



Literature Study on Analysis of Risky Riding Behavior in Motorcycle Riders

Salsabila Sembiring¹, Nismah Panjaitan^{*1} , Rosnani Ginting¹ 

¹Industrial Engineering Study Program, Universitas Sumatera Utara, Medan, 20155, Indonesia

*Corresponding Author: nismah.panjaitan@usu.ac.id

ARTICLE INFO

Article history:

Received 8 June 2026

Revised 8 July 2026

Accepted 16 July 2026

Available online 31 July 2026

E-ISSN: [2527-9408](#)

P-ISSN: [1411-5247](#)

How to cite:

S. Sembiring, N. Panjaitan, and R. Ginting, "Literature study on analysis of risky riding behavior in motorcycle riders," *J. Sist. Tek. Ind.*, vol. 28, no. 3, pp. 180–187, July 2026.

ABSTRACT

Risky driving behavior among motorcyclists is one of the main factors contributing to the high traffic accident rates, especially in developing countries. This study aims to identify, analyze, and synthesize various factors influencing risky riding behavior among motorcyclists thru a Systematic Literature Review (SLR) approach. The research method was conducted by searching for scientific articles from various academic databases, such as Google Scholar, Scopus, and ScienceDirect, using keywords related to risky driving behavior, road safety, and motorcycle riders. The literature selection process was conducted based on inclusion and exclusion criteria to obtain relevant and high-quality articles. The study results show that risky driving behavior is influenced by several main factors, namely individual factors, psychological factors, environmental factors, and social and regulatory factors. The most frequently observed forms of risky behavior include speeding, using mobile phones while driving, not using personal protective equipment, running red lights, and aggressive behavior on the road. This study concludes that efforts to reduce risky driving behavior require a multidimensional approach thru safety education, consistent law enforcement, and the development of transportation policies focused on the safety of road users. This research is expected to serve as a foundation for the development of driving safety strategies and a reference for future studies.

Keywords: *Motorcycle, Risky Driving Behavior, Systematic Literature Review, Traffic Accidents, Traffic Safety*

ABSTRAK

Perilaku berkendara berisiko pada pengendara sepeda motor merupakan salah satu faktor utama penyebab tingginya angka kecelakaan lalu lintas, khususnya di negara berkembang. Penelitian ini bertujuan untuk mengidentifikasi, menganalisis, dan mensintesis berbagai faktor yang memengaruhi perilaku berkendara berisiko pada pengendara sepeda motor melalui pendekatan *Systematic Literature Review* (SLR). Metode penelitian dilakukan dengan menelusuri artikel ilmiah dari berbagai basis data akademik, seperti Google Scholar, Scopus, dan ScienceDirect, menggunakan kata kunci terkait perilaku berkendara berisiko, keselamatan berkendara, dan pengendara sepeda motor. Proses seleksi literatur dilakukan berdasarkan kriteria inklusi dan eksklusi untuk memperoleh artikel yang relevan dan berkualitas. Hasil kajian menunjukkan bahwa perilaku berkendara berisiko dipengaruhi oleh beberapa faktor utama, yaitu faktor individu, faktor psikologis, faktor lingkungan, serta faktor sosial dan regulasi. Bentuk perilaku berisiko yang paling sering ditemukan meliputi pelanggaran batas kecepatan, penggunaan telepon genggam saat



This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International.

<http://doi.org/10.26594/register.v6i1.idarticle>

berkendara, tidak menggunakan alat pelindung diri, menerobos lampu lalu lintas, serta perilaku agresif di jalan. Studi ini menyimpulkan bahwa upaya pengurangan perilaku berkendara berisiko memerlukan pendekatan multidimensional melalui edukasi keselamatan, penegakan hukum yang konsisten, serta pengembangan kebijakan transportasi yang berorientasi pada keselamatan pengguna jalan. Penelitian ini diharapkan dapat menjadi dasar pengembangan strategi keselamatan berkendara dan referensi bagi penelitian selanjutnya.

