

## ORIGINAL ARTICLE

# Relationship of Water Consumption, Speed Suitability, and Fatigue to Accidents in Online Motorcycle Taxi Drivers

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## ABSTRACT

**Introduction:** Working as an online motorcycle taxi that spends extended periods in a hot environment increases the risk of dehydration and accidents if not mitigated by adequate fluid consumption. Additionally, excessive vehicle speed and fatigued driving increase the likelihood of being involved in an accident. This study aims to determine the significant relationship between water consumption, speed suitability, fatigue and the occurrence of accidents among online motorcycle taxi drivers. **Methods:** The study employed an observational cross-sectional approach with 110 online motorcycle taxi drivers in Sidoarjo. Data on water consumption, speed suitability, accidents were collected via a Google form, while fatigue was assessed with the Subjective Rating Test Questionnaire. Statistical analysis used Cramer's V to link water consumption with accidents and the contingency coefficient test to examine speed suitability, fatigue, and accidents. **Results:** The results of the analysis indicate a positive relationship with a weak relationship between water consumption ( $r = 0.227$ ) and speed suitability ( $CI = 0.220$ ) and the occurrence of accidents, as well as a strong relationship and positive relationship between fatigue ( $CI = 0.289$ ) and the occurrence of accidents among online motorcycle taxi drivers. **Conclusion:** There is a relationship between water consumption, speed suitability, fatigue, and accidents among online motorcycle taxi drivers. Fatigue notably strongly correlates with accidents. Drivers are urged to avoid exceeding 8-hour workdays or driving while fatigued (e.g., drowsy, uncomfortable, in pain).

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road infrastructure, and 9% to other factors. In 2019, Indonesia recorded 116,411 accidents. This number decreased to 100,028 in 2020 but saw a 3.62% increase in 2021, with 3,617 additional cases (2).

## INTRODUCTION

Traffic accidents pose a global concern demanding serious attention. The rise in the number of vehicles, especially motorcycles, without a corresponding improvement in infrastructure and driver safety contributes to this problem. The World Health Organization reports an ongoing increase in traffic-related fatalities, reaching 1.35 million annually, making it the eighth leading cause of death. On a daily basis, over 3,000 people lose their lives in traffic accidents (1). In Indonesia, the average annual accident rate has risen by 4.87%, resulting in three fatalities every hour. Human factors related to driving skills and behaviour account for 61%, while 31% is attributed to environmental conditions and

According to Law No. 22 of 2009, the highest allowable speed on Indonesian highways is 80 kilometres per hour for intercity roads and 50 kilometres per hour in urban areas (24). Accidents often result from driver violations, notably speeding. Manggala et al.'s research highlights that vehicle speed is the primary cause of accidents, particularly around corners (30). Rapid technological advancements in the digital age have significantly impacted the transportation industry. The number of vehicle owners in Indonesia has steadily risen each year, reaching 136,137,455 units in 2020. Among these, 84% (115,023,039 units) are two-wheeled vehicles (3). This increase is largely attributed to the growth of online motorcycle taxi applications, also known as online motorcycle taxis.

The increasing number of motorised vehicles on the road leads to additional issues, including traffic congestion and a rise in traffic accidents. In 2018, statistics from the Ministry of Health of the Republic of Indonesia revealed that motorcyclists accounted for 72.7% of all traffic-related injuries (32). This figure surpasses those of car drivers, non-motorised vehicle users, pedestrians, and passengers. Due to the nature of their profession, online motorcycle taxi drivers are vulnerable to traffic accidents, as evidenced by reports of accidents and fatalities resulting from exhaustion or fatigue. Examples include accidents involving Go-Jek drivers in Tugu Tani and collisions with road barriers in Surabaya (3). According to data from the Indonesia National Police, there have been 103 accidents involving Go-Jek drivers (5).

According to Tanriono et al.'s research, surpassing the government-recommended driving time is a significant factor in work-related accidents among motorcycle taxi drivers in Bitung (33). The stipulated working hours, as per Law No. 13 of 2003 on working hours (31), are either seven hours per day and forty hours per week for six working days or eight hours per day and forty hours per week for five working days. Workload is the burden that must be completed by workers of a job that is done, The level of workload productivity and work productivity had a significant relationship on manufactur workers (37). The duration of a worker's duty affects work fatigue, with excessive hours reducing physical efficiency and endurance, impacting various aspects of the body. A hot working environment can also contribute to discomfort, fatigue, increased error rates, and reduced quality of goods or services delivered. Among the three occupations most vulnerable to overheated environments, outdoor labour, especially on sun-exposed roadways, stands out (35).

