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The Impact of Drowsiness on Road Traffic Accidents in Yogyakarta

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ABSTRACT

Traffic accidents are a serious issue in Yogyakarta, with one of the leading causes being drowsy driving. Drowsiness while driving can reduce alertness, response time, and the driver's ability to react to emergency situations, thereby increasing the risk of accidents. This phenomenon not only causes material losses but also endangers the lives of drivers, passengers, and other road users.This study aims to analyze the impact of drowsiness on traffic accidents in Yogyakarta, identify factors influencing drowsiness while driving, and provide recommendations to reduce the risk of accidents caused by driver fatigue and sleepiness on the road. This study uses a quantitative approach, gathering data from traffic accident records in Yogyakarta over the past year. Additionally, a survey was conducted with drivers involved in accidents to measure their level of drowsiness while driving, duration of travel, and other related factors. The data were analyzed using Descriptive methods to examine the relationship between drowsiness and accident incidents. The study found a significant correlation between drowsiness while driving and the increased risk of accidents in Yogyakarta, especially during late night and early morning hours. Drivers who traveled long distances without adequate rest were at higher risk. Accidents most frequently occurred among drivers traveling for more than 2 hours without a break, particularly between 11:00 p.m. and 5:00 a.m. Further public education is needed regarding the dangers of drowsy driving. Additionally, it is recommended to increase the availability of rest areas and checkpoints on main roads, especially during high-risk times. The implementation of drowsiness detection technology in vehicles may also provide a solution to reduce drowsiness-related accidents.

Keywords: *Drowsy driving, Traffic accidents Yogyakarta, Accident risk, Driver fatigue, Drowsiness factors*

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INTRODUCTION

One of the major issues in Yogyakarta that is getting worse every year is traffic accidents. Driving while fatigued is one of the primary causes of these collisions. Driving while sleepy can increase the chance of an accident by impairing attention, slowing reaction times, and making it more difficult for the driver to respond to emergencies. Connecting one location to another through transportation is known as transportation. A tool or vehicle that makes it easier to move people, products, and animals from one location to another is called a means of transportation. There are three categories of transportation: land, sea, and air.as well as air. In order to develop an area with mobilized flows of people and products, which affects social, political, economic, and environmental aspects, transportation is necessary. This is demonstrated by accomplishments. Land mode in particular, as well as general

transportation advancements, provide the biggest sector growth. Vehicles used for land transportation support a variety of human endeavors by using land roadways as a means of traffic for moving passengers or products (Endang Sugiarti, 2019).

The most frequent factors are human variables and carelessness on the part of drivers. It was discovered that the quantity of traffic device infractions was the primary cause of traffic accidents.1 The driver operates the car at his own discretion, disregards the law, lacks driving skills, and has poor driver awareness. The frequency of recent traffic accidents has been on the rise lately, and this isn't just because of human mistake, which is believed to be the primary element determining accident causes. However, the road environment and vehicle factors. According to WHO (World Health Organization) estimates from 2018, 1.35 million individuals worldwide lose their lives in traffic accidents each year. This indicates that one someone dies on the streets worldwide every 24 seconds. So in addition, Indonesia ranks third globally in terms of the number of people killed in traffic accidents.

METHOD

The research methodology employs a descriptive quantitative design using a survey method through questionnaires aimed at 100 drivers in Yogyakarta. This study aims to identify the impact of drowsiness on road traffic accidents, particularly in the Yogyakarta region. Respondents were randomly selected, meeting the criteria of being at least 18 years old and having driving experience within the last six months in Yogyakarta. The questions in the questionnaire are designed to gather information on the demographic characteristics of the respondents, such as age, gender, and type of vehicle; the frequency of drowsiness while driving; the times and conditions that commonly cause drowsiness; experiences with accidents caused by drowsiness; and perceptions regarding the dangers of driving while drowsy.

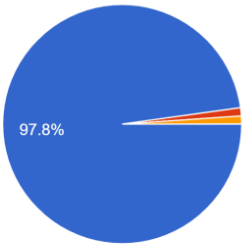
Data collection was conducted by directly distributing the questionnaire to respondents at several strategic points in Yogyakarta, such as parking areas and other public spaces. Completing the questionnaire took approximately 10–15 minutes, during which respondents were asked to provide answers based on their personal experiences. The data obtained was then analyzed using descriptive statistics to identify patterns in the tendency toward drowsiness while driving. Simple correlation analysis was applied to identify the relationship between the frequency of drowsiness and the occurrence of accidents. Additionally, data from open-ended questions were analyzed qualitatively to gain deeper insights into the subjective experiences of respondents in dealing with drowsiness while driving.

