

## Factors Causing Work Accidents in Public Transportation Drivers: A Cross-Sectional Study

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ARTICLE INFO	ABSTRACT
<p><b>Manuscript Received:</b> 11 Oct, 2024 <b>Revised:</b> 9 Dec, 2024 <b>Accepted:</b> 27 Dec, 2024 <b>Date of Publication:</b> 27 Dec, 2024 <b>Volume:</b> 14 <b>Issue:</b> 2 <b>DOI:</b> <a href="https://doi.org/10.56338/promotif.v14i2.6600">10.56338/promotif.v14i2.6600</a></p>	<p><b>Background:</b> Driving safety is an important factor in driving, especially for public transportation drivers. However, work pressures such as time targets, economic demands, and overwork can increase the risk of accidents. To analyze the factors that cause work accidents in public transportation drivers in Padangsidempuan.</p> <p><b>Methods:</b> Type of observational research with a cross-sectional study design. This research was carried out in the city of Padangsidempuan. The population and sample are all city transportation drivers, as many as 145. A research questionnaire was carried out for data collection. Sampling techniques with exhaustive sampling and data analysis using chi-square and logistic regression.</p> <p><b>Results:</b> This study proved that the length of working hours (<math>p=0.001</math>), smoking habits (<math>p=0.001</math>), compliance with the use of driving safety equipment (<math>p=0.001</math>), and health status (<math>p=0.001</math>) were the factors causing work accidents in public transportation drivers. At the same time, the most significant variable is the length of working hours Exp. (B)= 42.691.</p> <p><b>Conclusion:</b> This study concludes that most work accidents occur due to unsupportive driver factors. Based on these findings, it is recommended that it is important to monitor the driver's physical condition regularly, provide adequate rest guarantees, and pay attention to his health factors.</p>
<p><b>KEYWORDS</b></p> <p>Length of Working Hours; Health Status; Work Accidents; Drivers</p>	

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### INTRODUCTION

The community needs transportation in their daily activities because it can help deliver people and goods to their destinations. The existence of public transportation can unravel the congestion that occurs on the road (1). There are three means of transportation, namely land transportation, sea transportation, and air transportation (2). Public transportation on land is divided into highway and railway motorized vehicles. Highway public transportation is dominated by city transportation cars or buses (3). Based on WHO data, every year, an estimated 1.2 million people die due to traffic accidents worldwide, with another 50 million people injured as a result of these incidents (4,5). In Indonesia, data from the Indonesian Ministry of Health in 2020 noted that land transportation accidents are among the top 10 causes of outpatients. In addition, according to data from the Indonesian Ministry of Transportation, in the

same year, there were 26,495 cases of traffic accidents throughout Indonesia. Of the accidents, the majority (90.3%) were caused by human factors, with 86.8% due to driver error. In North Sumatra Province, in 2020, there were 6,083 traffic accidents (3). The death toll from the accident reached 1,670 people; 2,046 people suffered serious injuries, and 6,511 people suffered minor injuries, with a total material loss of 13,825.12 million rupiah based on BPS 2020 data. In 2020, there were 50 cases of traffic accidents in Padang Sidempuan City. The data includes accidents involving public transportation (6). Most public transportation accidents are caused by driver behaviour that does not apply the principles of Occupational Health and Safety (K3). Fatigue due to workload is one of the leading causes of road accidents (7).

Employment factors are important in driving safety, especially for public transportation drivers. Jobs as drivers demand high driving skills, physical endurance, and mentality (4,6,8). However, work pressures such as time targets, economic demands, and overwork can increase the risk of accidents. For example, long working hours without adequate rest can lead to physical and mental fatigue that decreases concentration while driving (5). Fatigue due to workload is one of the leading causes of road accidents. Exhausted drivers tend to experience distractions in focus and slow response to emergencies. In addition, the demands to work under time pressure often encourage drivers to take risks, such as speeding or ignoring traffic rules. This condition endangers drivers, passengers, and other road users (9,10).

