

ROAD SAFETY RISKS AMONG MOTORCYCLE FOOD DELIVERY RIDERS IN SOUTH AFRICA'S GIG ECONOMY: FINDINGS FROM A SURVEY IN PRETORIA

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ABSTRACT

South Africa's app-based food and parcel delivery boom has driven a surge in motorcycle use for last mile logistics employing tens of thousands of riders mainly in urban areas. This growth has raised road safety alarms with motorcycle fatalities rising from 1.9% to 3.9% of total road deaths between 2023 and 2024.

This quantitative survey of 109 motorcycle delivery riders in Pretoria captured self-reported data on crashes, near misses, protective gear practices and risky behaviours linked to gig economy pressures. Findings reveal a cycle of fatigue, and conspicuity gaps heightening vulnerability.

Using the Safe System Approach recommendations include mandatory training, app rewards, speed controls and lanes, road upgrades, vehicle standard enforcement and better post-crash support. This study fills a key data gap on South African delivery riders advocating for systemic reforms to improve safety in the expanding gig-economy urban transport landscape.

Keywords: Motorcycle delivery riders; Gig economy; Road safety; Safe System Approach; Rider conspicuity.

1. INTRODUCTION

South Africa's urban mobility landscape has transformed with the rise of pay per delivery-based food and parcel delivery platforms such as Mr D and Uber Eats, leading to a boom in motorcycle usage for last mile delivery. This sector employs thousands with estimates from 2020 placing active food delivery riders at over 6 400 (Arrive Alive, 2020) with growth in number increasing post COVID-19 pandemic. At present, informal reports suggest tens of thousands of riders nationwide, predominantly in cities like Pretoria, Johannesburg, and Cape Town (Arrive Alive, 2025).

However, this growth has coincided with heightened road safety concerns. Motorcyclists face severe injury risks in collisions due to, amongst other reasons, lack of the protective shell of cars. National statistics from the Road Traffic Management Corporation (RTMC) show motorcycle fatalities increasing as a proportion of total road deaths from 1.9% in 2023 to 3.2% in 2024 (DSC Attorneys, undated). Quarterly data for Q1 2025 recorded 2 403 fatalities overall, with motorcycles contributing variably but notably in crashes that occurred in urban areas (RTMC, date??). A review of literature indicates that risks encountered by motorcycle food delivery riders stem from per-delivery models incentivizing speed, long working hours that lead to fatigue, distractions from the use of navigation apps while riding, and conspicuity issues where other road user to detect riders (Tran et al., 2022; Zheng et al., 2019; Pai et al., 2009). Media sources highlight the underreporting of daily incidents, with estimates that seven delivery rider crashes occur per day, including fatalities. Despite literature on delivery rider risks, South Africa remains behind in terms of available empirical data on this sector of road users.

Through a survey of 109 food delivery motorcycle riders conducted in Pretoria, this paper focuses on road safety elements such as crash experiences, protective practices and risky behaviors. It applies to the Safe System Approach to propose targeted countermeasures.

1.1 Objectives

The objectives of this paper are to give feedback regarding the following challenges facing the industry, and to provide recommendations about changing the risks that the industry is facing:

- Detail self-reported crash and near-miss experiences.
- Assess protective gear and visibility practices
- Identify prevalent risks, behaviours and occupational risks.
- Propose Safe System based recommendations

2. LITERATURE REVIEW: CONTRIBUTING FACTORS WITH A GLOBAL AND SOUTH AFRICAN CONTEXT

2.1 Human factors

Human error is identified as one of the predominant factors in motorcycle crashes, from evidence by reports from the Motorcycle Institute of South Africa (2016), which attributes the important contributor of incidents to related rider mistakes rather than mechanical and environmental failures alone. Among these errors distraction merges as an important majority contributor through the use of mobile phones for navigation purposes, order acceptance and app management while riding. Such distractions are defined as any diversion from the primary task of vehicle control and hazard response. This aligns closely with behaviours observed among delivery riders who must constantly interact with digital platforms whilst riding.

