car	
Approaching a stationary motorcyclist	26%
Approaching a braking motorcyclist	20%
Turning across the path of an oncoming motorcyclist	31%
Changing lane across the path of an oncoming motorcyclist	15%
Changing lane across the path of an overtaking motorcyclist	8%
Colliding part area - Motorcycle	
Approaching a stationary car	16%
Approaching a braking car	32%
Turning across the path of an oncoming car	10%
Changing lanes across the path of an oncoming car.	21%
Changing lanes across the path of an overtaking car.	21%

3.4 Risky Driving Behavior

Table 4 summarizes the mean scores of risky driving behaviors among Malaysian commuters. Aggressive violations recorded the highest overall mean, indicating that deliberate risky acts are more common than unintentional errors or slips. Among these, the tendency to “take a chance and cross on lights that have turned red” emerged as the most dominant behaviour, confirming that intentional rule-breaking during traffic signals remains a major safety concern. Other aggressive tendencies, such as driving against one-way traffic or engaging in informal racing, appeared less frequent but still noteworthy. These findings suggest that commuting risks in Malaysia are primarily driven by conscious behavioural choices rather than inadvertent mistakes, emphasizing the need for stricter behavioural interventions and enforcement strategies targeting deliberate violations.

TABLE 4: Risky driving behavior

Construct	Mean
Aggressive Violation	2.30
Errors	2.10
Slips	2.11
Ordinary violations	2.12

3.5 Relationship Between Risky Driving Behavior And Commuting Accident Severity

Table 5 presents the Spearman’s rank-order correlations between risky driving behaviors and accident severity. The analysis revealed that gender was significantly and negatively correlated with ordinary violations, $r_s(58) = -0.290$, $p < .05$. This indicates a weak negative relationship, suggesting that male drivers and riders were slightly more likely than female drivers and riders to engage in ordinary violations such as speeding or unsafe overtaking.

Second, location was found to have significant negative correlations with both errors, $r_s(58) = -0.293$, $p < .05$, and ordinary violations, $r_s(58) = -0.413$, $p < .01$. The correlation with errors represents a weak negative relationship, while the correlation with ordinary violations indicates a moderate negative relationship. This suggests that commuting in certain locations was associated with reduced tendencies to commit errors and ordinary violations, possibly due to stricter traffic regulation or safer road design.

Finally, a significant positive correlation was observed between driver/rider injury and errors, $r_s(58) = 0.305$, $p < .05$. This represents a moderate positive relationship, indicating that higher levels of driving errors were associated with greater injury severity in commuting accidents. This highlights the critical role of human mistakes in influencing accident outcomes.

TABLE 5: Relationship between risky driving behavior and commuting accident severity

	Aggressive violation	Errors	Slips	Ordinary violation
Gender	-0.151	-0.109	-0.164	-0.290*
Age	-0.010	-0.111	-0.086	0.061
Poor road condition	-0.108	0.052	-0.057	-0.059
Vehicle type	-0.064	-0.124	-0.151	0.002
Mechanical issues	0.087	-0.001	-0.038	-0.151
Weather condition	0.211	0.125	0.160	0.164
Lighting Condition	0.145	0.250	0.181	0.196
Location	-0.196	-0.293*	-0.242	-0.413**
Road intersection	0.115	0.173	0.175	0.151
Car & Motorcycle type	0.002	-0.114	-0.075	-0.010
Driver/Rider injury	0.122	0.305*	0.190	0.129
Human body first impact	-0.130	-0.098	-0.150	-0.185
Colliding area	-0.170	-0.159	-0.181	-0.081

4. CONCLUSION

The overall analysis provides valuable insights into the demographic profile, accident characteristics, severity patterns, risky driving behaviors, and their correlations with accident outcomes among Malaysian commuters. The majority of respondents involved in commuting accidents were females and individuals aged 31–50 years, indicating that workers in their most productive years are particularly vulnerable. Manufacturing, education, and retail emerged as the highest-risk sectors, suggesting that these industries may warrant focused workplace safety and commuting risk management measures. In terms of accident characteristics, cars were more frequently involved than motorcycles, though both presented significant risks. Most respondents experienced accidents once or twice, with higher occurrences reported for medium-distance commutes (6–10 km). Notably, the risk of commuting accidents was greatest during morning commutes, coinciding with peak traffic and time pressure.

The severity of commuting accidents revealed that frontal and rear-end collisions were the most common, often resulting in minor or no injuries, though a notable proportion still suffered major injuries. The legs were the most vulnerable body part, especially for motorcyclists. Collision pattern analysis underscored high-risk situations such as cars turning across motorcyclists' paths and motorcycles approaching brake cars. Risky driving behaviors were most strongly reflected in aggressive violations, particularly running red lights, which was the highest recorded behavior across all items. This suggests that intentional, high-risk behaviors may contribute more substantially to accident severity than unintentional slips or errors.

This study has several limitations that should be acknowledged. The relatively small sample size ($n = 58$) may limit the generalizability of the findings to the broader Malaysian workforce. Future research should address these limitations by using larger, more diverse samples across multiple regions and industries. Longitudinal or mixed-method approaches are recommended to better understand how behavioural, environmental, and organizational factors interact over time to influence the risk of commuting accidents.

Findings collectively suggest that commuting accidents in Malaysia are shaped by demographic vulnerabilities, commuting conditions, and risky driving behaviors, with human errors and aggressive violations playing central roles in determining accident severity. Addressing these issues through targeted road safety campaigns, workplace policies, and stricter enforcement can help reduce the risk of commuting accidents and improve occupational safety for Malaysian workers.

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