Irregular work patterns also affect the level of driving safety. Many public transport drivers work without adequate rest schedules, especially during peak hours or on specific days with busy passengers. This can affect their health conditions, including sleep disorders and chronic stress, which ultimately increases the risk of accidents (11–13). Driving safety is also influenced by the driver's understanding of traffic rules and vehicle conditions. Lack of training or education regarding driving safety can make drivers less aware of the importance of safe driving behaviour. Neglect of routine vehicle inspections, such as brakes, lights, and tyres, can also potentially cause accidents (14–16). Another contributing factor is a less supportive work environment. In some cases, public transport drivers do not have access to health facilities or support from employers to maintain their physical condition. The pressure to achieve daily income targets often leads them to neglect the need for rest or healthcare. In addition, unsafe driving behaviours, such as using a mobile phone while driving or drunk driving, are also significant factors in accidents. Drivers who do not obey traffic rules or make risky decisions tend to be involved in accidents more often (16–18).

The risk of accidents for public transport drivers tends to increase due to a combination of unsupportive working conditions, lack of education about safety, and risky driving behaviour (19,20). Efforts that can be made include regular safe driving training, providing humane work schedules, and strict supervision of drivers' compliance with traffic rules (21–23). In addition, awareness campaigns regarding the importance of driving safety must also be encouraged to instil a safety culture among public transportation drivers (24). Thus, the risk of accidents can be minimized while improving the quality of public transportation services. This study aims to analyze the factors that cause work accidents in public transportation drivers in Padangsidimpuan.

## METHOD

This study uses an observational method with a cross-sectional study design. This approach aims to analyze the factors that cause work accidents in public transportation drivers in the city of Padangsidimpuan. The research was carried out in the city of Padangsidimpuan. The population and sample of the study include all city transportation drivers in the city of Padangsidimpuan, totalling 145 drivers in 2024 who were selected using the total sampling technique. The research instruments include relevant research questionnaires for data recording. Data analysis was carried out using chi-square test and logistic regression.

## RESULTS

**Table 1.** Distribution of Characteristics of City Public Transportation Drivers in Padangsidimpuan City

Driver Characteristics	n	Percentage
Age Group (Years)		
15 – 20	2	1,4

21 – 26	10	6,9
27 – 32	18	12,4
33 – 38	25	17,2
39 – 44	21	14,5
45 – 50	25	17,2
51 – 56	35	24,1
57 - 61	9	6,2
Total	145	100
<b>Education Level</b>		
Primary school	7	4,8
Junior High School	83	57,2
High School/Equivalent	55	37,9
Total	145	100
<b>Length of Working Hours</b>		
> 8 Hours	87	60,0
≤ 8 Hours	58	40,0
Total	145	100
<b>Smoking habits</b>		
Smoke	92	63,4
No Smoking	53	36,6
Total	145	100
<b>Compliance with the use of driving safety devices</b>		
Non-Compliance	83	57,2
Obedient	62	42,8
Total	145	100
<b>Health status</b>		
Unhealthy	61	42,1
Healthy	84	57,9
Total	145	100
<b>Occurrence of work accidents</b>		
Ever	85	58,6
Never	60	41,4
Total	145	100,0

Source: Primary Data

**Table 2.** The Relationship between Long Working Hours, Smoking Habits, Compliance with the Use of Driving Safety Equipment, Health Status and the Incidence of Work Accidents in Public Transportation Drivers

Length of Working Hours	Occurrence of Work Accidents				Sum	X <sup>2</sup> (p)
	Never		Ever			
	n	Per cent	n	Per cent		
>8 Hours	78	89,7	9	10,3	87	86,360
≤ 8 Hours	7	12,1	51	87,9	58	(0,001)
Sum	85	58,6	60	41,4	145	
<b>Smoking habits</b>						

Smoke	80	87,0	12	13,0	92	83,314 (0,001)
No Smoking	5	9,4	48	90,6	53	
Sum	85	58,6	60	41,4	145	
<b>Compliance with the use of driving safety devices</b>						
Non-Compliance	72	86,7	11	13,3	83	63,306 (0,001)
Obedient	13	21,0	49	79,0	62	
Sum	85	58,6	60	41,4	145	
<b>Health status</b>						
Unhealthy	55	90,2	6	9,8	61	43,191 (0,001)
Healthy	30	35,7	54	64,3	84	
Sum	85	58,6	60	41,4	145	