Keyword: Kecelakaan Lalu Lintas, Keselamatan Lalu Lintas, Perilaku Berkendara Berisiko, Sepeda Motor, Systematic Literature Review

1. Introduction

Traffic accidents are one of the important indicators in assessing road safety. Injuries due to traffic accidents are the eighth leading cause of death in the world [1]. According to data from the World Health Organization (WHO), the number of deaths due to traffic accidents worldwide continues to rise, reaching 1.35 million in 2016. Traffic accidents also rank as the eighth leading cause of death across all age groups and are the leading cause of death for the young adult age group of 5–29 years [1], [2], [3]. Motorcycles are one of the most serious contributors to traffic accidents. Motorcyclists face a higher risk of accidents compared to car drivers [4]. Traffic flows dominated by motorcycles are very different from car traffic flows due to the distinctive characteristics of motorcycles (which can be summarized as flexibility and maneuverability) [5]. In a rear-end collision, motorcyclists have a higher risk of injury compared to other motor vehicle operators. Even a minor collision can have serious effects on the dynamics of a motorcycle and cause the rider to fall and get injured, while a car is likely to only suffer minor body damage, and neither the driver nor the passengers will be injured [6].

Motorcycles, scooters, and bicycles are common two-wheeled modes of transportation. However, there are fundamental differences between the three. Motorcycles have high power and travel at high speeds among other vehicles on the road [7].

Traffic accidents are defined as unfavorable or damaging events that occur on roads, paths open to traffic, and are a real public health issue given the high rates of mortality and morbidity they cause [8]. Studies on traffic accidents consistently show that the underlying causes of these incidents are multifaceted, involving elements related to humans, vehicles, and the environment [9], [10]. Traffic accident victims in 2016 were recorded at 118 people, including 38 fatalities, 29 people with serious injuries, and 41 people with minor injuries from motorcycle traffic accident cases [11], [12].

In fact, statistics on traffic accidents and related injuries have shown that 80–90% of traffic incidents are caused by driver operational errors, mistakes and bad behavior, inattention, fatigue, and distractions [13]. As a result, the low level of normative awareness among road users and underdeveloped driving skills contribute to accidents and increase traffic congestion [14]. Some risky behaviors, such as incorrect stopping distances or not allowing enough time to stop at a yellow light, can be caused by a lack of experience or unintentional mistakes [15]. In the study of factors influencing rider behavior, the Motorcycle Rider Behavior Questionnaire (MRBQ) has been widely used to analyze motorcycle riding behavior and identify risky behaviors that can lead to accidents [15], [16], [17]. Five factors in the Motorcycle Rider Behavior Questionnaire (MRBQ), namely traffic errors (unintentional mistakes made by riders), control errors (deficiencies in motorcycle control), speed violations, stunt riding (deliberate thrill-seeking actions), and the use of safety equipment [18].

The lack of driver concentration is often referred to as the main cause of motor vehicle accidents [19]. A large number of studies have investigated the risk factors related to mobile phone use on driver performance and road safety. A survey conducted in Australia found that driver distraction contributes to 13.6% of serious traffic accidents [13].

The drivers involved in this informal activity are young adults, less educated, and have little to no driving experience [20]. The findings show that in most cases, young people aged 20 to 29 are the most represented among the victims, with a clear dominance of men [8]. Teenagers are the population most at risk for unsafe driving. They often seek thrills, such as riding motorcycles recklessly, which endangers themselves or others.

Seeking thrills, friendliness, and impatience are personality traits that can lead to risky driving, especially for young riders [21].

Most research on driver education has focused on accidents. Traffic violations, however, represent another important type of negative outcome. Whether due to lack of experience or deliberate decisions, most risky driving behaviors such as speeding, tailgating, texting, or foolishness also constitute traffic law violations [22]. Almost a quarter of all traffic accident deaths are motorcyclists [23]. The issue of deaths due to traffic accidents is one of the most threatening sustainability issues [24], [25].

2. Methods

The selection of studies in this literature review was conducted systematically following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines, as illustrated in Figure 1. The data collection process began at the Identification stage, where the literature search was conducted through two main databases, namely ScienceDirect and Google Scholar. From this search, a total of 138 records were found, with 120 articles from ScienceDirect and 18 articles from Google Scholar. Before entering the screening stage, 20 duplicate articles were removed, leaving 118 articles for further examination. No unqualified articles were found by the automation tool or for any other reason at this initial stage.

At the Screening stage, a total of 118 articles were filtered based on titles and abstracts relevant to the topic of analyzing risky driving behavior among motorcyclists. From this process, 55 articles were excluded because they did not meet the initial inclusion criteria. Subsequently, 63 articles were sought for full download (reports sought for retrieval), but 3 articles could not be accessed or their full texts were not found (reports not retrieved).