Fatigue further increases these risks arising from extended shifts. Christies and Ward (2022, 2023) highlight how prolonged exposure to demand schedule impairs judgment and reaction times leading to increased vulnerability on the road. In the context of gig economy platforms pay-per-delivery, compensation structures intensify these pressures by incentivizing riders to maximize output often at the expense of safety. Research conducted by the University College London (Christies and Ward, 2003) demonstrates that riders operating algorithmic management and piece-rate pay, report higher instances of speeding, red-light running and other violations, driven by the need to complete more deliveries quickly to sustain income.

A literature review published in 2025 covering 32 studies and 38 000 last mile workers found that poor conditions including precarity, algorithmic control and relentless deadlines correlate with elevated psychological outcomes like stress, fatigue, burnout and diminished lack of well-being (Useche et al. 2025).

Similar patterns appear in international context. For example, during the COVID-19 pandemic in Thailand, motorcycle food delivery riders exhibited significantly higher risks of major injuries in traffic accidents with factors such as fatigue and red-light running (Kwangsukstith et al. 2024).

In South Africa, insights from international case studies resonate with local realities whereby the gig economy is characterized by low entry barriers, account rentals among riders and heavy reliance on tips push workers towards maximization of deliveries. The precarious nature of this occupation together with inadequate infrastructure and protective gear exacerbate human error driven crashes.

The interplay of distraction, fatigue requires pressure forms a vicious cycle in which occupational demands override safety considerations resulting in elevated crash involvement among motorcycle delivery riders. Addressing these challenges require not only individual behaviour change but systemic reforms to working conditions and platform accountability.

2.2 Visibility and Conspicuity

Many crashes involving motorcyclists stem from a perceptual failure where other road users report looking in the direction of an approaching motorcycle but fail to detect it even when the motorcycle is objectively visible (Pai, 2009; Pai, 2011). This phenomenon is a major contributor to right-of-way violations, particularly at intersections and junctions where motorists turn into the path of a straight travelling? motorcycle. Pai's 2009 literature review

on motorcycle right of way accidents highlights that these often result from the motorcycle's inherently small frontal profile which provides weaker visual cues for speed and distance judgement compared to larger vehicles (Pai, 2009). These crashes are frequently severe due to the lack of protection of riders. Post-crash interviews commonly reveal motorists claiming they "did not see" the motorcycle despite witnesses confirming its presence (Hurt et al., 1981; Clarke et al., 2007; Pai, 2011).

Effective countermeasures to enhance motorcycle conspicuity have been extensively studied. Daytime headlight operation significantly reduces crash risk by increasing brightness contrast and drawing attention. The International Transport Forum's 2015 report on powered two wheeler safety recommends daytime running lights, advanced lighting configurations, high visibility clothing and retroreflective materials as cost effective interventions to address conspicuity failures (ITF, 2015).

Motorcycle delivery riders often omit these conspicuity aids due to cost, discomfort in hot climates or perceived low necessity during frequent short urban trips. Riders face heightened exposure because of time pressure, algorithmic incentives for speed and frequent manoeuvres which further reduce effective visibility to other road users. Research on motorcycle delivery riders notes that precarious working conditions exacerbate non-use of visibility gear, contributing to collision and injury severity (Useche et al., 2025; Kwangsukstith et al., 2024).

Overall improving conspicuity through low-cost measures in the form of mandatory daytime headlights, reflective and fluorescent clothing and light-coloured helmets offer substantial potential to reduce motorcycle crash risks for gig economy motorcycle riders who operate in high density urban environments. These interventions are especially urgent in contexts like South Africa, where delivery riders contribute to rising fatality proportions (RTMC, 2025).

2.3 Environmental and Vehicle Factors

Peak hour congestion increases crash risk for motorcycle delivery riders by intensifying vehicle interactions at junctions and merge points where reaction time and visibility are constrained. Poor road conditions in the form of potholes, uneven surfaces and degraded pavement further contribute by causing loss of traction, sudden swerving or reduced braking stability effects, disproportionately severe for two-wheeled vehicles (Motorcycle Safety Institute of South Africa, 2016).

In African settings, wet or slippery roads during rainy seasons amplify these risks. Motorcycle delivery riders additionally face instability from improperly secured or shifting loads which can destabilize the motorcycle during manoeuvres in congested or degraded road conditions (Useche et al., 2025).