This study also considers ethical research aspects by maintaining the confidentiality of respondents identities and ensuring that their participation is voluntary. Before filling out the questionnaire, respondents were briefed on the purpose of the study and asked for their consent. Nonetheless, this study has limitations, as it only involves 100 respondents, which may not fully represent the driving population in Yogyakarta. The data obtained is also subjective, relying on each individual’s experiences and perceptions. This methodology is expected to provide

relevant data regarding the impact of drowsiness on road traffic accidents in Yogyakarta.

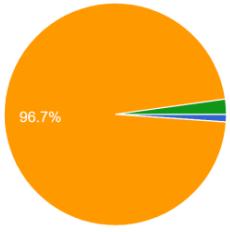
FINDING AND DISCUSSION

RESULT



1.1 Does drowsiness increase the risk of accidents in Yogyakarta? *(Apakah mengantuk dapat meningkatkan risiko kecelakaan di Yogyakarta?)*

From this data, many respondents domiciled in Yogyakarta answered yes, this shows that being sleepy can increase the risk of accidents in Yogyakarta. Drowsiness can significantly increase the risk of accidents in Yogyakarta, as it does in other areas. This condition affects drivers' ability to concentrate, slows their response to road situations, and reduces their capacity to make accurate decisions. In Yogyakarta, known for its heavy traffic, narrow roads, and high vehicle activity, drowsiness is one of the primary causes of accidents. The characteristics of local traffic, especially in tourist areas and city centers, demand full concentration from drivers, while diverse road conditions, such as narrow paths, sharp turns, and poorly lit areas, require extra vigilance. Additionally, the duration and schedules of trips, which often extend into the night—particularly for public transport services and nighttime tourism activities—increase the risk of drivers experiencing fatigue. To reduce this risk, drivers are advised to get enough rest before driving, especially for long-distance or nighttime journeys. Moreover, educational campaigns on the dangers of driving while drowsy and the enforcement of regulations ensuring adequate rest periods for professional drivers are essential. With these preventive measures, the risk of accidents caused by drowsiness in Yogyakarta can be minimized.



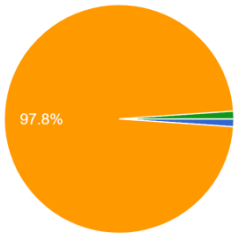
1.2 Are drowsy drivers more often involved in accidents? (*Apakah pengemudi yang mengantuk lebih sering terlibat dalam kecelakaan?)*

For next question, we know that According to the analysis's findings, there is a substantial correlation between the number of fatal traffic accidents and sleepy drivers. The condition known as drowsiness occurs when a motorist loses focus and reaction

time as a result of either not getting enough sleep or operating a vehicle for more than five hours without stopping.Yes, drowsy drivers are more frequently involved in accidents compared to those driving in an alert state. Drowsiness reduces a driver's ability to concentrate, slows their response to road situations, and impairs decision-making. In some cases, drowsiness can lead to microsleep, a brief episode of sleep lasting a few seconds, during which the driver loses control of the vehicle.

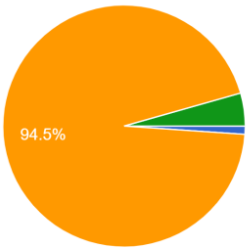
Studies indicate that drowsiness has effects similar to driving under the influence of alcohol, where reflexes slow, and the risk of errors increases. Drowsy drivers often fail to recognize their level of fatigue and continue driving despite being impaired. Factors such as long-distance travel, nighttime driving, lack of sleep, or jobs requiring extended working hours can increase the risk of accidents due to drowsiness.

To reduce this risk, it is crucial for drivers to ensure they are well-rested before driving, take regular breaks during long journeys, and avoid driving during times when the body is naturally more prone to sleepiness, such as early morning or after lunch. Enforcing road safety regulations and conducting educational campaigns are also necessary to raise awareness about the dangers of drowsy driving.