Working as an online motorcycle taxi driver often means enduring heat, affecting productivity and causing fatigue. Fatigue symptoms include increased heart rate, sweating, extreme tiredness, disorientation, dizziness, and a rise in body temperature. Heat stress leads to fluid and electrolyte loss, requiring regular water intake to prevent dehydration and accidents. About 60% of body weight is water, which is vital for temperature regulation and bodily functions (6). In hot environments, drinking at least 250ml of water every 30 minutes is crucial (36). Risky behaviours like high-speed driving contribute to accidents among online motorcycle drivers. Initial observations by researchers found that three out of five drivers had accidents (18).

Accidents are caused by fatigue, diminished driving concentration, and drivers who are distracted by their devices and fail to pay attention to road conditions; additionally, high driving velocities exacerbate accidents. The researchers were interested in the strong relationship between water consumption, speed

suitability, fatigue and the incidence of accidents among online motorcycle taxi drivers based on previous research and preliminary findings.

## **MATERIALS AND METHODS**

This was an analytical cross-sectional observational study in which the researcher observed the research object without subjecting it to any special treatment. This research was conducted at the base camp of the Sidoarjo-Porong Online Driver Association in Sidoarjo Regency, East Java, from October 2020 to March 2021. This research employs a total population sample with strict inclusion criteria. Following the selection of respondents, 110 online motorcycle taxi drivers in the Sidoarjo Regency were identified through the distribution of questionnaires.

### **Sociodemographic**

The population for this study consisted of all motorcycle online taxi drivers from two online taxi communities in the Sidoarjo Regency, specifically those affiliated with the Sidoarjo-Porong Online Driver Association, totalling 120 drivers. After selecting respondents based on inclusion criteria, we obtained a sample of 110 online motorcycle taxi drivers affiliated with the Sidoarjo-Porong Online Driver Association. Drivers who did not meet the inclusion criteria, such as those not affiliated with the specified association and those who completed the questionnaire incompletely or were unwilling to participate, were excluded from the research. The questionnaire included general questions about age, years of service, tenure, and educational level.

### **Water Consumption**

Water consumption is categorised into three categories, namely Less (<1 cup (200-300 ml)/30 minutes), Enough (1 cup (200-300 ml)/30 minutes), More (> 1 cup (200-300 ml)/ 30 minutes).

### **Speed Suitability**

The speed Suitability variable refers to the condition of respondents whose vehicle speeds do not comply with Law Number 22 of 2009. In the questionnaire sheet options it is divided into two categories: compliant and non-compliant.

### **Fatigue**

Fatigue is a condition resulting from work activities, characterised by feelings of tiredness and a decrease in the ability to perform a task based on subjective perceptions reported by respondents. Measurement is carried out using the Subjective Rating Test Questionnaire from the Industrial Fatigue Research Committee (IFRC).

### **Accidents**

Accidents are unintended traffic collisions on the road involving a vehicle being driven and another vehicle or a single-vehicle accident that has resulted in various

losses or damages. Measurement is done by filling out a questionnaire sheet consisting of whether the respondent has ever experienced an accident or has never experienced an accident.

Each variable will be descriptively analysed utilising two analytical techniques: univariate and bivariate analysis. The bivariate analysis employed the Coefficient Contingency statistical test for the speed suitability variable with the accident occurrence and Cramer's V statistical test for the water consumption variable with the accident occurrence. Bivariate analysis is conducted using the SPSS software. This investigation has been granted ethical clearance by the Health Research Ethical Clearance Commission of the Faculty of Dental Medicine (545/HRECC.FODM/XII/2020).

## RESULTS

Table I shows information regarding individual characteristics of online motorcycle taxi drivers include age, working period, duration of employment, and water consumption. It's evident that the majority of these drivers are below 35 years old, with 78 drivers (70.9%), as opposed to 32 drivers (29.1%) who are older. Work experience was categorised into two groups: less than three years and more than three years, where 88.2% (97 drivers) fell into the former category and 11.8% (13 drivers) into the latter. Employment duration was also divided into two categories: less than 8 hours and more than 8 hours. Majority of the drivers, 79.1% (87 drivers), work more than eight hours daily, while 20.9% (23 drivers) work fewer hours. Additionally, the study analysed water consumption during work hours, with 33.6% of the 110 respondents having low water intake, 49.9% maintaining appropriate water consumption, and the remaining 22.5% (28 individuals) falling into another category.

