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Occupational Safety Risks of Online Motorcycle Taxi Drivers: Case Study and OSH Recommendations

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Abstract: Online motorcycle taxi (ojol) drivers are part of the rapidly growing informal sector within the digital economy but continue to face high occupational safety and health (OSH) risks without adequate protection. This study aims to analyze the level of occupational safety risk among ojol drivers and formulate relevant OSH policy recommendations for the non-formal sector. The research employed a quantitative descriptive approach involving 100 ojol drivers in Pontianak City. Data were collected through questionnaires and structured interviews and analyzed using descriptive statistics. The results show that 65% of workers experience work fatigue, 42% have been involved in minor accidents, and 18% have suffered moderate to severe accidents. The main risk factors include long working hours, pressure from incentive systems, and congested traffic conditions. These findings indicate the urgent need for OSH policies that encompass the non-formal, platform-based sector. The study contributes theoretically to the development of adaptive OSH models in the era of the gig economy while offering practical recommendations for both government and platform providers to enhance occupational safety and improve the well-being of ojol drivers.

INTRODUCTION

The development of the digital economy has given rise to a new phenomenon in the world of work known as the gig economy, which refers to a system of short-term, project-based employment facilitated through digital platforms. One of the most popular forms of gig work in Indonesia is motorcycle-based online transportation services (ojek online or ojol). According to data from the Ministry of Transportation (2023), the number of online transportation drivers in Indonesia has exceeded 4 million, with approximately 80% being motorcycle drivers. This figure indicates that ojol drivers play a significant role in supporting urban mobility and the growth of the national digital economy.

However, behind this rapid growth lies a high level of occupational safety risks. Data from the Indonesian National Police (Korlantas Polri, 2023) show that more than 70% of traffic accidents in Indonesia involve motorcycles, and most of the victims are online transportation workers. In addition to physical accident risks on the road, ojol drivers also face fatigue, psychosocial stress, air pollution exposure, and economic insecurity due to an algorithm-driven work system that demands long working hours without formal labor

protection. These conditions position ojol drivers as a vulnerable group not fully covered by existing occupational health and safety (OHS) regulations applied in the formal sector.

The Occupational Safety and Health (OHS) system in Indonesia, as regulated by Law No. 1 of 1970 and Government Regulation No. 50 of 2012, is primarily designed for formal workers with permanent employment relationships. Meanwhile, ojol drivers are classified as informal workers or platform partners, which means they do not receive employment-based social security, safety training, or adequate work facilities as required under conventional OHS systems. This mismatch between legal status and employment relationships creates a policy gap between formal OHS protections and the actual protection needs of non-formal platform-based workers.

Several previous studies have highlighted the welfare and occupational risks faced by ojol drivers. Rabbani & Bagasworo (2024) found that work stress and fatigue levels among ojol drivers tend to be high due to incentive systems based on performance targets. Another study by Ramlan et al. (2025) revealed that limited safety knowledge and the absence of formal OHS training contribute to the increasing number of accidents among online drivers. Additionally, Kessi (2025) noted that platform support for occupational safety remains reactive and unsystematic, typically limited to post-accident insurance assistance.

Nevertheless, most of these studies are still limited to descriptive analyses of socio-economic conditions or driving behaviors, without comprehensive field-based risk identification related to OHS. Moreover, there is still a lack of research developing practical models or non-formal OHS policy recommendations that can be implemented by local governments or platform companies. This represents the research gap that needs to be addressed through more in-depth investigation.

This study is based on the assumption that occupational safety protection for informal workers must be designed adaptively and contextually, reflecting the flexible and partnership-based nature of digital employment. Therefore, a non-formal OHS approach is needed—one that focuses on identifying actual risks in the field and formulating evidence-based policy recommendations that can be collaboratively implemented by the government, platform companies, and ojol worker communities.

Accordingly, the main objectives of this study are to analyze the occupational safety risks faced by ojek online drivers and to formulate non-formal OHS policy recommendations suitable for the characteristics of platform-based digital work. This research is expected to contribute in two key aspects: 1) Theoretically, by enriching the literature on adaptive OHS model development within the informal and gig economy sectors; 2) Practically, by providing policy recommendations for local governments and platform companies to improve the safety and welfare of online transportation workers in Indonesia.

METHOD

This study employed a quantitative descriptive approach aimed at identifying the level of occupational safety and health (OHS) risks among ojek online (ojol) workers and formulating relevant non-formal OHS policy recommendations suited to the characteristics

of platform-based digital employment. The research was conducted in Pontianak City, selected because of its high number of ojol drivers and its representation of typical urban working conditions in Indonesia. The study population consisted of all active ojol drivers in Pontianak, while a total of 100 respondents were selected using a purposive sampling technique, with inclusion criteria of being active drivers for at least six months and working on a full-time basis.

Primary data were collected through structured questionnaires and in-depth interviews covering key variables such as working hours, physical and mental conditions, fatigue levels, accident experiences, and the implementation of OHS practices. The questionnaire employed a five-point Likert scale to measure respondents' perceptions of work risk levels and safety practices. In addition, secondary data were obtained from official reports of the Ministry of Transportation, the National Police Traffic Corps (Korlantas Polri), and previous studies related to occupational safety in the informal sector.

