Academia Journal of Humanities & Social Sciences
Volume 2, April 2025
[Peer-Reviewed and Indexed in NepJOL]
p-ISSN 3021-9841; e-ISSN 3021-985X
http://myagdicampus.edu.np/academia/
MMC, Beni

Research Article/ Safety Roads and Sustainable Development Goals

Traffic Accidents on the Hetauda-Narayangarh Road: Promoting Safer Roads for the Sustainable Development Goals (SDGs)

Subarna Prasad Ghimire, PhD Scholar
Faculty of Humanities and Social Sciences, Pokhara University, Nepal

Article History:
Submitted 22 December 2024
Reviewed 26 February 2025
Revised 28 February 2025
Accepted 19 March 2025

Corresponding Author:
Subarna Prasad Ghimire
subarnaghimire@yahoo.com

Article DOI:
https://doi.org/10.3126/ajhss.v2i1.77168

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ABSTRACT

This study investigates the causes of traffic accidents along the Hetauda-Narayangarh route in Nepal from the drivers' perspectives. The study emphasizes that addressing driver-related errors and enhancing infrastructure, education, and community collaboration are essential for ensuring road safety and supporting sustainable development in Nepal. The key findings indicate that driver-related errors, such as reckless driving and speeding, account for approximately 80% of accidents, with distractions—particularly the mobile phone use and fatigue—playing a critical role in the diminished driving performance. The study utilized a structured questionnaire distributed to 100 drivers, yielding 80 valid responses that were analyzed using SPSS version 27. The results suggested that adverse weather conditions, especially light rain and fog, exacerbate accident risks, making road signage, and driver education imperative. While most respondents reported the regular vehicle maintenance, there remains a notable lack of formal driver training, with 95% indicating prior untraining; this points to a crucial need for educational initiatives. In conclusion, enhancing road safety along the Hetauda-Narayangarh corridor necessitates improved infrastructure, consistent vehicle checks, and strategic driver education efforts, fostering collaboration among the government, community stakeholders, and the driving population to minimize accidents. The study sets a foundation for future research aimed at improving transportation safety in the similar contexts.

KEYWORDS: Road traffic accidents, drivers' behavior, fatigue, safety training

INTRODUCTION

The transportation system is crucial for the effective and safe movement of freight and passengers between locations. The advancement of socio-economic development is intricately connected to the existence of a robust and efficient transportation infrastructure. This study highlights a critical intersection of socio-economic factors and sustainable development in addressing road traffic accidents along the Hetauda-Narayangarh route in Nepal, underscoring the urgent need for enhanced driver education, improved infrastructure, and collaborative efforts to promote road safety and mitigate accident risks. However, a rising number of vehicles on the roads has led to significant societal challenges, especially concerning traffic accidents, which can result in a wide spectrum of injuries—ranging from minor to fatal—and substantial property damage. According to global statistics, road accidents are the leading cause of death and injury worldwide. In 2021, the figure of fatalities reached approximately 1.9 million, translating to nearly 15 deaths per 100,000 people. This places road incidents as the twelfth highest cause of death globally, with data from the World Health Organization (WHO, 2023) indicating that 92% of these fatalities occur in low – and middle-income nations, which collectively house less than 1% of the world's total motor vehicles. In Nepal, road traffic accidents are exacerbated by various factors such as difficult terrain, inadequate road conditions, reckless driving behavior, and lack of stringent regulatory enforcement, resulting in significant casualties and property loss.

In this regard, Shashi et al. (2023) highlighted that the several factors contribute to traffic accidents; however, driver-related faults—like reckless driving, aggressive overtaking, and excessive speed—constitute around 80% of these incidents and are the primary contributors to road traffic collisions. It is important to note that accidents seldom arise from a solitary influence; rather, they are the outcome of a wide range of factors, encompassing roadway design, user behavior, and environmental circumstances.

Human behavior stands as the foremost factor contributing to road accidents. Research shows that adverse weather scenarios—including fog, rain, extreme cold, and heat—are closely associated with crashes. Notably, accidents caused by fog represent 34% of incidents, while rainfall is responsible for 25% (Hammad et al., 2019). In India, a study indicated that speeding is the predominant cause of road traffic accidents, accounting for 47.1%, followed by alcohol consumption at 32.1% and reckless cornering at 20.7%. Similarly, Kakkar et al. (2014) conclude reckless driving itself is attributed to 68% of the fatalities and injuries, with drunk driving contributing to 32% of these outcomes.