These environmental and vehicle factors highlight the urgent need for a regular maintenance protocol, platform-enforced vehicle standards and targeted road infrastructure upgrades to reduce preventable crashes among motorcycle delivery riders in South Africa.

2.4 South African and African Trends

RTMC data for Q4 2024 and 2025 indicate that cars and light delivery vehicles dominate fatal crashes at 37.3% and 16.6%, respectively, while motorcycles maintain a lower but rising share amid the delivery boom (RTMC, 2025). Incidents linked to delivery riders persist with the surge linked to the growth of e-commerce and underreporting is also being common (Motorcycle Institute of South Africa, 2025). Media coverage also highlights crashes

affecting riders (IOL, 2025; GroundUp, 2025). In other African countries motorcyclists remain vulnerable with calls for helmet enforcement and training (SSATP Africa Status Report, 2025).

2.5 Safe System Approach and Countermeasures

The Safe System Approach prioritizes forgiving designs in the form of safe vehicles, accommodating roads (motorcycle lanes), speeds, users (hazard training) and post-crash response. For delivery riders, the Safe System Approach addresses gig-specific pressures (Salmon et al, 2023). Dumbaugh et al, 2023 and ITF (2015) recommend Integrated Transport Systems (ITS) and conspicuity.

3. RESEARCH METHODOLOGY

3.1 Research Design and Approach

A quantitative descriptive survey targeted 109 riders at delivery hotspots in Pretoria through purposive sampling. A structured questionnaire captured self-reported safety data, analyzed with descriptive statistics in the form of frequencies and percentages. Ethical protocols included informed consent and anonymity.

3.2 Study Limitations

This study relies on self-reported data risking bias associated with social desirability and underreporting of risky behaviours and involvement in crashes. The sample limits generalizability beyond urban motorcycle delivery riders. The use of telematics would enhance validity.

4. RESULTS AND INTERPRETATION

This section presents and interprets the road safety findings. Key focus areas include exposure factors, crash involvement, protective gear usage, and risky behaviour. Data is summarized with tables for clarity, highlighting patterns and implications for rider vulnerability.

4.1 Exposure Factors

4.1.1 Weekly Working Hours

Riders reported exceptionally high weekly working hours and frequent short to medium trip distances, both of which significantly increase fatigue, hazard exposure, and the likelihood of committing riding errors.

Table 1: Weekly Working Hours

Weekly hours worked	Percentage (%)	Interpretation
Less than 40 hours	6	Minimal group; likely part time or occasional riders
More than 40 hours	94	Dominant pattern; reflects gig-economy pressure to maximize deliveries

Table 1 above illustrates that the overwhelming majority of riders (94%) worked more than 40 hours per week, highlighting the fatigue risk driven by the gig economy's incentive to maximize deliveries and availability.

4.1.2 Typical Distance per Delivery Trip

Table 2 reveals that the 73% concentration in 5-10km trips means riders face high-frequency urban manoeuvres such as intersections, lane changes, and pedestrians. This is consistent with prior research linking short trip exposure to higher crash involvement (Nguyen-Phuoc et al., 2019). Longer trips ranging more than 20km are rare but when they occur, they increase trip fatigue exposure. Overall, the predominance of short ride height frequency trips significantly amplifies daily hazards for delivery riders.

Table 2: Typical Distance per Delivery Trip

Distance per trip (km)	Percentage (%)	Interpretation
0-5	6	Very short urban hops
5-10	73	Frequent short urban trips with repeated hazard interactions correlates with elevated crash risk
10-20	17	Moderate urban routes
>20	4	Longer trips are rare but higher fatigue risk

4.2 Crash Involvement

4.2.1 Crash and Near-Miss Experience in the Past 12 Months

Table 3 reveals a moderate overall crash involvement rate with 18% of riders reporting at least one crash in the past 12 months while 82% reported none. Minor injury crashes were considerably more common than severe injury crashes suggesting that most incidents result in relatively low severity outcomes likely due in part to high helmet usage. Near miss incidents were the most frequent at 37% with 24% experiencing two or more, indicating that riders regularly encounter high risk situations.