A total of 60 articles were successfully obtained and then thoroughly assessed for eligibility. At this in-depth evaluation stage, 25 articles were excluded with details as follows: 15 articles were removed because the research focus was not on risky behavior/did not discuss motorcycles, and 10 articles were removed due to the document type being a short review and methodological limitations. At the final stage, a total of 35 articles were deemed to meet all eligibility criteria and were Included in this literature review analysis.

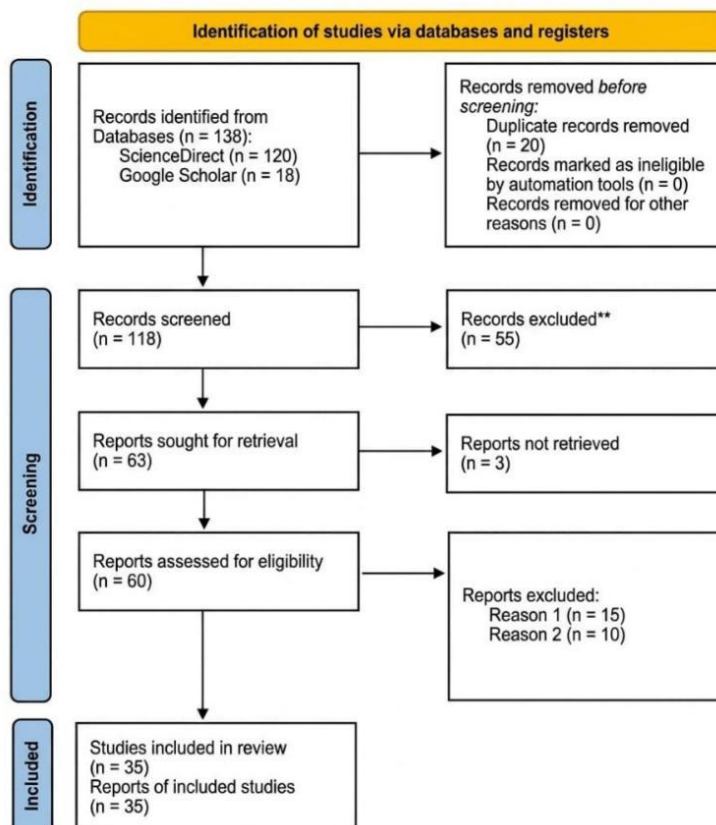


Figure 1. PRISMA Flow Diagram for Literature Selection Process

3. Result and Discussion

3.1. Characteristics of the Reviewed Journal

Based on the selection process of the Systematic Literature Review (SLR) protocol that has been established, a total of 35 journal articles that meet the inclusion and exclusion criteria were obtained. The articles were then extracted to observe publication trends, methodologies, and the focus of findings related to risky driving behavior among motorcyclists. The distribution of publication years analyzing risky driving behavior has shown fluctuations in recent years. To provide an overview, here is a visualization of the publication trends from the analyzed articles:

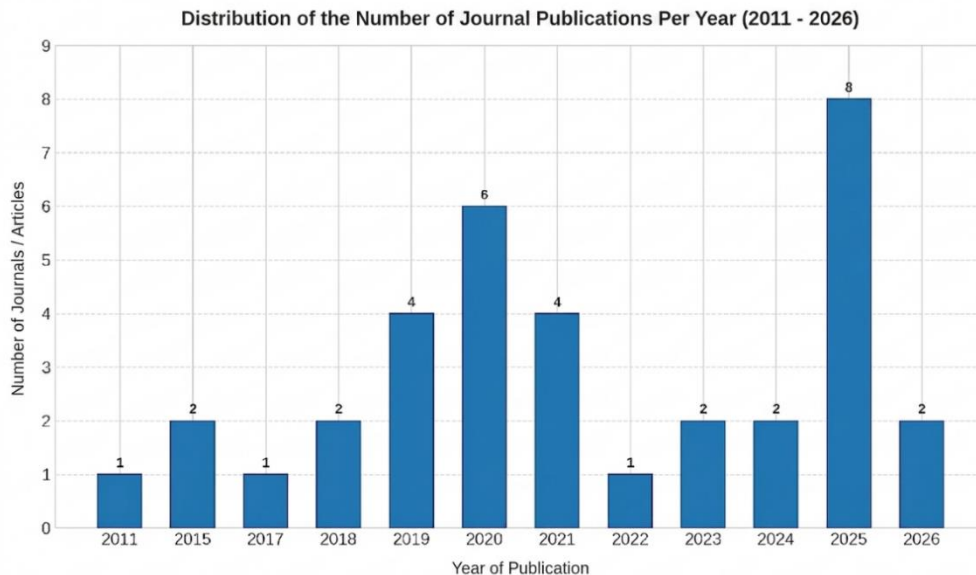


Figure 2. Distribution of the Number of Journal Publication Per Year 2011-2026

Figure 2 shows that the number of publications related to risky riding behavior among motorcycle riders fluctuated during the period 2011–2026 and did not exhibit a consistent upward or downward trend. The number of publications increased gradually from 2018 to 2020, reaching six articles in 2020, before decreasing in 2022. A significant increase was observed in 2025 with eight publications, indicating renewed research interest in motorcycle safety issues. These fluctuations suggest that research on risky riding behavior is highly influenced by emerging transportation challenges, road safety concerns, technological developments, and regional accident trends. Although the topic has attracted continuous attention from researchers, the inconsistent publication pattern indicates that it remains a developing research field with opportunities for further exploration.

Following the publication trend analysis, the selected articles were categorized according to their publication year, journal name, and publisher. As shown in Table 1, the reviewed studies were published across a wide range of journals, reflecting the multidisciplinary nature of research on risky riding behavior among motorcycle riders.

Table 1. Journal Name, Publisher, and Year of Publication

Year	Number of Articles	Journal Name/Publisher
2011	[5]	IATSS Research
2015	[22], [25]	Accident Analysis & Prevention, Transportation Research Record
2017	[15]	Accident Analysis & Prevention
2018	[14], [23]	IATSS Research, PLoS One
2019	[11], [19], [26], [6]	Public Health Indonesia, IEOM Proceedings, Journal of Indonesian Road Safety, Safety Science
2020	[18], [1], [16], [10], [4], [3]	Safety Science, IOP Conference Series (Materials Science and Engineering), Sustainability, Jurnal Kesehatan, IATSS Research
2021	[21], [13], [27], [20]	Int. Journal of Injury Control and Safety Promotion, IJERPH, Health Science Journal of Indonesia, Traffic Injury Prevention
2022	[7]	Traffic Injury Prevention

Year	Number of Articles	Journal Name/Publisher
2023	[24], [12]	Heliyon, Int. Journal of Transportation Science and Technology
2024	[9], [28]	The Open Public Health Journal, Journal of Chemical Health Risks
2025	[17], [8], [29], [30], [31], [32], [33]	Transportation Research Interdisciplinary Perspectives, Buletin Profesi Insinyur, Archives of Craniofacial Surgery, Int. Journal of Health Literature and Science, Transportation Research Procedia, Int. Journal of Africa Nursing Sciences
2026	[34], [2], [35]	Case Studies on Transport Policy, Transportation Research Part F: Traffic Psychology and Behaviour, PLoS One

3.2. Demographic Characteristics and Instruments for Measuring Risky Behavior

The majority of the literature shows that risky driving behavior is closely related to the younger age group, particularly teenagers, students, and online motorcycle taxi drivers [16], [17], [24], [25]. In Southeast Asia and Africa, motorcycles serve as the primary mode of transportation and a source of livelihood, but they also contribute to the highest accident rates [5], [26], [35].

To measure this behavior, the Motorcycle Rider Behavior Questionnaire (MRBQ) has become the most valid and widely used measurement tool globally [4], [6], [11], [13], [20], [24], [34]. The reviewed studies employed different instruments and methodological approaches to evaluate risky riding behavior. As presented in Table 2, each instrument focuses on specific behavioral aspects and has been applied across various research settings.

Table 2. Instruments and Approaches for Measuring Driving Behavior

Instrument/ Approach	Measurement Focus	Related References
MRBQ (Full / Short Version)	Measuring errors, traffic violations, and driving control.	[4], [6], [11], [13], [20], [24], [34]
Naturalistic Riding Data	Direct observation of driving behavior and safe distance (headway) on the highway in real-time.	[3], [10]
Qualitative Approach / FGD	In-depth exploration of safety challenges in the field (specifically motorcycle taxis).	[35]

Cross-environmental research shows significant differences in driving behavior. Drivers in urban areas tend to commit violations due to traffic congestion and haste, while drivers in rural areas often neglect safety equipment due to minimal legal oversight [34].