In Qatar, a study pointed out that negligent driving was implicated in 71% of accidents, with tailgating and excessive speed contributing 16% and 13%, respectively (Bener, 2005). Another study conducted in Hail, Saudi Arabia, highlighted that the human error is responsible for 67% of road traffic accidents, whereas poor road conditions and vehicle issues account for 29% and 4%, respectively. Various factors influencing road traffic accidents include a day of the week, the driver's age, weather conditions, elevation, and vehicle type (Charandabi et al., 2022). Touahmia (2018) also underscores speeding and violating traffic laws as the primary causes of road traffic accidents. Furthermore, Hassan et al. (2017) notes that speed is a significant determinant affecting both the frequency and severity of accidents worldwide.

In Nepal, irresponsible driving and speeding rank among the major contributors to road accidents with careless behavior, particularly on two-wheelers, heightening the risk of accidents and fatalities (Atreya, Shrestha, & Budhathoki, 2021). It is significant to mention that heavy vehicles, such as trucks and tankers, tend to be involved in accidents

more often than buses and motorcyclists. The WHO has reported that the alcohol-related incidents account for 5% to 35% of all road fatalities. However, the instances of drink-driving in Nepal have reportedly decreased from 2013/14 to 2018, attributed to stricter enforcement of anti-drunk-driving regulations.

In addition, a study by Zhang et al. (2019) indicated that fatigue is a contributing factor in about 20% of all accidents and approximately 40% of severe accidents in China. Additional studies assert that traffic law violations are a leading cause of road traffic accidents (Wang, Fu, & Yan, 2022). By enhancing adherence to traffic laws, a significant reduction in accidents could be realized. Timmermans et al. (2019) conclude on their study that the external factors, including those related to weather, also influence road safety, though they only account for roughly 5% of all road traffic accidents.

In Cameroon, the human factors such as drowsiness, distraction, excessive speed, non-compliance with traffic signals, and improper overtaking were cited as responsible for 85% of accidents. Specifically, excessive speed contributed to 34.3% of these collisions, while distraction was involved in 30.3%. Accidents in Cameroon frequently involve trucks and tourist vehicles, with the highest rates occurring on Fridays and Saturdays, particularly between 12 p.m. to 6 p.m. and 6 p.m. to midnight, which account for 35% and 30% of all accidents, respectively (Tsala et al., 2021). Brázdil et al. (2022) suggest to improve road safety, various measures should be implemented, including the development of safer vehicles, better road maintenance, accurate weather forecasting, public safety campaigns, and enhanced emergency response systems.

Examining accident statistics can significantly enhance our understanding of these incidents. Worldwide, the scholars are crafting accident prediction models designed to analyze accident data comprehensively. Prato et al. (2010) postulated that road accidents can often be classified as random occurrences, while Zeng et al. (2017) introduced a method grounded in a Multinomial Logit model to investigate how various factors affect the severity of road accidents. The overarching goal of analyzing the causes of these accidents is to mitigate road traffic incidents and implement preventive strategies. Singh et al. (2016) emphasized in their study that road crash injuries, being predominantly human-made issues, are largely both preventable and predictable, thus lending themselves to rational analysis and timely countermeasures.

The focus of this study is on the Hetauda-Narayangarh route, a 78-kilometer-long stretch of the Mahendra Highway, which experiences a wide variety of traffic flow and is notorious for frequent accidents. Thus, this study aims to identify the pivotal factors influencing road traffic accidents as perceived by drivers, while also assessing the driver performance. To gather data for this investigation, the primary sources were utilized through a structured questionnaire incorporating both closed-ended and open-ended questions. Additionally, the secondary data sources were consulted to conduct a thorough literature review.

RESEARCH METHODS

This study primarily utilized primary data, focusing on identifying the factors contributing to road traffic accidents along the Hetauda-Narayangarh corridor, a stretch in East-West highway measuring 78 kilometers, from the viewpoint of drivers. Given that drivers directly experience these accidents; their insights are invaluable for understanding the underlying causes. Furthermore, this study highlights the socio-economic implications of road traffic accidents along the Hetauda-Narayangarh corridor, emphasizing the need for sustainable development through enhanced road safety measures informed by the drivers' insights and data-driven recommendations. To gather

data, a comprehensive questionnaire featuring 20 meticulously structured questions, both closed-ended and open-ended, was created. The data collection process involved conducting face-to-face interviews with the selected drivers. Additionally, a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree) was employed to gauge the opinions of respondents on various factors related to road safety.