Table II displays speed categories for online motorcycle taxi drivers, distinguishing between appropriate and inappropriate speeds. The appropriate category applies if the speed does not exceed 80 kilometres per hour on intercity roads or 50 kilometres per hour in urban areas. Among the respondents, 52 drivers (47.3%) fall within the correct speed categories, while 58 drivers (52.7%) consider the speed category inappropriate. Accidents resulting in losses are unwanted occurrences. Table 3 shows that out of 110 online motorcycle taxi drivers, the majority, 61 drivers (55.5%), have never been involved in an accident, while 49 drivers (44.5%) have experienced accidents.

Fatigue levels among online motorcycle taxi drivers in the Sidoarjo Regency who are members of the Sidoarjo-Porong Online Driver Association base camp were assessed using IFRC Japan's Subjective Self Rating Test questionnaire, categorising them into low, moderate, high, or very high fatigue levels. The findings from Table

**Table I: Characteristics of Respondents Frequency Distribution**

Variable	n	Percentage (%)
<b>Age (years old)</b>		
< 35	78	70.9
≥ 35	32	29.1
<b>Working Period</b>		
≤ 3 years	97	88.2
>3 years	13	11.8
<b>Length of work</b>		
≤ 8 hour	23	20.9
>8 hour	87	79.1
<b>Water Consumption</b>		
Less	37	33.6
Enough	45	40.9
More	28	22.5
<b>Total</b>	110	100

**Table II: Frequency Distribution of Human Factors**

Variable	n	Percentage (%)
<b>Speed Suitability</b>		
Appropriate	52	47.3
Inappropriate	58	52.7
<b>Accident Incident</b>		
Ever	49	44.5
Never	61	55.5
<b>Total</b>	110	100

**Table III: Frequency Distribution of Fatigue**

Variable	n	Percentage (%)
<b>Fatigue</b>		
Low	50	45.5
Moderate	34	30.9
High	16	14.5
Very High	10	9.1
<b>Total</b>	110	100

III reveal that approximately 45.5% of drivers experience low fatigue, 30.9% exhibit moderate fatigue, 14.5% are highly fatigued, and 9.1% suffer from acute fatigue. Moreover, an analysis of the relationship between water consumption and accident occurrence demonstrates a weak correlation, as indicated by a Cramer's V coefficient of +0.227 in Table IV. These results suggest that lower water intake is associated with a higher incidence of accidents, with drivers who consume less water being more frequently involved in collisions.

The analysis of the variable speed suitability for online motorcycle taxi drivers reveals a significant correlation with the incidence of accidents. The relationship test analysis shows a contingency coefficient value of +0.220, indicating a positive but weak link between speed suitability and accident. This suggests that higher driving speeds are associated with a higher accident rate. Table V illustrates that out of 49 accidents, the majority

**Table IV: The Relationship Between Water Consumption and Motorcycle Taxi Online Accidents**

Total Drinking Water Consumption	Incidence of Accident				Coefficient contingency (r)
	Yes, ever		Never		
	n	%	n	%	
Less	22	44.9	15	24.6	+0.227
Enough	15	30.6	30	49.2	
More	12	24.5	16	26.2	
Total	49	100	61	100	

**Table V: The Relationship Between Suitability of Speed and Accident Incidence for Online Motorcycle Taxi Drivers**

Speed Suitability	Incidence of Accident				Coefficient contingency
	Yes, ever		Never		
	n	%	n	%	
Appropriate	17	34.7	35	57.4	+0.220
Inappropriate	32	65.3	26	42.6	
Total	49	100	61	100	

(65.3%) occurred among drivers with inappropriate driving speeds, while most accident-free drivers (57.4%) maintained appropriate speeds. Additionally, using the Coeff-Cramer’s V test in Table VI, the data analysis yields an association coefficient of +0.289, confirming a strong and positive relationship between fatigue and accidents among online motorcycle taxi drivers. As driver fatigue increases, so does the likelihood of accidents.