Source: Primary Data

Table 2 shows that of the 87 public transportation drivers who stated that working hours were > 8 hours, 89.7% had experienced work accidents. Meanwhile, of the 58 public transportation drivers who stated that working hours ≤ 8 hours, some had experienced work accidents as many as 12.1%. The results of the statistical analysis were obtained in that the value of  $X^2$  was calculated (86.360) >  $X^2$  table (3.841) or the value of  $p$  (0.001) <  $\alpha$  (0.05). This means that the length of working hours is related to the occurrence of work accidents. Of the 92 public transportation drivers who stated that they smoked, 87.0% had experienced a work accident. Meanwhile, of the 53 public transportation drivers who stated that they did not smoke, 9.4% had experienced work accidents. The results of statistical analysis were obtained that the value of  $X^2$  was calculated (83.314) >  $X^2$  table (3.841) or the value of  $p$  (0.001) <  $\alpha$  (0.05). This means that smoking habits are related to the incidence of work accidents. Of the 83 public transportation drivers who stated they did not comply with using driving safety equipment, 86.7% had experienced work accidents. Meanwhile, of the 62 public transportation drivers who stated that they obeyed the use of driving safety equipment, 21.0% had experienced work accidents. The results of statistical analysis were obtained that the value of  $X^2$  was calculated (63.306) >  $X^2$  table (3.841) or the value of  $p$  (0.001) <  $\alpha$  (0.05). This means that compliance with the use of driving safety equipment is related to the occurrence of work accidents. Of the 61 public transportation drivers who stated their health status was unhealthy, 90.2% had experienced work accidents. Meanwhile, of the 84 public transportation drivers stating their health status, 35.7% have experienced work accidents. The results of statistical analysis were obtained that the value of  $X^2$  was calculated (43.191) >  $X^2$  table (3.841) or the value of  $p$  (0.001) <  $\alpha$  (0.05). This means that the health status is related to work accidents.

**Table 3.** Multivariate Analysis of the Causes of Work Accidents in Public Transportation Drivers

Variable	B	S.E	Sig	Exp (B)	95% C for EXP (B)	
					Lower	Upper
Length of Working Hours	3,754	0,917	0,000	42,691	7,070	257,800
Smoking habits	3,672	0,973	0,000	39,333	5,841	264,884

Compliance with the use of driving safety devices	2,097	0,833	0,012	8,143	1,592	41,654
Health status	1,783	0,881	0,043	5,949	1,059	33,420
Constant	-16,827	3,056	0,000	0,000		

Source: Primary Data

Table 3 shows that the length of working hours (p-value = 0.000), smoking habits (p-value = 0.000), compliance with the use of driving safety equipment (p-value = 0.012), and health status (p-value = 0.043) are related to the occurrence of work accidents. Of the four variables, the variable most related to the occurrence of work accidents is the variable of the length of working hours  $\text{Exp}(B) = 42.691$ .

## DISCUSSION

### The Relationship Between Long Working Hours and Work Accidents in Public Transportation Drivers

Long working hours are closely related to an increased risk of traffic accidents, mainly due to physical and mental exhaustion. Working hours exceeding 8 hours per day can lead to decreased concentration, slow reactions, and errors in decision-making while driving. Fatigue due to excessive working hours has a similar effect to drunk driving, which increases the risk of accidents by up to three times. In addition, workers with irregular work schedules, such as night shift work, often experience sleep pattern disturbances that disrupt the body's circadian rhythm (25,26). Psychological stress due to long working hours is also an important factor contributing to accidents. Burnout caused by overwork can reduce alertness and increase distractions, such as mobile phone use while driving. Meanwhile, job sectors such as transportation and logistics often have work durations that are not by regulations, thus increasing exposure to the risk of fatal accidents (27,28).