1.3 Are drivers who lack sleep more likely to have accidents? (*Apakah pengemudi yang tidak cukup tidur lebih mungkin mengalami kecelakaan?)*

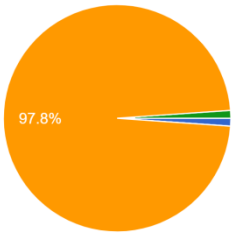
The importance of a good night's sleep makes you feel much more refreshed when wake up from sleep (Nafia. Dkk, 2020). Inadequate sleep for drivers can lead to poor performance and increased risk of accidents. Fatigue, This increases the danger of accidents and injuries while driving. Inadequate sleep might raise the risk of accidents and near miss incidents (Warpani, 2002). Getting enough sleep improves stamina and productivity at work. Compared to a lack of sleep.



1.4 Can sleeping before driving help prevent accidents? (*Apakah tidur sebelum berkendara dapat membantu mencegah kecelakaan?)*

Stop and relax (sleep), Sleep is necessary for the body to function properly. If you intend to stop during your journey, do so every time. The motorist is fatigued. We can do to nap before sleep. If the driver is unable to stop at night, sleep. A 30-minute afternoon session is more exhausting than a 30-minute coffee break.

Minimum Service Standards for Hours Freight transport drivers rest.In general, drivers must take breaks. After driving for two hours in a row, the driver's status should be checked within 15 minutes. Fulfilling this SPM will result in rest hours for the driver.



1.4 Does fatigue affect a driver's reaction ability? (*Apakah kelelahan mempengaruhi kemampuan reaksi pengemudi?)*

Drivers should consider their health when traveling, including weariness. Recognizing and resolving fatigue signs is beneficial for drivers working with Happy.
Work fatigue is a process in which the body's efficiency and endurance decrease in order to continue doing the necessary activities. Driving is a job that puts you at risk of weariness since it takes a lot of concentration and a quick combination of your brain, hands, feet, and eyes. Fatigue in drivers can impair awareness and concentration, making it difficult to respond in an emergency. Work weariness can result in workplace accidents. Perceived weariness among bus drivers can lead to road accidents, endangering themselves, their passengers, and others.

DISCUSSION

Traffic accidents are unforeseen incidents on the road involving vehicles and other road users, which can result in loss of life or material damage. Traffic issues are complex, with the increasing number of vehicles and high road congestion being among the primary causes of accidents. Considering the importance of transportation, traffic is regulated within an integrated national transportation system to create balanced transportation that meets societal needs while ensuring smooth, safe, comfortable, orderly, and secure travel.

The analysis results indicate a significant relationship between drowsy driving and the risk of fatalities in traffic accidents. Drowsiness is a condition where drivers experience reduced reaction time and concentration due to insufficient rest (sleep) or driving for more than 5 hours without a break (Warpani, 2002). Drowsy riders will experience a decrease in stamina if they ride a motorcycle at a speed of 80 km/h for 2 hours without stopping. Many accidents caused by drowsy riders occur due to a lack of awareness that they are feeling drowsy. Most riders often force themselves to continue their journey even when their physical condition is not optimal.

Several studies suggest that drowsy drivers are generally caused by a lack of adequate rest. For example, drivers who work overtime and have not had the opportunity to sleep or those with insufficient sleep duration often push themselves to drive despite their condition (Kartika, 2017). Monotonous long-duration journeys carry a high risk of causing drivers to feel drowsy while driving, which can lead to accidents. Research has shown that rest time significantly affects the drowsiness levels of drivers during driving.

Drivers who lack attention while driving can be one of the main causes of accidents, often leading to fatalities. When drivers lose focus, their ability to concentrate and react quickly to road situations significantly decreases (Fitria,2021). This condition is highly dangerous, especially in scenarios that demand quick decisions, such as responding to a vehicle that suddenly stops or avoiding obstacles on the road.

The risk of accidents increases even further when drivers travel at high speeds. Driving at high speed not only shortens reaction time but also amplifies the severity of the damage caused by collisions. Moreover, inattentive drivers often fail to observe traffic signs or adapt to changing road conditions, such as sharp curves, slippery surfaces, or other vehicles changing lanes unexpectedly. To reduce these risks, it is essential for drivers to remain alert and focused throughout their journey. Avoiding distractions, such as using mobile phones or driving while fatigued, can significantly reduce the likelihood of fatal accidents. Additionally, adhering to speed limits is a critical step in ensuring road safety and protecting both the driver and other road users.

A lack of alertness can impair a driver’s ability to anticipate road conditions, causing them to fail in predicting potential hazards that may arise due to vehicle conditions or the traffic environment. In such situations, drivers often lose awareness of potential threats, such as suddenly speeding vehicles, abrupt changes in road surfaces, or movements of nearby vehicles.

