

Big Bike Crashes in Malaysia: An Analysis of Media-Reported Crash Patterns and Policy Implications

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ABSTRACT – “Big bikes”, a colloquial term in Malaysia for motorcycles with an engine capacity exceeding 250cc, represent a distinct and growing segment of the nation’s vehicle fleet. Unlike the ubiquitous small-capacity “Kapcai” used primarily for daily commuting, big bikes are frequently utilized for leisure touring and long-distance travel. Due to their higher power-to-weight ratios and speed capabilities, these vehicles present unique crash risks that differ significantly from those of smaller motorcycles. This study explores crash patterns, demographics, and risk factors associated with big bike accidents in Malaysia by analyzing 100 media-reported cases from 2018 to 2019. The results reveal a high fatality rate, with 86% of reported crashes resulting in death, and 92.1% of these fatalities occurring at the crash scene. Fatal crashes were evenly distributed between highways and federal roads and frequently occurred during daytime hours on weekends, correlating with leisure usage. Inferences from crash narratives suggest that handling errors and a lack of defensive riding skills are the primary contributing factors. These findings highlight a critical gap in the current licensing framework. The study concludes that the recent policy shift allowing easier transitions to full B-class licenses must be counterbalanced with rigorous, specialized training focused on high-speed machine control and hazard perception to ensure the safety of this vulnerable road user group.

KEYWORDS: Road safety, big bikes, motorcycle accidents, licensing policy, Malaysia, crash analysis

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1. INTRODUCTION

Motorcycles are one of the main modes of transport in Malaysia, especially for daily commuting. Being smaller in size enables them to maneuver through traffic, allowing them to reach their destination more quickly; hence, they are the favorite mode of transport (Ibrahim et al., 2019; Abdul Khalid et al., 2020). Consequently, they account for almost 70% of all road trauma cases in Malaysia (Manan & Várhelyi, 2012).

Generally, motorcycles in Malaysia fall into two groups: (1) Kapcai (motorcycles with an engine capacity of less than 250cc); (2) Big bike (motorcycles with an engine capacity of more than 250cc). Kapcai dominates the roads, accounting for more than 90% of motorcycles in Malaysia (Zulkipli et al., 2021). Kapcai is normally used for daily commuting to work as it is cheaper to operate and maintain, as well as more flexible in traffic; whereas big bikes more commonly populate the roads during the weekends for leisure rides (sometimes in a long-distance convoy).

As they differ in terms of engine size, power, torque, top speed, handling, and maneuvering, they require different riding licenses. This is to address the different risk profiles between these groups. As big bikes are less common, studies on their risk are less common than those for their Kapcai counterparts. Thus, this study aims to explore the pattern of big bike crash risk by collecting and analyzing data from media reports. The results of this study would contribute to identifying potential interventions for these big bikers.

1.1 Global Perspectives on Engine Size and Crash Risk

The relationship between motorcycle engine size and crash risk is well-documented but complex. Early studies suggested that larger engine displacements are associated with higher fatality rates. Langley et al. (2000) found that motorcycles with capacities > 250 cc had a significantly higher crash risk than smaller counterparts. However, more recent research has nuanced this finding, suggesting that the power-to-weight ratio, rather than engine capacity alone, is the critical determinant of crash severity and fatality risk (Haworth & Blackman, 2013). Specifically, high-powered sportbikes with power-to-weight ratios exceeding 150 kilowatts per ton demonstrate substantially higher fatality rates than cruiser-style motorcycles with equivalent engine displacements but lower power outputs (Haworth & Blackman, 2013).

The primary mechanism for this increased risk is acceleration capability. High-performance motorcycles can accelerate faster than riders can cognitively process hazards, leading to “loss of control” accidents. In the United States, the National Transportation Safety Board (2018) has highlighted that speeding and handling errors are disproportionately represented in crashes involving liter-class (1000cc+) sportbikes. Similarly, Malaysian research indicates that loss of control, poor visibility, and incompetence (poor driving skills) are the three highest factors in motorcycle fatal crash causality on expressways (Manan et al., 2018).