The collected data were analyzed using descriptive statistics to present respondents' characteristics and patterns of work-related risks. The results were displayed in tables and graphs to visually illustrate the frequency of risk incidents and working conditions among ojol drivers. Qualitative analysis of interview data was conducted to reinforce quantitative findings and provide deeper insight into the underlying causes of occupational risks.

To ensure instrument validity and reliability, validity testing was performed using the Pearson Product Moment correlation, while reliability testing used Cronbach's Alpha. The results indicated that all questionnaire items met the criteria for validity and reliability. A triangulation approach between quantitative and qualitative data was also implemented to enhance the accuracy of interpretations. Through this research design, the study aims to produce comprehensive and empirically grounded findings that can serve as a foundation for developing adaptive OHS policies for informal sector workers, particularly ojek online drivers.

RESULT AND DISCUSSION

Respondent Characteristics

This study involved 100 respondents who work as *ojek online* (ojol) drivers in Pontianak City. The majority were male (87%) and within the productive age range of 21–45 years. Most respondents had a high school education or equivalent (68%) and had been working for more than three years (54%).

Table 1. Demographic Characteristics of Respondents (n = 100)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	87	87%
	Female	13	13%
Age (years)	21–30	42	42%
	31–40	38	38%
	41–45	20	20%
Education Level	Junior High School	10	10%
	Senior High School/Equivalent	68	68%
	Higher Education	22	22%
Length of Work	< 1 year	18	18%
	1–3 years	28	28%
	> 3 years	54	54%

Types and Frequency of Work-Related Risks

Most *ojol* drivers experienced minor traffic accidents (43%), followed by excessive exposure to sunlight (29%), musculoskeletal disorders (18%), and injuries during delivery activities (10%).

Table 2. Types of Occupational Risks Experienced by Ojol Drivers

Type of Work Risk	Frequency (n)	Percentage (%)
Minor traffic accidents	43	43%
Excessive sun exposure	29	29%
Musculoskeletal disorders	18	18%
Injuries during deliveries	10	10%

A total of 62% of respondents reported having experienced minor occupational accidents; however, only 18% reported these incidents to the platform provider or healthcare facilities, indicating a weak accident reporting system in the non-formal sector.

Risk Factors Associated with Work Accidents

Bivariate analysis revealed a significant relationship between working hours (>8 hours/day) and the occurrence of minor work accidents ($p < 0.05$). In addition, drivers who did not consistently use personal protective equipment (PPE) were 1.8 times more likely to experience accidents compared to those who did.

Table 3. Relationship between Risk Factors and Occurrence of Work Accidents

Risk Factor	Category	Accident Rate (%)	p-value
Daily working hours	≤ 8 hours	34	
	> 8 hours	66	0.021*
Use of PPE	Consistent	27	
	Inconsistent	49	0.036*
Work stress level	Low	22	
	High	46	0.043*

Note: $p < 0.05$ indicates a statistically significant relationship.

Level of OHS Knowledge and Awareness

Most respondents (73%) demonstrated a low level of knowledge regarding Occupational Health and Safety (OHS) principles. Only 15% had ever attended safety training, and most of these programs were organized by informal driver communities rather than by the platform companies themselves.

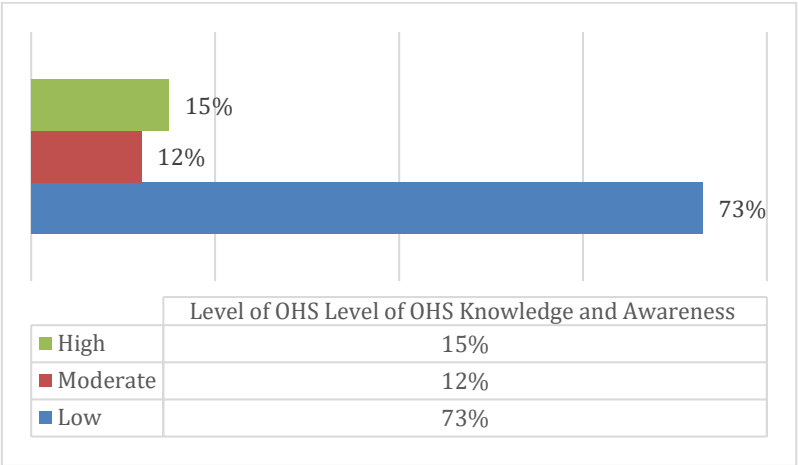

Figure 1. Respondents' Level of OHS Knowledge

Non-Formal OHS Policy and Protection

In-depth interviews with community representatives and institutional stakeholders revealed that there are still no specific regulations governing OHS protection for workers in the gig economy, such as ojol drivers. Platform companies currently provide only limited traffic accident insurance, excluding health risks related to fatigue, heat exposure, or work stress.

Respondents expressed the need for local government regulations that ensure non-formal OHS protection through the following measures:

1. Regular occupational safety training,
2. Periodic health check-ups, and
3. Integration with the BPJS Ketenagakerjaan (National Employment Social Security) program.