Table 3: Crash and Near-Miss Experience in the past 12 Months

Category	None (%)	One (%)	Two or More (%)
Severe injury crash	82	11	6
Minor injury crash	65	26	9
Near- miss incident	63	13	24

The high near miss prevalence, as illustrated in Table 3, suggests underlying systemic hazards such as peak-hour congestion, lane filtering and visibility issues that could easily escalate into actual crashes. Frequent near misses reinforce the elevated vulnerability of riders and highlight the need for interventions such as hazard perception training, improved visibility measures and infrastructure adaptations to prevent near misses from becoming reportable crashes.

4.3 Protective Gear Usage

4.3.1 Frequency of Use of Protective Gear and Visibility

The data among motorcycle delivery riders shows strong adherence to head protection but variable uptake of other safety items as illustrated in Table 4. Full face helmets are always worn by 94% of riders with only 3% never using one. Riding boots (73% usage) and protective jackets (61% usage) are also commonly used, offering good protection against lower-limb and upper body injuries. However, visibility aids show only moderate compliance in the form of bright/fluorescent clothing worn by 53% and strips by 58% of all riders. This gap is concerning as poor conspicuity is a major factor in crashes involving motorcyclists (Pai, 2009; ITF, 2015).

Phone or communication system use while riding is low (71% said never), suggesting limited distraction from devices during movement compared with some international delivery rider studies. The strong helmet uptake is a positive safety behaviour but incomplete visibility protection and use of body protective clothing indicate opportunities for visibility awareness campaigns to further reduce injury severity among these vulnerable road users.

Table 4: Frequency of Protective Gear Usage (%)

Item	Always (%)	Sometimes (%)	Seldom (%)	Never (%)
Full face helmet	94	1	2	3
Riding boots	73	10	4	13
Protective jacket	61	21	6	13
Bright/fluorescent clothing	53	11	8	28
Bright/fluorescent strips	58	12	5	25

The strong helmet uptake is a positive safety behaviour but incomplete visibility protection and use of body protective clothing indicate opportunities for visibility awareness campaigns to further reduce injury severity among these vulnerable road users.

4.4 Risky Behaviours

4.4.1 Frequency of Prevalent Risky Behaviours

The survey data reveals that while severe traffic violations such as running red lights remain uncommon, job-driven risky behaviours are highly prevalent. These patterns reflect the intense time pressure and incentive structure of delivery work in the gig-economy.

Table 5: Frequency of Prevalent Risky Behaviours

Behaviour	Always	Sometimes	Seldom	Never
Riding during peak traffic hours	81	6	5	8
Frequently changing lanes/filtering	19	39	9	33
Mobile use while riding	13	6	7	74
Not using headlights during daytime	20	2	5	73
Exceeding speed limit	14	14	6	66
Riding while feeling tired	7	7	5	81
Running a red light	3	7	7	83

Table 5 highlights the frequency of prevalent risky behaviours. Riding during peak traffic hours is reported at 92% at least sometimes reflecting unavoidable exposure to congestion, reduced reaction times, and high conflict risk. Frequent lane changing/filtering is reported at 67% and is the second most common hazardous tactic to navigate traffic jams quickly. Unsafe speeding (34%) further increases visibility failures and distraction, which are key contributors to crashes. Riding while tired (19%) directly links to the 94% working more than 40 hours weekly.

The dominant behaviours are outcomes of the gig economy pressures, time urgency, economic need, and lack of rest. Effective countermeasures, including visibility enforcement, hazard perception training, dedicated lanes and platform accountability, are urgently needed to reduce preventable crashes among South Africa's motorcycle delivery riders.

5. CONCLUSION

This survey of 109 motorcycle delivery riders in Pretoria reveals critical road safety challenges in South Africa's gig-economy last mile sector. Extended hours, frequent short urban trips, crash involvement, helmet use but weak visibility practices and job-driven risky behaviours highlight occupational pressures interrelated with human, environmental, and systemic factors.

5.1 Key Findings and Interpretation

Most riders worked more than 40 hours on a weekly basis with 73% of the trips ranging between 5 and 10 km. These patterns drive fatigue and hazard exposure in line with global gig economy research (Christie and Ward, 2022; Useche et al., 2025).