1.2 The Malaysian Context

In Malaysia, the motorcycle fleet is overwhelmingly dominated by underbone motorcycles (Kapcai). However, the big bike or “superbike” culture is expanding. According to the Malaysian Institute of Road Safety Research (MIROS), while Kapcai riders are involved in a high volume of accidents due to their numbers, high-powered motorcycles are over-represented in single-vehicle crashes caused by speeding and cornering errors on highways. Fatalities involving motorcyclists in Malaysia are three times higher compared to passenger car fatalities, six times higher than pedestrian fatalities, and nearly 50 times higher than bus passenger fatalities (Manan & Várhelyi, 2012). This catastrophic disparity underscores the vulnerability of two-wheeled users in a road system designed primarily for automobiles.

Psychological factors also play a role in big bike crashes. “Sensation seeking” behavior is often higher among sport motorcycle riders than among commuters (Ismail et al., 2015). In Malaysia, this manifests in weekend “convoy rides”, where peer pressure and group dynamics can encourage risk-taking behaviors such as speeding and competitive riding. The study by Borhan et al. (2018) found that motorcyclists with lower levels of education and younger demographics are more likely to take risks at intersections, though age-stratified analysis specific to big bike riders remains limited.

1.3 Licensing and Regulation

Malaysia employs a tiered licensing system divided into various classes (Jawi, 2018). The B2 class is for motorcycles not exceeding 250cc, while the B1 class is designated for motorcycles up to 500cc, though it is rarely used. The full B license covers motorcycles exceeding 500cc and all other displacements.

Historically, upgrading from B2 to B required a rigorous process. However, recent policy shifts in 2024 have introduced a “transition program” allowing experienced B2 holders to upgrade to Full B with a shortened practical course (BERNAMA, 2024). While intended to facilitate equity and access, this raises safety concerns. The best international practices, such as the European Union’s A1/A2/A tiered system, require substantial experience and testing at each level to ensure riders can handle the jump in power (European Commission, 2013). The Learner-Approved Motorcycle Schemes in Australia restrict new riders to motorcycles with power-to-weight ratios of less than 150 kilowatts per ton, ensuring a

graduated skill progression (Haworth & Blackman, 2013). This study's data on crash causes provides a crucial benchmark to assess whether riders are currently failing due to a lack of skill – a gap that expedited licensing might exacerbate.

2. METHODOLOGY

2.1 Data Source and Collection

This study used a retrospective analysis of secondary data from Malaysian media reports (Jawi et al., 2015). Sources included The Sun, New Straits Times, Utusan Malaysia, Harian Metro, KOSMO, Borneo Post, and Berita Harian. Media reports were chosen because official police data often groups motorcycles into a single category, making it hard to isolate crashes involving >250cc without access to detailed raw databases. Additionally, media reports usually highlight severe and high-profile crashes, which match the high-severity nature of big bike incidents. This approach aligns with earlier trauma narrative analyses in road safety research (Manan & Várhelyi, 2012; Jantan et al., 2020).

2.2 Inclusion Criteria

The reports explicitly identified vehicles as “superbikes”, “big bikes”, or motorcycles with capacities exceeding 250cc. They covered the period from January 1, 2018, to December 31, 2019. These reports contained essential details such as location, the victim's status, and the crash mechanism.

2.3 Data Processing

The reports were screened for duplicates and relevance, which resulted in a final dataset of 100 unique crash cases. Variables that were extracted included crash severity, distinguishing between fatal and non-fatal incidents. Demographic information, such as the age of the rider, was also gathered. Additionally, crash characteristics were recorded, noting whether the incident involved a single vehicle or multiple vehicles, as well as the day of the week and time of day when the crash occurred. The location data encompassed road type, such as highway or federal road, and the road configuration, including straight segments, junctions, or curves. The purpose of travel was also determined, categorized as commuting for work, leisure, or other reasons, which were inferred from contextual clues like convoy involvement or traveling to work.

2.4 Expert Review

A panel of road safety experts reviewed the crash narratives to infer the “most probable causal factor” (e.g., speeding, loss of control, reckless riding) based on the reported dynamics (e.g., “skidded at corner”, “crashed into divider”). This qualitative assessment method was standard in crash investigation literature, where detailed case-by-case analysis was necessary to attribute causation beyond surface-level factors.