3.3. Internal and External Factors Causing Risky Behavior

Risky behavior on the road does not occur in isolation, but is influenced by the interaction between internal factors (psychological and perceptual) and external factors (technology and environment).

3.3.1. Internal Factors (Perception and Psychological)

Many motorcyclists, especially young ones, have a low level of awareness and a misguided perception of risk [12]. They often underestimate the potential for accidents and consider aggressive behavior as normal [16], [17]. Limited knowledge of traffic rules and a careless attitude exacerbate the probability of human error on the road [14], [28], [30], [32].

3.3.2. External Factors (Technological Disruptions and Environmental Pressures)

The use of technology on motorcycles has become one of the main triggers of distracted driving:

- Electronic Maps (GPS): The use of digital maps while riding a motorcycle has been proven to significantly increase the mental workload of the rider and raise the probability of human error [8].
- Smartphones: Engaging in activities with a phone (making calls/sending messages) while driving disrupts driving performance and triggers fatal traffic violations [18].
- Work Pressure: For online motorcycle taxi drivers or motorbike taxis (like Bodaboda in Tanzania), income

pressure and performance targets from the app force them to violate speed limits and run traffic lights [25], [26], [35].

- d. Road and Vehicle Conditions: Exposure to vibration on motorcycles in unstable traffic conditions also contributes to rider fatigue, which reduces concentration [31].

3.4. Health Impact and Effectiveness of Safety Interventions

3.4.1. The Impact of Injuries Due to Risky Behavior

Speed limit violations have been proven to be directly correlated with an increase in motorcycle accident rates [9], [22]. The physical impact of this accident is much more fatal compared to other modes of transportation [21]:

- a. Head Injury: Non-compliance with the use of standard helmets is the main cause of the high incidence of head injuries due to traffic accidents, especially in Indonesia [19].
- b. Jaw Fractures: A systematic review shows that motorcycle accidents are the largest external trauma causing fractures in the jaw/midfacial bones due to severe impacts [29].

3.4.2. Intervention and Prevention Solutions

Safety Riding Education: Health and safety education using audiovisual media has proven effective in increasing knowledge, improving attitudes, and building positive subjective norms among high school students [7]. A tiered driver education approach is crucial in reducing violation rates in the early years of license ownership [1], [2].

In addition to education, government policy interventions such as strict law enforcement, road infrastructure improvements, and control over the growth of motorcycle numbers (aligned with the Human Development Index/HDI) have proven capable of significantly reducing traffic fatality rates in the long term [23], [27].

4. Conclusion

This literature review emphasizes that risky driving behavior among motorcyclists is triggered by a combination of individual psychological factors, technological distractions (cell phones and GPS), and economic pressures (from online motorcycle taxis). The resulting impact dominates cases of head injuries and fatal maxillofacial fractures. Intervention cannot rely solely on law enforcement, but must be integrated through audiovisual-based safety riding education from an early age and strict regulations on app-based transportation management.

This literature review also shows that the group of university students (late adolescents to early adults) are the main actors most vulnerable to engaging in risky driving behavior on the road. Psychological characteristics at this age, such as high ego, unstable emotions, low risk perception, and a tendency to seek challenges, are the main triggers for the high rates of traffic violations and accidents among students.

References

- [1] A. Alvisyahri, R. Anggraini, and S. Sugiarto, "Motorcyclist Perceptions on Road Safety Considering Awareness, Riding Behavior, and Risk-Taking Behavior, as Latent Variables," *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 917, no. 1, 2020.
- [2] K. S. Nambiza, A. Neven, W. G. Kazaura, and K. Brijs, "A qualitative exploration of risky riding behaviors and road safety challenges among motorcycle taxi riders in Dar es Salaam," *Transp. Res. Part F Traffic Psychol. Behav.*, vol. 116, no. October 2025, p. 103399, 2026.
- [3] F. M. Amalia and M. I. Nurmansyah, "Perilaku Berisiko dalam Berkendara dan Kejadian Kecelakaan Sepeda Motor pada Mahasiswa," *J. Kesehat.*, vol. 3, no. 4, pp. 273–286, 2020.
- [4] M. T. Yousif, A. F. M. Sadullah, and K. A. A. Kassim, "A review of behavioural issues contribution to motorcycle safety," *IATSS Res.*, vol. 44, no. 2, pp. 142–154, 2020, doi: 10.1016/j.iatssr.2019.12.001.
- [5] K. V. Hung and L. T. Huyen, "Education influence in traffic safety: A case study in Vietnam," *IATSS Res.*, vol. 34, no. 2, pp. 87–93, 2011.
- [6] M. Winkelbauer, M. Donabauer, A. Pommer, and R. Jansen, "Naturalistic data on time headway behind motorcycles and other vehicles," *Saf. Sci.*, vol. 119, no. December 2017, pp. 162–173, 2019.
- [7] T. Kent, J. Miller, C. Shreve, G. Allenback, and B. Wentz, "Comparison of injuries among motorcycle, moped and bicycle traffic accident victims," *Traffic Inj. Prev.*, vol. 23, no. 1, pp. 34–39, 2022.
- [8] F. H. Rahou and Y. Aboussaleh, "Analysis of injuries and deaths from road traffic accidents in Morocco: Driver behaviors assessment and prevention perspectives," *Transp. Res. Interdiscip. Perspect.*, vol. 34,