The study showed that of the 87 public transportation drivers who stated that working hours were >8 hours, 89.7% had experienced work accidents. Meanwhile, of the 58 public transportation drivers who stated that working hours  $\leq 8$  hours, some had experienced work accidents as many as 12.1%. The results of the statistical analysis were obtained in that the value of  $X^2$  was calculated (86.360) >  $X^2$  table (3.841) or the value of  $p$  (0.001) <  $\alpha$  (0.05). This means that the length of working hours is related to the occurrence of work accidents. In contrast to the study (29), respondents who had experienced work accidents but had regular working hours were 83.3%. To prevent the risk of accidents, it is necessary to implement regulations regarding the maximum working hours limit following labour laws. The government and companies also need to educate workers about the dangers of fatigue in driving and provide adequate rest facilities. With this step, the risk of accidents due to long working hours can be minimized so that the safety of workers and other road users can be more guaranteed (30). From the results of the Chi-square test, the significance value (p-value) of the two variables is 0.028; because the significance value is below 0.05, this means that there is a relationship between the length of work and safe driving behaviour (31).

Regulations regarding the length of work for drivers according to Law of the Republic of Indonesia number 22 of 2009 paragraph 2 states that for drivers of Public Motor Vehicles, a maximum of 8 hours a day. The length of work is related to safe driving behaviour because a driver who works more than 8 hours a day will tend to experience fatigue and reduce concentration in driving. This has an impact on unsafe safe driving behaviour (32,33).

### The Relationship Between Smoking Habits and the Incidence of Work Accidents in Public Transportation Drivers

Smoking habits have a significant relationship with the incidence of traffic accidents because smoking activities can interfere with the driver's concentration and alertness. When smoking, drivers often divide their attention between driving activities and other actions such as picking up cigarettes, lighting them, or turning off cigarette butts. This causes impaired concentration or distracted driving, which has been identified as one of the leading causes of traffic accidents (34). The results of the study showed that of the 92 public transportation drivers who stated that they smoked, 87.0% had experienced a work accident. Meanwhile, of the 53 public transportation drivers who stated that they did not smoke, 9.4% had experienced work accidents. The results of statistical analysis

were obtained that the value of  $X^2$  was calculated  $(83.314) > X^2$  table  $(3.841)$  or the value of  $p$   $(0.001) < \alpha$   $(0.05)$ . This means that smoking habits are related to the incidence of work accidents. In line with the research conducted by Ayu (2014) on the Relationship between Smoking Habits and Student Learning Concentration at SMK Antartika Sidoarjo, where a result of  $p < 0.05$  was obtained, there was a relationship between adolescent smoking habits and the learning concentration power of students of SMK Antartika Sidoarjo. The difference is with (35) that there is no relationship between smoking behaviour and the concentration level of bus drivers at the Tirtanadi Terminal in Surakarta.

Cigarette smoke in vehicles also increases the risk by obscuring the driver's view, especially in enclosed vehicles. In addition, smoking habits are often associated with other risky behaviours, such as traffic rule violations and speeding, which further aggravate the situation. Previous research has also shown that individuals with smoking habits have a higher tendency to neglect driving safety than those who do not smoke. Therefore, this habit not only has an impact on physical disorders but also on decisions and behaviour while driving (36). From a policy perspective, these findings underscore the importance of educating drivers about the dangers of smoking while driving and the need for regulations that prohibit smoking while driving. Several countries have implemented this ban as part of road safety efforts, with quite positive results in reducing smoking-related accidents (37). With a multidisciplinary approach involving education, law enforcement, and policy development, the negative impact of smoking on driving safety can be minimized.

### **The Relationship between Compliance with the Use of Driving Safety Equipment and the Incidence of Work Accidents in Public Transportation Drivers**

Compliance with using driving safety equipment, such as helmets for motorcyclists or seat belts for car users, is closely related to the incidence of traffic accidents and the severity of injuries sustained. The use of appropriate safety equipment can reduce the risk of serious injury and even death in the event of an accident. Research shows that helmet use significantly reduces the risk of head injury by 69% and the risk of death by up to 42% in motorcyclists (38). Similarly, seat belts can reduce the risk of fatal injury to car passengers by up to 45% (39). The study's results prove that compliance with driving safety equipment is related to the incidence of work accidents. Motorists who do not use full PPE and behave unsafely while driving are likelier to experience traffic accidents than those who use full PPE and behave safely. Non-compliance with the use of driving safety equipment is often caused by a lack of awareness of the importance of the device, disregard for traffic rules or comfort factors. Motorists who do not use safety equipment suffer more severe injuries when accidents occur. In contrast, compliant individuals tend to have a higher level of protection, as safety devices are designed to absorb most of the impact of an impact in the event of an accident (40).