Due to time constraints, a pilot survey was not feasible; therefore, a straightforward random sampling method was implemented to select the participants, specifically targeting those with substantial driving experience on the Hetauda-Narayangarh route. The objective of this random sampling method was to choose the participants from the population in an unbiased manner. Sharma (2017) emphasized that the simple random sampling technique offers the researchers an opportunity to draw the valid generalizations from the sample data to the larger population. The sample size was calculated using Daniel's equation, which accounted for a 95 percent confidence level, a margin of error of +/- 5 percent, and a standard deviation of 0.5. This calculation indicated that a minimum sample size of 80 was necessary. An effort was made to distribute 100 questionnaires, and prior to conducting the interviews, all participants were thoroughly informed about the purpose and objectives of the study. Out of the 100 questionnaires distributed, 80 were successfully collected, while the others were deemed invalid due to irrelevant or incomplete responses.

While the questionnaire was pre-coded, coding for open-ended questions took place after the fieldwork was completed. All gathered quantitative data underwent thorough editing and filtering before being input into SPSS version 27 for analysis. Descriptive statistics provided insights for further analysis. The results obtained from this analysis were interpreted to derive conclusions and were presented using frequencies, percentages, cross tabulations, means, as well as minimum and maximum values. On the basis of these findings, recommendations were developed to improve the overall road safety within the Hetauda-Narayangarh corridor. Through this nuanced approach, the study aims to contribute to the ongoing discourse on road safety and accident prevention in this critical area.

RESULTS AND DISCUSSION

The study examined the primary factors contributing to the road traffic accidents along the Hetauda-Narayanghar segment of the Mahendra Highway. By investigating various aspects such as driver behavior, road conditions, and vehicle maintenance, the study aimed to identify the critical areas for improvement to enhance road safety in this region. Additionally, the findings could serve as a foundation for future interventions and policy-making efforts aimed at reducing traffic-related incidents.

Results

Table 1 provides a comprehensive overview of the demographic characteristics of the participants, showcasing a notably skewed gender representation, with an overwhelming 98.98% identified as male. This pronounced demographic disparity raises the questions regarding the gender representation in the driving profession, warranting a closer examination of the factors that contribute to such ~~a~~ predominance. The data based on age unveils that a significant portion of respondents, specifically 42.5%, are situated within the 40-50 age bracket. The diversity among age groups, including individuals aged 30-40, 50-60, 20-30, and 60-70 years, suggests the varying levels of driving experience and life perspectives which could influence their driving styles, attitudes towards safety, and susceptibility to fatigue. The analysis also indicates that the most

common occupation among those surveyed are the bus drivers, followed closely by the drivers of minibuses, heavy goods vehicles, jeeps, trucks, taxis, and private cars. This occupational hierarchy suggests a potential link between the type of vehicle driven and the nature of driving demands, including hours worked and stress levels associated with the different driving environments.

The respondents reported varied daily driving hours, nearly half indicating a routine of 7-9 hours. A significant portion also admitted to exceeding 9 hours of driving per day, which raises the concerns about the potential for chronic fatigue affecting their performance on the road. The fact that over three-fifths rated their driving experience as 'good' suggests a level of confidence, yet, the reliance on informal avenues for learning to drive signals a gap in formal education that could be critical for enhancing road safety. Moreover, a considerable 65% of drivers acknowledged the detrimental effects of fatigue on their driving capabilities. This recognition points to a critical area for improvement, emphasizing the necessity for targeted education programs on fatigue management. Furthermore, an impressive 76.3% of respondents confirmed their vehicles underwent regular maintenance, and a remarkable 95% expressed contentment with the condition of their vehicles, underscoring the role of vehicle upkeep in promoting the safe driving practices.