no. October, 2025.

- [9] D. L. Setyowati, Y. Setyaningsih, C. Suryawati, and D. Lestantyo, "Assessment of Risky Riding Behaviors Using the Motorcycle Rider Behavior Questionnaire (MRBQ) among University Students," *Open Public Health J.*, vol. 17, no. 1, pp. 1–9, 2024.
- [10] L. Lady, T. Try Mulyo, and K. Kumino, "Identify factors that caused false and violation by motorcycle rider," *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 909, no. 1, 2020.
- [11] W. Rahman, D. L. Setyowati, and R. H. Ifroh, "Effect of Health Education of Safety Riding Using Audiovisual Media on Knowledge, Attitudes and Subjective Norms of Junior High School Students in Samarinda Indonesia," *Public Heal. Indones.*, vol. 5, no. 3, pp. 54–61, 2019.
- [12] A. M. Ngoc, C. C. Minh, N. T. Nhu, H. Nishiuchi, and N. Huynh, "Influence of the human development index, motorcycle growth and policy intervention on road traffic fatalities – A case study of Vietnam," *Int. J. Transp. Sci. Technol.*, vol. 12, no. 4, pp. 925–936, 2023.
- [13] C. A. Catalina Ortega, M. A. Mariscal, W. Boulagouas, S. Herrera, J. M. Espinosa, and S. García-Herrero, "Effects of mobile phone use on driving performance: an experimental study of workload and traffic violations," *Int. J. Environ. Res. Public Health*, vol. 18, no. 13, 2021.
- [14] Y. Kitamura, M. Hayashi, and E. Yagi, "Traffic problems in Southeast Asia featuring the case of Cambodia's traffic accidents involving motorcycles," *IATSS Res.*, vol. 42, no. 4, pp. 163–170, 2018.
- [15] A. N. Stephens, J. Brown, L. de Rome, M. R. J. Baldock, R. Fernandes, and M. Fitzharris, "The relationship between Motorcycle Rider Behaviour Questionnaire scores and crashes for riders in Australia," *Accid. Anal. Prev.*, vol. 102, pp. 202–212, 2017.
- [16] S. Uttra, S. Jomnonkwao, D. Watthanaklang, and V. Ratanavaraha, "Development of self-assessment indicators for motorcycle riders in Thailand: Application of the motorcycle rider behavior questionnaire (MRBQ)," *Sustain.*, vol. 12, no. 7, pp. 1–16, 2020.
- [17] K. S. Nambiza, A. Neven, W. G. Kazaura, M. W. Khattak, and K. Brijs, "Exploring risky riding behaviors and road safety outcomes among motorcycle taxi riders in Dar es Salaam, Tanzania," *Transp. Res. Interdiscip. Perspect.*, vol. 34, no. June, p. 101743, 2025.
- [18] H. Trung Bui, I. Saadi, and M. Cools, "Investigating on-road crash risk and traffic offences in Vietnam using the motorcycle rider behaviour questionnaire (MRBQ)," *Saf. Sci.*, vol. 130, no. April, p. 104868, 2020.
- [19] L. Lady and W. Susihono, "Effect of using electronic map while driving on human error probability," *Proc. Int. Conf. Ind. Eng. Oper. Manag.*, vol. 2019, no. MAR, pp. 1464–1473, 2019.
- [20] H. Ospina-Mateus, L. Q. Jiménez, and F. J. López-Valdés, "The rider behavior questionnaire to explore associations of motorcycle taxi crashes in Cartagena (Colombia)," *Traffic Inj. Prev.*, vol. 22, no. S1, pp. S99–S103, 2021.
- [21] Y. Umniyatun, M. I. Nurmansyah, Y. Farradika, T. B. Purnama, and D. N. Hidayat, "Motorcycle risky behaviours and road accidents among adolescents in Jakarta metropolitan area, Indonesia," *Int. J. Inj. Contr. Saf. Promot.*, vol. 28, no. 3, pp. 339–346, 2021.
- [22] D. F. Shell, I. M. Newman, A. L. Córdova-Cazar, and J. M. Heese, "Driver education and teen crashes and traffic violations in the first two years of driving in a graduated licensing system," *Accid. Anal. Prev.*, vol. 82, pp. 45–52, 2015.
- [23] H. Hosseinpourfeizi *et al.*, "The short Persian version of motorcycle riding behavior questionnaire and its interchangeability with the full version," *PLoS One*, vol. 13, no. 8, pp. 1–13, 2018.
- [24] S. Jomnonkwao, T. Champahom, C. Se, N. Hantanong, and V. Ratanavaraha, "Contributing factors to near-miss experiences of motorcyclists in Thailand: A random parameter probit model approach," *Heliyon*, vol. 9, no. 12, p. e22625, 2023.
- [25] V. H. Williams, S. B. McLaughlin, S. L. Williams, and T. Buche, "Exploratory analysis of motorcycle incidents using naturalistic riding data," *Transp. Res. Rec.*, vol. 2520, pp. 151–156, 2015.
- [26] A. Kusumawati, K. N. S. Ayuningtyas, and E. Ellizar, "the Effect of Speed Limit Violation on Motorcycle Crash Rate: Case Study Bandung National Road," *J. Indones. Road Saf.*, vol. 2, no. 3, p. 171, 2019.
- [27] L. Tana, D. Delima, N. Kusumawardani, and L. Indrawati, "Helmet use behavior and its relation to head injury of road traffic accident in Indonesia (Basic Health Research, 2018)," *Heal. Sci. J. Indones.*, vol. 12, no. 1, pp. 56–65, 2021.
- [28] S. Satriani *et al.*, "Analysis of Risk Factors for Traffic Accidents Among Online Motorcycle Taxi Drivers in Makassar City in 2024," *J. Chem. Heal. Risks*, vol. 14, no. 4, pp. 867–874, 2024.
- [29] R. Z. Akbar, N. Puspasari, N. Handayani, and R. Fitriana, "Analysis of Rider Behavioral Factors in Motorcycle Traffic Accidents," *Bul. Profesi Ins.*, vol. 8, no. 2, pp. 56–064, 2025.
- [30] A. M. Arif, A. Tajrin, and Nurwahida, "Analysis of jaw fractures in motorcycle accidents: a systematic