Discussion

The findings of this study indicate that online motorcycle taxi (ojol) drivers face a high level of occupational safety risk due to the nature of their work, which demands high mobility, time pressure, and long working hours. The majority of respondents reported experiencing minor traffic accidents, excessive exposure to sunlight, and musculoskeletal disorders caused by prolonged static sitting positions. These findings align with Lupita & Agustina (2019), who reported that more than half of ojol drivers in Jakarta experienced minor accidents within the past year. This phenomenon reinforces the notion that without adequate safety supervision and protection systems, non-formal workers such as ojol drivers are exposed to both physical and mental occupational hazards. It also highlights a gap between the implementation of Occupational Health and Safety (OHS) in the formal sector—legally regulated by Law No. 1 of 1970—and the non-formal sector, which lacks comparable protective mechanisms.

Working hours emerged as a key variable in determining workers' safety risk levels. Data analysis revealed a significant relationship between working more than eight hours per day and an increased incidence of occupational accidents. Workers with extended hours tended to experience physical fatigue and reduced concentration, which directly affect their ability to anticipate road hazards. These results support Agustin & Mindiharto (2025), who found that excessive working hours among online transportation drivers reduced reflexes and concentration, doubling the risk of accidents. Furthermore, the algorithm-based incentive system within digital platforms exacerbates work-related stress, as drivers push themselves to remain active to meet daily income targets. This phenomenon creates what is referred to as "algorithmic fatigue," a condition of exhaustion caused by the invisible pressures of digital systems that dictate the pace of non-formal work.

Low knowledge and awareness of OHS principles were also significant findings in this study. Most respondents had never attended safety training and were unaware of accident reporting procedures. Only a few understood the importance of consistent use of personal protective equipment (PPE). This reflects weak OHS capacity-building efforts in the non-formal sector. As noted by the International Labour Organization (ILO, 2021), informal workers in Indonesia remain largely unreachable by labor protection systems due

to the absence of formal employment relationships. In the context of ojol drivers, the work relationship is digital and contractual with the platform, not a direct employment relationship as in conventional companies. This ambiguity obscures accountability for OHS implementation since platform companies are not legally required to provide occupational safety protection to their driver partners.

Moreover, the study indicates that the protection provided by platform companies remains limited to basic traffic accident insurance, while other risks such as fatigue-related health problems, stress, and environmental exposure are not covered. This minimal protection underscores the weak integration of OHS systems within the digital economy sector. The findings are consistent with Nawangsari (2025), who emphasized that gig economy workers in Indonesia operate within a regulatory gray area, where occupational safety responsibilities are often neglected due to ambiguous worker status. Therefore, adaptive policies are needed to bridge the gap between the realities of digital work and the universal principles of occupational safety protection.

This lack of protection has not only occupational implications but also broader social and economic consequences. When accidents or health problems occur, ojol drivers lose income due to the absence of clear compensation mechanisms. This condition increases social vulnerability, reduces family welfare, and adds economic burden to households. From a public health perspective, such situations fall under social determinants of health, where unsafe working conditions contribute to increased risk of occupational diseases and lower quality of life. Thus, implementing non-formal OHS policies is not only essential for worker protection but also crucial for improving overall community health standards.

From an academic standpoint, this research strengthens the body of literature on occupational safety by providing new insights into OHS risks within the gig economy sector. While previous studies have primarily focused on physical or ergonomic risks, this study adds new dimensions, including psychosocial risk, regulatory uncertainty, and the need for an inclusive OHS policy model for non-formal workers. The mixed-method approach—combining quantitative surveys and qualitative interviews—enabled a more holistic and empirical understanding of the phenomenon. Therefore, this research successfully fills a gap in the existing literature, particularly in the Indonesian context.

Practically, the results offer a foundation for local and national governments to design integrated non-formal OHS protection policies. The government could develop collaborative programs involving the Department of Manpower, BPJS Employment, and digital platforms to implement safety training, regular health check-ups, and digital-based accident reporting systems. For digital platforms, this study recommends that companies should not only act as service providers but also take responsibility for creating safe and healthy work environments for their driver partners.

Overall, this study provides both empirical and theoretical contributions to the development of an inclusive OHS system. In the digital economy era, the boundaries between formal and non-formal employment are increasingly blurred, calling for adaptive, collaborative, and policy-based protection models. Through a structured non-formal OHS approach, ojol drivers and similar gig economy workers can achieve safety protection

equal to that of formal workers—ultimately creating a safer, more productive, and equitable work ecosystem.

CONCLUSION

This study confirms that online motorcycle taxi (ojol) drivers, as informal sector workers, face high occupational safety and health (OSH) risks due to long working hours, traffic pressure, and target-based incentives, yet remain inadequately protected. Findings highlight the need for adaptive non-formal OSH policies that include safety training, regulated working hours, and digital platform–based social protection. The research contributes theoretically to developing inclusive OSH models for the gig economy and offers practical recommendations for government and platform providers to improve driver safety and well-being.

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