The findings illuminate the significant insights into the nexus between experience, vehicle maintenance, and road safety. They underline a pressing need for implementing comprehensive training programs that address the pervasive issue of driver fatigue, alongside the initiatives that raise awareness about safe driving habits. These strategies hold promise for enhancing not only individual driver safety but also broader road safety outcomes within the community. Ultimately, addressing these factors could lead to a more informed and safety-conscious driving culture.

Table 1
Decomposition of Respondents' General Information

Variable		Frequency	Percent
Gender	Male	79	98.8
	Female	1	1.3
Age group	20-30	5	6.3
	30-40	28	35
	40-50	34	42.5
	50-60	12	15
	60-70	1	1.3
Type of vehicle driven	Car	3	3.8
	Jeep	11	13.8
	Taxi	9	11.3
	Bus	19	23.8
	Mini Bus	15	18.8
	Truck	10	12.5
	Light Goods Van	1	1.3
	Heavy Goods Van	12	15
Years of driving	2-12	39	48.8
	12-22	26	32.5

	22-32	11	13.8
	32-42	4	5
Daily driving hours	<4	4	5
	4-6	11	13.8
	7-9	39	48.6
	>9	26	32.5
Overall driving experience	Excellent	4	5
	Good	52	65
	Average	24	30
Place where respondents learnt driving	By formal training	16	20
	Other	64	80
Believe that fatigue affects respondent driving performance	No	52	65
	Yes	28	35
Vehicle regular maintained	No	19	23.8
	Yes	61	76.3
Satisfied with the condition of respondent vehicle	No	4	5
	Yes	76	95
	Total	80	100

Source: Field Survey, 2024

When the participants were asked to identify the underlying causes of road traffic accidents, there was a striking consensus among nearly all respondents regarding the primary factors contributing to these incidents. As detailed in Table 2, the vehicle malfunctions, the conduct of other drivers, and the substance use—especially alcohol and drugs—were identified as the most significant causes of accidents. Following these, the factors such as speeding, reckless behavior by other road users, distracted driving, adverse weather conditions, and inadequate road infrastructure were noted. The findings suggest that both human error and environmental factors are the critical contributors to the frequency of road traffic accidents. This combination emphasizes the urgent need for enhanced safety measures, improved driver education, and better infrastructure maintenance. Furthermore, addressing the complex interplay of these factors is essential not only for reducing accident rates but also for fostering a culture of responsibility among drivers. By examining the insights presented in Table 2, the stakeholders can develop targeted strategies to mitigate risks and promote safer road usage effectively.

Table 2

Distribution of Respondents by Their Response on Factors for Road Traffic Accidents

Variables		Frequency	Percent
Factors responsible for Causes of Road Accident	Distract driving	78	97.5
	Speeding	79	98.8

	Weather condition	78	97.5
	Poor road condition	75	93.8
	Vehicle malfunction	80	100
	Others vehicles' drivers' behavior	80	100
	Fatigue and stress	77	96.3
	Alcohol and drug use	80	100
	Recklessness of other road users	79	98.8
	Others	12	15

Source: Field Survey, 2024

Table 3 provides a comprehensive breakdown of the primary causes of distracted driving, demonstrating that an overwhelming 97.5% of respondents pinpointed the mobile phone use as a predominant source of distraction for the drivers. This alarming statistic reflects a growing concern in our increasingly connected world. Following mobile phones, the next significant distractions stemmed from monitoring the passengers' behavior and keeping an eye on the pedestrians traversing the road, both of which can divert attention away from driving. Additionally, the drivers reported being distracted by managing the vehicle systems, engaging with activities of their passengers, and the ubiquitous habit of eating or drinking while behind the wheel. Other crucial factors contributing to distraction included the presence of eye-catching roadside billboards, addressing the passenger requests, and engaging in the conversations with nearby individuals. Such findings highlight the multifaceted nature of distractions that the drivers encounter and emphasize the necessity for improved awareness and strategic interventions to mitigate these risks.