3. RESULTS AND DISCUSSION

Table 1 provides all the details of the results based on the collected reports.

3.1 Severity and Survivability

The analysis indicates a bleak outlook for serious motorcycle crashes reported in the media, with data from 100 cases showing that 86% resulted in fatalities and only 14% were non-fatal. Among those who succumbed, a significant 92.1% were pronounced dead at the scene, whereas merely 7.9% survived long enough to receive hospital treatment. This markedly high on-site mortality rate implies that such incidents involve high-energy impacts, likely causing non-survivable trauma such as severe head injuries, cervical spine injuries, or extensive internal bleeding, presumably due to elevated speeds at the time of collision.

TABLE 1: Details of crash reports collected from online sources from 2018 – 2019

Description	Fatal Cases	Non-fatal Cases
Number of cases / reports collected	86	14
Travelling purposes	Leisure: 21 (24.4%) Work: 11 (12.8%) Unknown: 54 (62.8%)	Leisure: 1 (7.1%) Work: 5 (35.7%) Crime: 1 (7.1%) Unknown: 7 (50.0%)
Crash type	Single-vehicle: 25 (29.1%) Multi-vehicles: 61 (70.9%)	Single-vehicle: 2 (14.3%) Multi-vehicles: 12 (85.7%)
Crash partners involved	1 vehicle: 25 (29.1%) 2 vehicles: 54 (62.8%) 3 vehicles: 6 (7.0%) 4 vehicles: 0 (0%) 5 vehicles: 1 (1.2%)	1 vehicle: 2 (14.3%) 2 vehicles: 12 (85.7%) 3 vehicles: 0 (0%) 4 vehicles: 0 (0%) 5 vehicles: 0 (0%)
Crash time	Daytime (0700-1900): 65 (75.6%) Night-time (1900-0600): 21 (24.4%) Peak hours: 32 (37.2%) Non-peak hours: 54 (62.8%)	Daytime (0700-1900): 8 (57.1%) Night-time (1900-0600): 6 (42.9%) Peak hours: 6 (42.9%) Non-peak hours: 8 (57.1%)
Crash day	Weekdays: 46 (53.5%) Weekend: 40 (46.5%)	Weekdays: 7 (50.0%) Weekend: 7 (50.0%)
Road type	Highway: 49 (49%) Federal: 50 (50%) Track: 1 (1%)	Highway: 7 (50.0%) Federal: 7 (50.0%)
Road configuration	Junction: 39 (45.3%) Corner / curvy: 18 (20.9%) Straight: 29 (33.7%)	Junction: 5 (35.7%) Corner / curvy: 3 (21.4%) Straight: 6 (42.9%)
Number of victims (big bike users)	89	17
Victims age	16 – 20: 4 (4.5%) 21 – 30: 23 (25.8%) 31 – 40: 24 (27.0%) 41 – 50: 17 (19.1%) Above 50: 19 (21.3%) Not available: 2 (2.2%)	16 – 20: 1 (5.9%) 21 – 30: 9 (52.9%) 31 – 40: 3 (17.6%) 41 – 50: 0 (0%) Above 50: 2 (11.8%) Not available: 2 (11.8%)
Death pronounced	On the spot: 82 (92.1%) At hospital: 7 (7.9%)	Severe injury: 15 (88.2%) Minor injury: 2 (11.8%)
Causal factor	Lack of Skills: 63 (73.3%) Reckless: 9 (10.5%) Accident: 4 (4.7%) Fatigue: 1 (1.2%) Road infrastructure: 1 (1.2%) Insufficient Information: 8 (9.3%)	Lack of Skills: 7 (50.0%) Reckless: 1 (7.1%) Accident: 4 (28.6%) Fatigue: 0 (0.0%) Road infrastructure: 1 (7.1%) Insufficient Information: 1 (7.1%)

3.2 Crash Configurations and Partners

Multi-vehicle crashes primarily contributed to both fatal and non-fatal accident categories, accounting for 70.9% and 85.7%, respectively. These incidents involve two or more vehicles and represent a significant portion of overall crash data.