Compliance with safety devices is also affected by the implementation and enforcement of traffic regulations. In countries with vigorous law enforcement, the level of compliance with the use of driving safety equipment is higher than in countries that are less strict in enforcing the law. Public education programs on the importance of using safety equipment, supported by strict supervision, have proven to be effective in increasing compliance and reducing the number of traffic accidents (41). These findings underscore the importance of synergy between education, law enforcement, and the availability of affordable safety equipment to improve public compliance. These efforts can not only reduce the number of accidents but also reduce the negative impact in the form of serious injuries and deaths due to traffic accidents. Increasing awareness and compliance with the use of safety equipment can significantly minimize the risks posed by traffic accidents.

### **The Relationship between Health Status and the Incidence of Work Accidents in Public Transportation Drivers**

The driver's health status is one of the important factors contributing to the risk of traffic accidents. Drivers with poor health status, such as visual impairment, hearing loss, cardiovascular disease, diabetes, or psychiatric disorders, have a higher risk of accidents. Decreased sensory function, such as blurred vision or impaired hearing, can reduce the driver's ability to respond to emergencies on the road (42). Additionally, chronic diseases such as diabetes or hypertension can cause fatigue, dizziness, or sudden loss of consciousness while driving, potentially triggering accidents. The study's results showed that of the 61 public transportation drivers who stated their health status was unhealthy, 90.2% had experienced work accidents. Meanwhile, of the 84 public transportation drivers stating their health status, 35.7% have experienced work accidents. The results of statistical analysis were obtained

that the value of  $X^2$  was calculated (43.191) >  $X^2$  table (3.841) or the value of  $p$  (0.001) <  $\alpha$  (0.05). This means that the health status is related to work accidents. This is in line with health research, which is a state of physical, mental, spiritual, and social health that allows everyone to live socially and economically productively. Based on the results of the study, it was found that the  $p$ -value was 0.012 ( $p < 0.05$ ), showing that there was a relationship between driver health factors and the incidence of accidents in PT. X (43). The study results show that poor health factors increase the risk of accidents. Poor health factors such as fatigue and complaints about body conditions such as wrists, back, and hips result from driving too long because they have working hours that exceed the standard limit (43). Law Number 13 of 2003 concerning workforce has regulated the limit of working hours, which is 8 hours a day if working 5 days a week (44–46).

Mental health also plays a significant role. Disorders such as stress, anxiety, or depression can affect the driver's concentration and decision-making. In addition, drivers who use certain medications, both prescribed and recreational, tend to have a higher risk of accidents due to side effects such as drowsiness, coordination disorders, or slowed reactions (47). The importance of health status as a determinant of traffic accident risk underscores the need for regular health checks for drivers, especially those in the public transportation sector. Early detection and management of health problems can minimize the risk of accidents (48).

### Limitations and Cautions

This study has limitations on the number of respondents who do not represent the entire population of public transportation drivers in Padangsidempuan City, as well as self-reporting data that is vulnerable to bias. Other factors, such as road conditions, weather, and user behaviour, are difficult to control, while cross-sectional designs only show relationships, not cause-and-effect. Respondent time, resources, and trust limitations also affect the accuracy of the data. This needs to be considered in the interpretation of the results and the improvement of future research.

### CONCLUSION

The results of this study show that the length of working hours plays a crucial role in driving safety, especially for public transportation drivers, and in reducing the risk of traffic accidents. Therefore, adequate attention and support are needed to ensure drivers can carry out their duties optimally. This support includes reasonable management of working hours, education about safety, and monitoring of drivers' physical and mental conditions so that driving safety can be more guaranteed.

### CONFLICTS OF INTEREST

No conflicts of interest.

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