Analysis shows a significant correlation between driver drowsiness and the risk of fatal road accidents. Drowsiness is a state in which drivers experience a reduction in reaction time and concentration, often caused by insufficient sleep or driving continuously for more than five hours without a break. This condition becomes even more dangerous when drivers operate motorcycles at high speeds, such as 80 km/h for two hours without stopping, as their stamina drastically decreases.

One of the primary reasons for the high number of accidents caused by drowsiness is drivers' lack of awareness about their physical condition. Many motorcycle riders fail to recognize that they are becoming drowsy and often force themselves to continue driving. This habit increases the likelihood of accidents, especially in situations that demand high concentration, such as driving at night or on busy roads.

To reduce the risk of accidents caused by fatigue or drowsiness, it is essential for drivers to pay close attention to their physical condition before and during the journey. Sufficient rest and avoiding prolonged driving without breaks can help maintain alertness. Moreover, drivers should be more attentive to the early signs of fatigue, such as decreased focus, so they can take a short break and recover before continuing their trip.

Drowsy drivers are often affected by a lack of rest, such as working overtime without having the chance to sleep but still forcing themselves to ride their motorcycles home. This situation frequently occurs because drivers feel rushed or eager to get home, even when their bodies are not in an optimal condition for driving. In addition to sleep deprivation, drowsiness in drivers can also be triggered by prolonged exposure to carbon gases emitted from other motor vehicles. Carbon gases, a primary component of vehicle emissions, can impact brain function by reducing the oxygen supply it needs. As a result, drivers experience decreased concentration and brain performance, ultimately leading to drowsiness. This risk is heightened when drivers are in areas with high levels of air pollution, such as crowded urban roads or during long traffic jams. Prolonged exposure to harmful gases not only increases drowsiness but can also have negative effects on overall health, such as respiratory problems or, in severe cases, carbon poisoning.

To mitigate these risks, drivers should ensure they are in good physical condition before driving, including getting adequate rest. Additionally, wearing a mask or protective gear can help minimize exposure to carbon gases during the journey. Adhering to speed limits and avoiding driving when tired are also crucial steps to maintaining road safety (Listiana & Primbada, 2022). Drivers who experience fatigue often fail to recognize their physical condition. This is largely due to overconfidence, where they believe they can identify when they are tired. However, fatigue is not a condition that can be easily assessed subjectively, and in many cases, individuals only realize its impact when it is too late to take preventive action.

When drivers become drowsy, their ability to react to road situations and maintain focus decreases significantly. On the other hand, fatigued drivers often struggle to concentrate and lose awareness of their surroundings. The combination of drowsiness and fatigue is particularly dangerous, as it impairs a driver's ability to respond quickly and safely in critical situations on the road. Fatigue and drowsiness not only affect physical performance but also impact decision-making abilities. For instance, a fatigued driver may hesitate to take appropriate action when faced with a vehicle suddenly stopping ahead or when attempting to avoid obstacles on the road. Furthermore, slowed reflexes make drivers more susceptible to accidents, especially in complex traffic environments or during heavy congestion.

To reduce the risk of accidents caused by fatigue or drowsiness, drivers must be more mindful of their physical limitations. Getting sufficient rest before a trip, taking breaks when feeling tired, and avoiding long drives without pauses can help maintain alertness. Additionally, utilizing modern vehicle technology, such as fatigue warning systems, can provide extra support in ensuring safety on the road. Driving while fatigued is as dangerous as driving under the influence of alcohol or drugs, as it severely impairs reaction time, decision-making, and attention. Therefore, it is essential for drivers to ensure they get sufficient rest before embarking on long trips. Adequate sleep not only helps improve focus but also reduces the chances of drowsiness taking over while on the road. Taking regular breaks every two hours or so can significantly refresh the mind and body, preventing the buildup of fatigue that might otherwise lead to poor judgment or lapses in attention. In addition, drivers should avoid driving during hours when they are typically most tired, such as late at

night or in the early morning hours, when the body naturally seeks rest. Moreover, modern vehicle technology offers valuable assistance in promoting road safety. Fatigue warning systems, lane departure alerts, and even adaptive cruise control are now integrated into many cars to help detect signs of driver drowsiness and reduce the risk of accidents. These systems not only serve as helpful reminders to take breaks but also provide a safety net in situations where fatigue might cloud a driver's awareness. By combining these proactive measures, both through personal discipline and technological assistance, the chances of accidents due to drowsiness can be minimized, ensuring safer journeys for all road users.