Single-vehicle crashes, on the other hand, comprised 29.1% of fatal crashes. Although this percentage is lower than for multi-vehicle incidents, it remains noteworthy because it often indicates a loss of control without external interference. This pattern highlights different mechanisms underlying various types of accidents.

Regarding vehicle involvement in fatal crashes, 62.8% of cases involved a collision with a single other vehicle. A smaller proportion (7.0%) involved three vehicles, and in one case (1.2%), five vehicles were

involved. These figures illustrate the complexity and variability present in fatal collision scenarios. In contrast, non-fatal crashes predominantly involved two vehicles (85.7%), with single-vehicle crashes accounting for 14.3%.

3.3 Temporal Analysis

Fatal crashes predominantly occurred during the daytime, accounting for 75.6%, with 37.2% occurring during peak hours. Non-fatal crashes exhibited a similar pattern, but with a higher proportion occurring at night (42.9%). When examining the day of the week, fatal crashes were almost evenly split between weekdays (53.5%) and weekends (46.5%).

Regarding the purpose of travel, when identifiable in fatal crashes, leisure riding was noted in 24.4% of cases, nearly twice as often as work-related travel at 12.8%. Conversely, non-fatal crashes were more frequently associated with work travel (35.7%), while leisure and crime-related trips each accounted for 7.1%. These patterns suggest two distinct risk profiles: the weekday commuter, characterized by lower speeds and more interaction with traffic, and the weekend leisure rider, who typically rides at higher speeds and engages in touring.

3.4 Road Environment

Fatal crashes were distributed almost equally between highways (49%) and federal roads (50%), with one case (1%) occurring on a track. Non-fatal crashes followed the same distribution along highways and federal roads (50.0% each). Regarding road configurations, 45.3% of fatal crashes occurred at junctions, followed by 33.7% on straight roads and 20.9% on curved or cornered roads. Non-fatal crashes showed a similar trend, with junctions accounting for 35.7%, straight roads for 42.9%, and curved roads for 21.4%.

3.5 Demographics

The fatal cases involved 103 motorcycle riders, while 17 riders were in non-fatal cases. Among these riders, the most affected age group in fatal crashes was 31–40 years (27.0%), slightly ahead of 21–30 years (25.8%) and 41–50 years (19.1%). Those over 50 made up 21.3% of fatal case victims. In non-fatal cases, the most common age group was 21–30 years (52.9%), followed by 31–40 years (17.6%). The percentage of victims aged 50+ was lower in non-fatal crashes (11.8%), and individuals aged 41–50 did not appear in this category.

3.6 Causal Inference

Expert review of case narratives identified “lack of skills” as the primary probable cause for the crash in both fatal and non-fatal scenarios. This includes inability to negotiate corners, improper braking, and failure to anticipate traffic flow at high speeds. “Reckless behaviour” was in second and third place in the fatal and non-fatal cases, respectively. The experts concluded 4.7% of the fatal cases were accidents (after considering and giving the benefit of the doubt to the users), while 28.6% of accidents occurred in the non-fatal condition. A total of 9 cases lacked sufficient information to make a good inference of the causal factor.

4. Discussion

4.1 The Risk Profile

The analysis shows a concerning trend whereby a large number of deaths involve riders aged 31 to 50 and older. In road safety studies, this group is often called “born-again bikers”, people who rode in their youth, stopped riding due to work or family, and later returned to riding when they could afford powerful motorcycles (Oliver, 1997). They may have outdated risk perceptions based on smaller bikes like Kapcai, and their reaction times might be slower. Yet they ride motorcycles with acceleration and top speeds that rival those of supercars. The fact that “lack of skills” is identified as the main cause supports the idea that these riders are pushing beyond their limits, riding bikes that are too powerful for their skill level.

This issue is especially concerning in Malaysia, where a rapid rise in disposable income among middle-class professionals aged 30–50 has led to more people owning superbikes. Without structured training programs that match their skills, this group faces a higher risk of motorcycle accidents. The fact that most serious crashes involve older riders, while younger riders (aged 21–30) experience more minor incidents, suggests that younger riders might have better physical resilience or ride more cautiously, even though their initial training is generally less thorough.