Higher near-miss rates signal systemic issues such as visibility and congestion that could escalate. This is consistent with Pai (2009), and underreporting noted in the media. Helmet use was high with good uptake of protective gear such as boots and jackets. Visibility aids lagged which exacerbates conspicuity failures as a major crash contributor.

Prevalent behaviours were time pressure driven where a large number of riders rode in peak traffic, lane filtering frequently and exceeding speed limits. Violations such as red-light running were rare reflecting algorithmic incentives over safety. These results address the objectives by documenting crash patterns, protective gaps, and gig-specific risks, revealing a phenomenon where economic survival overrides safety.

5.2 Implications

The findings fill a data gap on South African delivery riders mirroring rising motorcycle fatality proportions amid platform growth. They echo international patterns and vulnerabilities with local factors such as poor roads and the precarious nature of this workforce.

5.3 Limitations and Future Research

Self-reported data has the potential to introduce bias. The study sample limits generalizability. Future work should make use of telematics, longitudinal multi-city comparisons to evaluate interventions.

6. RECOMMENDATIONS

This study confirms that motorcycle food delivery riders operate under intense gig-economy pressures that elevate fatigue, reduce conspicuity, and encourage risky behaviours. These factors contribute to the observed rise in motorcycle involvement in road fatalities nationally. Applying the Safe System Approach which designs a forgiving transport system that accommodates human error and minimises harm, the following targeted and enforceable interventions are recommended.

1. Safer Road Users through Mandatory Training, Hazard Perception and Fatigue Management

- Platform registered motorcycle delivery riders should undergo mandatory onboarding and annual refresher training that addresses gig specific hazards, including urban traffic congestion, riding with loads, distraction free navigation and fatigue recognition.
- Platforms must limit working hours to maximum of 10-12 hours and require mandatory breaks. They should also introduce fatigue risk scoring (a method used to quantify the level of fatigue related safety risks for workers in safety critical industries such as transportation) and offer safety incentives to riders who adhere to these rules.

2. Safe Vehicles through Visibility, Protective Gear, and Maintenance Standards.

- Requires all platform riders to keep daytime running headlights on at all times, wear high visibility fluorescent or reflective vests and use light coloured helmets.
- Require regular vehicle inspections for roadworthiness, brakes, and lights. Platforms should conduct random compliance checks, with deactivation applied for repeated non-compliance.

3. Safer Speeds and Safer Roads through Infrastructure and Traffic Management.

- Pilot dedicated motorcycle filtering lanes or safe corridors in high volume delivery areas, combined with advanced stop lines at intersections.
- Introduce targeted speed management in the form of traffic calming, appropriate limits and in-app alerts in hotspots. Platforms can reward speed limit adherence.
- Prioritise rapid road maintenance through pothole repair, surface, improvements and drainage on frequent delivery routes to reduce traction loss.

4. Post Crash Response and Platform Accountability

- Require platforms to offer insurance for medical costs, disability and fatalities during on-trip incidents.
- Establish a delivery rider safety forum that includes regulatory authorities, research institutions, platforms, road safety advocacy groups and rider representatives to monitor incidents via anonymised telematics data and evaluate interventions.

Implementing these targeted interventions offer a practical and effective way to reduce fatigue-related risks, improve rider conspicuity and minimize hazardous behaviours among

motorcycle delivery riders. By combining mandatory training and fatigue management, stricter vehicle standards, infrastructure, improvements and greater platform accountability it is possible to create a more forgiving transport system that protects vulnerable gig economy workers while maintaining the efficiency of food delivery services.

7. CONCLUSION

This study is based on a sample of 109 motorcycle delivery riders in Pretoria, underscores the elevated road safety risks faced by workers in South Africa's gig economy. The findings reveal that extended working hours, a high frequency of short delivery trips, elevated near-miss incidents, and time-pressured riding behaviours collectively amplify the likelihood of road traffic crashes.

To mitigate these risks, the study recommends the implementation of mandatory onboarding training programmes, enforced rest breaks, enhanced visibility measures for riders, the provision of dedicated motorcycle lanes, and greater accountability on the part of digital platforms.

By addressing the local empirical data gap, this research provides an evidence base to inform policy reform aimed at protecting vulnerable road users, particularly motorcycle delivery riders, in South African cities.

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