**DISCUSSION**

The human body struggles to regulate its temperature in response to external conditions, balancing heat generated by metabolism with heat dissipation through physiological processes. Normal body tissue temperatures are around 36–37°C, but even minor deviations of 1-2°C can lead to discomfort, altered appearance, and health issues (35). Excessive workplace heat, like that faced by online motorcycle taxi drivers during long shifts, can result in heat stress and dehydration. Dehydration, caused by insufficient fluid intake, is weakly correlated with accident rates. Of the 49 drivers in accidents, 44.9% were dehydrated. Dehydration impairs concentration, distracting drivers from road hazards. Among 110 surveyed drivers, 73 maintained adequate water intake (at least one glass or 200-300 ml every 30 minutes), contributing to alertness and reducing the risk of dehydration-induced fatigue

**Table VI: The Relationship Between Fatigue and Incidence of Accidents for Online motorcycle taxi Drivers**

Fatigue	Incidence of Accident				Coefficient contingency
	Yes, ever		Never		
	n	%	n	%	
Low	15	30	35	70	+0.289
Moderate	18	52.9	16	47.1	
High	11	68.8	5	31.3	
Very High	5	50	5	50	
Total	49	100	61	100	

during driving.

Dehydration, as explained by Hardinsyah, occurs when the body loses more fluids than it takes in through urine, sweat, faeces, and breathing. It’s primarily caused by excessive sweating without adequate fluid intake and is characterised by a water deficit without an electrolyte imbalance. Factors like environmental temperature, physical activity intensity, and personal tolerance influence fluid loss and physical performance. The human body can tolerate up to a 2% loss in body weight due to dehydration, but some individuals may struggle in such conditions (6).

Suma’mur highlights that a high-temperature work environment leads to increased sweating and significant fluid loss while water intake decreases (7). This situation results from heat stress, where the body struggles to regulate its internal temperature, causing symptoms like profuse sweating, constant thirst, discomfort, and reduced appetite due to fluid loss through sweat evaporation. Sari’s study further confirms the link between water consumption and dehydration (8). Among 53 respondents, 24 had insufficient water intake, with 11 of them (20.8%) experiencing severe dehydration. In contrast, among the 29 respondents who consumed enough water, only three (5.7%) experienced severe dehydration. Excessive sweating due to a hot work environment, combined with inadequate water intake, can lead to fatigue and reduced focus, increasing the risk of accidents.

Harrianto emphasises that hydration is a critical factor affecting workers in their tasks. Dehydration from excessive sweating leads to a more rapid increase in the body’s core temperature during work (35). Simply drinking water when thirsty is inadequate to prevent conscious dehydration, as thirst diminishes before fluid balance is restored. Initially, at a 1.5% body weight loss due to dehydration, subsequent fluid absorption in the intestine decreases due to compensatory innervation vasoconstriction. Sweat has a low electrolyte content of 0.1-0.3 grams%, making the loss of NaCl through sweating relatively minor and not a significant concern. Optimal hydration involves drinking small amounts of water at regular intervals, such as 250-300 ml, every 20-30 minutes.

Water is a crucial component of human cells, constituting about 60% of total body weight. It’s distributed throughout the body, including plasma, tissues, and organs. Adequate water is essential for various bodily functions like temperature regulation, metabolism, joint lubrication, digestion, cell formation, and maintaining electrolyte balance and brain function. When the body lacks water, cells shrink, impairing their proper functioning (6).

Insufficient water intake affects concentration in the



body as water plays a vital role in maintaining electrolyte balance and supporting brain function (8). Decreased focus can pose a driving hazard, with studies showing a link between reduced concentration and traffic accidents (11). Poor physical condition also increases the risk of accidents (10). Drivers in poor physical shape are four times more likely to have work accidents than those in excellent condition, as it affects their energy levels. Taking short breaks to stretch and relax muscles can help combat fatigue and tension. Drivers should have access to mineral water during their journey to stay hydrated and alert when needed.

Recent research by Sari found a significant association between a hot working environment, water intake, and dehydration among textile workers, with p-values of 0.00 and 0.001 ( $<0.05$ ) (12). Out of 53 workers in the study, 37 experienced moderate to severe dehydration. To combat this, employees are advised to take short breaks when feeling thirsty or overheated and consume water regularly, with one glass every 20 to 30 minutes in hot conditions. Additionally, factors like economic needs and rest patterns play a role in concentration, as indicated by a study in India (13). Truck drivers there, spending nearly 14 hours on the road and getting less than 7 hours of rest, are 1.5 times more likely to experience drowsiness due to extended driving for financial incentives. They were driving while drowsy, which increases the risk of traffic violations by 2.4-5.8 times and the likelihood of drowsiness by up to 1.5 times.