Drowsiness is a significant yet often overlooked factor contributing to road traffic accidents, including in Yogyakarta, a bustling city in Indonesia. The rise in traffic volume, especially during peak hours or holiday seasons, has made the roads in Yogyakarta more prone to incidents, and drowsiness has become one of the main causes of these accidents. Fatigued drivers are more likely to experience reduced concentration, slower reaction times, and impaired decision-making, which can lead to severe accidents, often involving pedestrians, motorcyclists, or other vehicles.

Several factors contribute to driver drowsiness in Yogyakarta. The city, known for its historical and cultural landmarks, attracts a large number of tourists, which results in heavy traffic throughout the day. Many drivers especially those in the tourism industry, such as bus drivers or delivery personnel often work long shifts and face tight schedules. These drivers may be tempted to push through their fatigue to meet deadlines, but prolonged periods of alertness without adequate rest increase the risk of drowsiness behind the wheel. Furthermore, in Yogyakarta, motorcyclists are prevalent on the roads due to the city's narrow streets and lack of efficient public transportation. Many motorcyclists, especially those who drive for work or as part of ride-hailing services, often work long hours and may suffer from sleep deprivation. Since motorcyclists have less protection than car drivers, the risk of fatal accidents increases when they operate vehicles while drowsy.

The impact of drowsiness on road traffic accidents in Yogyakarta is severe and far-reaching. Studies show that fatigued drivers are more likely to veer off the road, fail to stop at traffic signals, or collide with other vehicles or pedestrians. This is particularly concerning during the night, when drowsiness is more pronounced. The poor lighting conditions on some roads and the lack of proper infrastructure further exacerbate the risks, as drivers may struggle to navigate through poorly lit areas while fighting sleepiness.

Moreover, accidents caused by drowsy driving tend to be more severe because drowsiness can lead to a delayed reaction to avoid an impending collision. In some cases, drivers may even fall asleep at the wheel, leading to catastrophic accidents. This has a profound effect not only on the victims but also on their families and the community at large, contributing to a rise in fatalities and injuries, especially in densely populated urban areas like Yogyakarta.

CONCLUSION

Based on the research that the author has analyzed to mitigate the considerable impact of drowsiness on road traffic accidents in Yogyakarta, a

comprehensive approach is crucial to enhance road safety and safeguard all road users. Firstly, efforts to raise public awareness must be intensified to inform drivers about the dangers of driving while drowsy and the importance of adequate rest prior to travel. These educational initiatives can be effectively delivered through various media, including social media platforms, radio broadcasts, television programs, and community outreach events, ensuring they reach diverse audiences.

Secondly, enhancing infrastructure is essential to reduce the risks associated with drowsy driving. Establishing well-equipped rest areas 5along key routes would provide drivers with safe and accessible places to rest during long journeys. Additional safety features, such as rumble strips on highways and clearly visible road markings, can help keep drivers attentive. Improving street lighting in rural and suburban areas can also increase visibility and decrease nighttime accidents related to fatigue.

Thirdly, stronger regulatory measures should target commercial drivers, who are particularly vulnerable to fatigue due to long working hours. Policies limiting driving durations and requiring mandatory rest breaks can effectively reduce the likelihood of fatigue-related incidents. Employers should be encouraged to train drivers in safe driving practices and promote a culture where safety is prioritized over meeting tight schedules.

Adopting advanced technology also offers an effective solution. Encouraging the use of modern driver-assistance technologies, including drowsiness detection systems, lane-keeping aids, and automatic braking systems, can help prevent accidents. These tools provide real-time feedback to drivers and can take corrective actions in critical situations.

Enforcing traffic laws strictly is another vital step in reducing negligent behaviors. Penalties for violations related to drowsy driving, such as driving without sufficient rest, can serve as a strong deterrent. Routine traffic checkpoints to monitor and educate fatigued drivers would further reinforce adherence to safety protocols.

Lastly, ongoing research and systematic data collection on drowsiness-related accidents are necessary to design effective interventions. Collaborations between government bodies, academic researchers, and private stakeholders can support detailed studies to pinpoint trends, identify high-risk zones, and craft tailored strategies to tackle drowsy driving.

By adopting this multifaceted strategy, Yogyakarta can significantly decrease drowsiness-induced traffic accidents, ensuring safer roads and a more efficient transportation system for everyone.

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