4.2 Policy Implications & Recommendations

The Malaysian government's 2024 initiative to facilitate B2-to-Full B upgrades through a two-hour transition program has been met with controversy, given recent findings. If a "lack of skill" is identified as the primary cause of accidents, a two-hour adaptation period may be inadequate to bridge the gap between operating a 10hp Kapcai and a 200hp superbike. This power disparity is comparable to transitioning from a compact car to a top-fuel dragster.

Developing a specialized curriculum focused on high-speed dynamics, counter-steering, emergency braking, and trail braking techniques is recommended. It is insufficient for students to simply ride around a circuit without undergoing an evidence-based assessment of their competencies. The curriculum should comprehensively include training on wet-weather braking performance, understanding cornering limits and managing lean angles, hazard perception at highway speeds, and emergency maneuver training, such as swerve-and-brake techniques.

Another recommendation for Malaysia is to adopt a more stringent tiered licensing system akin to the European Union's A2 license, which limits power to a maximum of 35kW or 47bhp, with a power-to-weight ratio of 0.2kW per kilogram. Riders should be required to gain experience on a mid-weight motorcycle, such as a 250cc to 500cc bike, before progressing to larger, liter-class machines. This approach aims to prevent abrupt transitions from small engines like 150cc directly to 1000cc bikes. Evidence from international studies indicates that intermediate stages in licensing can mitigate crash severity in the most powerful motorcycle categories.

Given the overrepresentation of big bike riders aged 31 to 50 in fatal crashes, it is advisable to develop targeted outreach programs for this demographic. Such initiatives should highlight physiological differences in reaction times and emphasize the need for formal training beyond basic licensing. This approach could include online modules that address aging-related cognitive factors influencing riding abilities, alongside encouragement for older riders to undertake advanced courses, such as the Advanced Rider Training (ART), prior to purchasing high-powered motorcycles.

4.3 The Leisure vs. Commute Paradox

The data indicating that leisure riding accounts for 24.4% of fatal crashes yet only 12.8% of work-related crashes highlights a significant safety concern, especially considering that work-related travel is generally more frequent. Typically, weekend leisure riders tend to ride at sustained high speeds without traffic constraints, often travel in groups due to peer influence or competitive tendencies, undertake longer journeys, which can lead to fatigue, and navigate unfamiliar roads, lacking route familiarity. These factors collectively contribute to the higher risk associated with leisure motorcycle riding during weekends.

The current licensing and training paradigm does not sufficiently address these factors. To improve safety and effectiveness, interventions such as mandatory "group riding safety" modules, fatigue awareness training, and guidance on navigation and route planning for long-distance touring could be implemented.

4.4 Limitations and Data Considerations

This study recognizes that reliance on media reports introduces a bias toward more severe and sensational crashes, potentially underestimating the frequency of minor incidents such as fender benders involving large bikes. Nonetheless, for an analysis centered on fatality risks, this data remains a valuable resource. Future research should aim to validate these findings using hospital trauma registry data from institutions and government databases.

Furthermore, the current analysis is limited to data from 2018 to 2019. Recent policy initiatives, including the B2-to-B transition program launched in October 2024, have not yet produced enough crash data for a thorough evaluation. A follow-up study after 2024 would be helpful to assess whether the accelerated licensing process has affected the patterns of big bike crashes.

5. CONCLUSION

In general, several main trends of big bike crashes are evident: individuals aged 21-40 years are the most affected by crashes; multi-vehicle collisions dominate, suggesting that traffic density and interaction between vehicles significantly contribute to crash occurrences; junctions emerge as high-risk locations, where conflicts mostly happen; work-related trips tend to result in non-fatal crashes, while leisure trips are more often associated with fatalities; crashes peak during the daytime when road usage is at its highest. Furthermore, additional riding competency and skillset seem to be the most contributing factor for these crashes – this includes risk appreciation and speed management.

These gaps indicate a significant opportunity for improving the big bikes' safety situation. In addition to improving infrastructure, preferably through complete segregation from other traffic, the training and licensing system for big bike riders should also be reformed to improve its sustainability and ensure better safety for this segment of road users in Malaysia.

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