Heinrich's theory suggests that a lack of trust is the leading cause of human fatalities, accounting for 88% of all deaths, with 10% attributed to a lack of trust and 2% to unpredictable circumstances (7). This risky human behaviour is also a significant contributor to car accidents. A study by Bucshózy et al. involving drivers aged 18 to 79 identified human errors, fatigue, and stress as the primary causes of automobile accidents. Inappropriate driving behaviours like speeding, not wearing seatbelts, using mobile phones while driving, and driving under the influence of alcohol or drugs also contribute to accidents. Younger drivers tend to take more risks and follow traffic rules less compared to older drivers. Driver knowledge, attitude, and experience, in addition to factors like knowledge and attitude, play a role in driver behaviour and its impact on accidents (15).

Working as an online motorcycle taxi driver, especially on motorbikes, is associated with risky behaviours, including errors and violations. These risky behaviours encompass speeding, fatigue, disregarding road markings and traffic signals, and frequently using mobile phones. Such behaviours elevate the risk of accidents. This study specifically investigates the driving speed of online motorcycle taxi drivers and finds a weak correlation between speed adherence and accident frequency. Additionally, the study highlights a positive

relationship between speed adherence and accident frequency, indicating that higher speeds are linked to a greater likelihood of accidents.

This study identified a significant number of online motorcycle taxi drivers (58 drivers) who exceeded appropriate speeds, thereby increasing the accident risk. Road conditions, traffic congestion, and vehicle conditions can also contribute to accidents. These findings align with prior research by Konlan et al., which revealed that high speed was responsible for 31.5% of motorcycle accidents, with others caused by slippery or damaged roads and collisions (16). Similarly, Meirinda et al.'s research showed a correlation between driving speed and accidents among motorcycle employees at Koperasi Sumber Rejeki, with a p-value of 0.03 ( $\leq 0.05$ ). The study found that 90% of respondents who exceeded 60 kilometres per hour had experienced accidents, and those exceeding 40 kilometres per hour had difficulty controlling their vehicles in emergencies (17).

In line with this study, research on online motorcycle taxi and base motorcycle taxi drivers in Manado City revealed an Odds Ratio (OR) of 2.260. This means that those who engage in unsafe driving practices, such as driving at high speeds, are 2.26 times more likely to experience work-related accidents compared to those who drive safely (18). In a study by Nguyen-Phuoc et al., which examined accident risk behaviour among online motorcycle drivers on highways, 21% of risky behaviour involved exceeding speed limits, significantly increasing accident likelihood (p-value of 0.01). The odds ratio (OR) of 1.78 indicated that high-speed drivers had a 1.78 times greater risk of accidents compared to low-speed drivers. Moreover, the risk of accidents was higher for online scooter drivers who were students and worked over 50 hours weekly (19).

Murphy and Morris conducted a study using logistic regression models and linear regression analysis to investigate the relationship between speed and fatal motorcycle accidents, confirming the same findings. Their statistical analysis demonstrated a significant connection between speed and the probability of fatal motorcycle accidents (20). The logistic regression model revealed that each kilometre-per-hour increase in speed between the reaction point and the critical conflict zone raised the chances of a fatal motorcycle accident by 5%. These results emphasise that higher motorcycle speeds are linked to a greater risk of fatal accidents. In addition, linear regression analysis indicated that increased speed was associated with more severe injuries sustained by motorcycle accident victims. The data showed that as motorcycle speed increased, so did the severity of injuries in fatal incidents.

The findings from Murphy and Morris's study emphasise that speed significantly affects both the risk and the severity of injuries in fatal motorcycle accidents. It's

crucial to impose speed limits on motorcycles to reduce the likelihood of such accidents (20). Additionally, research by Pawar et al. reveals that drivers' perception of increased time pressure can lead to higher speeds on the highway, a major contributing factor to accidents. Elevated time pressure can influence driver behaviour, making them more prone to taking risks and exhibiting slower brake reactions, ultimately increasing the accident rate (21).