Table 3

Distribution of Respondents by Their Response on Causes of Distract Driving

Variables		Frequency	Percent
Causes of Distract Driving	Eating	60	75
	Passengers' Distraction	64	80
	Conversation	52	65
	Handling Request	54	67.5
	Monitoring Passengers' behaviors	76	95
	Operating Vehicles System	71	88.8
	Mobile	78	97.5
	Hording boards	54	67.5
	Pedestrian	71	88.8

Source: Field Survey, 2024

Table 4 provides a comprehensive analysis of how various weather conditions influence the road traffic incidents, revealing the critical insights into driving safety. Remarkably, a substantial 92.5% of respondents pinpointed the light rain as a major

contributor to accidents, signaling an alarming trend in how even seemingly minor precipitation can lead to the significant risks on the road. Mist or fog followed closely as another hazardous condition. Furthermore, while heavy rain, overcast skies, and clear weather were acknowledged as the factors in accidents, their impact appeared to be less pronounced in comparison to light rain and fog. This data emphasizes the necessity for a proactive approach to road safety, as adverse weather not only diminishes visibility but also impairs the road traction, thereby significantly elevating the likelihood of accidents. Interestingly, the findings suggest that even mild weather variations, such as mist, hold the potential to create the dangerous driving conditions. This underscores the critical need for the drivers to maintain heightened awareness and adaptability, regardless of the weather forecast, in order to navigate safely through the varying environmental challenges, thus reinforcing the importance of understanding the weather's role in the context of road safety.

Table 4

Decomposition of Respondents by their Response on Type of Weather Causing Accidents

Variable		Frequency	Percent
Weather Conditions	Fine	2	2.5
	Mist/fog	67	83.8
	Light Rain	74	92.5
	Heavy Rain	23	28.7
	Cloudy	2	2.5

Source: Field Survey, 2024

Table 5 outlines the participants' insights regarding the influence of vehicle speed on the road traffic collisions. A notable 80% of those surveyed recognized that speeds surpassing 80 km/h pose a considerable risk factor in the occurrence of accidents. Following this, speeds between 40-80 km/h were identified as the next most concerning, while speeds below 40 km/h were deemed relatively less hazardous. These results underscore a significant correlation between elevated speeds and the likelihood of accidents, indicating that driving above this critical threshold substantially heightens the collision risks.

The present study consistently shows that higher vehicle speeds not only reduce reaction times but also increase the severity of accidents when they do occur, as kinetic energy rises with speed. The findings from this survey emphasize the urgent necessity for more rigorous enforcement of speed limits and the implementation of targeted awareness campaigns designed to promote safer driving behaviors among the public. Additionally, by comprehensively understanding the driver attitudes and behaviors regarding speed, policymakers, and road safety advocates can craft more effective strategies to diminish traffic accidents associated with excessive speeding. The factors such as the creation of speed-reduction policies, installation of speed cameras, and public education initiatives can play the pivotal roles in enhancing the overall road safety.

Table 5

Distribution of Respondents by their Response on Speeds for Road Traffic Accidents

Variable		Frequency	Percent
Cause of Accident by Speed	0-40 km/hour	3	3.8
	40-80km/hour	60	75
	Above 80km/hour	71	88.8

Source: Field Survey, 2024

Table 6 illustrates the participants' perceptions about how poor road conditions contribute to traffic accidents. A notable proportion of respondents pinpointed the inadequate signage and poor road markings as the predominant factors leading to these incidents. Following closely were the concerns about potholes, cracks, and uneven surfaces, which are the well-documented issues in road safety literature. This study has shown that poorly marked roads can create a confusion among the drivers, significantly increasing the risk of accidents. Moreover, the potholes and irregular surfaces not only endanger the integrity of vehicles but can also compromise the driver control, leading to the loss of vehicle stability and, consequently, accidents. In fact, the study reveals that the significant crashes can be attributed to the road conditions, underscoring the urgency for the effective road maintenance and improved traffic management strategies. Such enhancements are essential not only for safeguarding the drivers and passengers but also for promoting the overall public safety. By addressing these critical aspects, it is anticipated that there will be a meaningful reduction in traffic incidents, along with an enhanced driving experience for all users of the roadways, thereby fostering a safer transportation environment.

Table 6

Decomposition of Respondents by Their Response on Poor Road Conditions Causing Accidents

Variables		Frequency	Percent
Poor Road Condition	Potholes and Cracks	69	93.2
	Uneven Surface	34	45.9
	Lack of Signal and Road Making	71	95.9

Source: Field Survey, 2024

Figure 1 presents a detailed analysis of the diverse factors contributing to road traffic accidents, revealing the significant insights from the respondents. The data obtained has been shown in a bar diagram. Since the data is scale in nature, it can be shown in the bar diagram. Notably, nearly half of the participants (48.8%) indicated that distracted driving has a strong correlation with the occurrence of road traffic accidents. This highlights the critical importance of driver attentiveness and the potential risks posed by the mobile devices, conversations, and other distractions while driving.