- review,” *Arch. Craniofacial Surg.*, vol. 26, no. 3, pp. 85–91, 2025.
- [31] A. Tira Octavia, C. Wahyuningtias, and N. Luthviatin, “Determinants of Traffic Accidents in Motorcycle Riders: Literature Review,” *Int. J. Heal. Lit. Sci.*, vol. 3, no. 1, pp. 8–21, 2025.
- [32] T. Figlus and P. Szafraniec, “Analysis of the exposure of a motorcycle driver to vibration in non-stationary traffic conditions,” *Transp. Res. Procedia*, vol. 83, pp. 520–527, 2025.
- [33] M. P. Nyangi and G. Waria, “Prevalence of road traffic accident knowledge and attitudes of Bodaboda drivers in Singida Region, Tanzania,” *Int. J. Africa Nurs. Sci.*, vol. 23, no. September, p. 100907, 2025.
- [34] D. Watthanaklang *et al.*, “Analysis of motorcycle rider behavior and attitudes in urban and rural environments: comparative study utilizing a motorcycle rider behavior questionnaire,” *Case Stud. Transp. Policy*, vol. 23, no. June 2025, p. 101693, 2026.
- [35] M. Iqbal, K. Shafique, and M. Ashraf, “Assessment of helmet usage among secondary school students in urban settings: A descriptive analytical study from Karachi, Pakistan,” *PLoS One*, vol. 21, no. 1 January, pp. 1–12, 2026.