Elvik et al.'s meta-analysis, encompassing studies since 2000, underscores a strong link between driving speed and driver safety. Two mathematical models, the power model and the exponential model, were employed, both showing significant evidence of the speed-driving risk association. The Power model estimates 5.5% for fatalities and 3.9% for injuries, while the exponential model's highest estimate for mortality is 0.08 and 0.06 for injuries. On average, a one-kilometer-per-hour increase in driving speed elevates the accident risk by 3% (22). Speed plays a pivotal role in road safety, as evident from a study by Hu et al. in China. They analysed accident data from four major Chinese cities involving electric bike riders. The research, published in Lin Hu's report, revealed that higher speeds among electric bicycle riders significantly increased the likelihood of collisions. Furthermore, the risk of accidents and injuries among electric cyclists was found to decrease by 51.5% when wearing helmets, and it was influenced by the driver's age (23).

Law No. 22 of 2009 in Indonesia governs driving speed limits (31). Research by Zainuddin et al. supports this regulation, demonstrating a connection between speed and accident severity. Driving at 20 kilometres per hour carries a 5% risk of causing death, while driving at 85 kilometres per hour increases the fatality risk by 85%. Motorcycle accidents often result in severe injuries due to their high impact (25). Haddon's Matrix theory highlights that drivers' speed-conscious behaviour plays a crucial role in preventing accidents in the pre-accident phase. Effective speed management relies on speed indicators in vehicles, necessitating drivers' ability to control their speed.

Driving at speeds exceeding 40 kilometres per hour can impair vehicle control during sudden situations, like abrupt stops or evasive manoeuvres. A mere 1-kilometre per-hour increase in average speed correlates with a 5% higher risk of severe injury in accidents (24). Risky driving behaviours are closely linked to traffic collisions (25). Hu et al.'s eight-month research, using CIDAS data from 41 drivers, analysed various factors such as vehicle speed, compliance with traffic rules, following distance, and acceleration. Lin Hu's study accurately identified unsafe driving habits and highlighted that age, vehicle type, and daily driving time contribute to risky behaviours leading to traffic accidents (23, 28).

Subjective exhaustion, fatigue, and adherence to self-protection measures during driving are additional human factors contributing to traffic accidents. Pramesti's study established a correlation between subjective exhaustion, fatigue, and compliance with self-protective measures while driving (29). The research indicates that fatigue significantly relates to occupational accidents, with an association value of 0.289. The findings suggest that increased fatigue among drivers elevates the risk of accidents.

A study by Marsaid et al. revealed that fatigued drivers have a 0.237 higher risk of causing a fatal accident than those who are not fatigued. Online motorbike taxi drivers become exhausted due to working overtime, leading to accidents, especially during early morning shifts. Fatigue impairs a driver's concentration and vigilance, making it difficult to react quickly in emergencies. Human reaction times, which typically range from 0.4 to 0.8 seconds, decrease with increasing driver fatigue (11). Meirinda et al. found that physical labour affects various bodily systems, including muscles, the respiratory system, and the cardiovascular system. They prolonged work hours with inadequate rest lead to decreased physical abilities and increased work-related fatigue, resulting in accidents. Meirinda, et al.'s study revealed a significant correlation between fatigue and traffic accidents among Sumber Rejeki Blora Cooperative motorcyclist employees, with a p-value of 0.044 (<0.05) (17).

The research identified various risk factors for fatigue among online motorcycle taxi drivers in Jabodetabek and Denpasar. The nature of online motorcycle taxi jobs, characterised by a partner relationship with companies rather than employee status and the significant responsibilities involved, were highlighted as challenging factors. The study revealed a fatigue rate of 61.8% among online motorcycle taxi drivers, attributed to factors including insufficient sleep duration (<7 hours), being under 30 years of age, marital status, lack of regular physical activity, and work-related stress.

## CONCLUSION

There is a relationship between water consumption, speed suitability, and fatigue with accidents in online motorcycle taxi drivers. Specifically, there is a strong relationship between fatigue and accidents. Excessive driving, followed by insufficient rest, can result in fatigue among online motorcycle taxi drivers, increasing the risk of road accidents. To mitigate accidents among online motorcycle taxi drivers, it is recommended to promote optimal hydration, vehicle maintenance, speed regulation, and adequate rest between rides.

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