Moreover, almost 50% of respondents (46.2%) acknowledged that the poor road conditions significantly contribute to accidents. This finding underscores the need for improved infrastructure and regular maintenance to enhance road safety. In this context, it is concerning that a substantial number of participants (32.5%) identified the vehicle condition as a major factor; the implications here suggest that the regular vehicle checks and maintenance should be prioritized to mitigate the risks.

Interestingly, more than half of the respondents (55.5%) remained neutral regarding the impact of the weather conditions, which could indicate a lack of awareness or varied personal experiences with the weather-related driving hazards. Conversely, a striking 90% of respondents strongly agreed that speeding plays a crucial role in the road traffic accidents, emphasizing the urgent need for stricter speed regulations and awareness campaigns to promote safe driving practices.

Over two-fifths of respondents recognized that the overloading vehicles also significantly contribute to traffic incidents, indicating the importance of adhering to weight limits and safety standards in the cargo transport. In contrast, about 35% of respondents felt that lack of enforcement of traffic laws does not significantly impact the

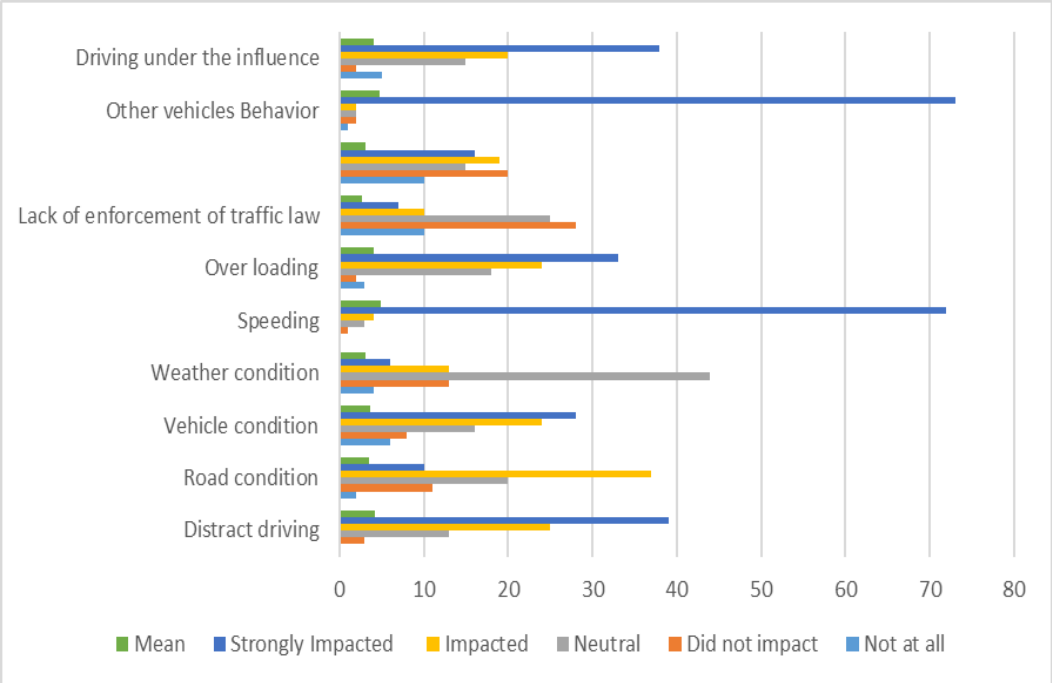
accident rates, which may reflect a perception that the existing regulations are adequate or an acknowledgment of personal responsibility among the drivers.

Furthermore, an overwhelming majority (91.3%) agreed that the behavior of other road users plays a strong role in accidents. This suggests that defensive driving and heightened awareness of surrounding vehicles are critical for safety. Lastly, nearly half of the respondents (47.5%) indicated that driving under the influence is a major contributing factor to accidents, reinforcing the need for ongoing education and interventions to combat impaired driving.

These findings collectively call for a multifaceted approach to improve road safety, involving better education for the drivers, improved infrastructure, stricter enforcement of traffic laws, and public awareness campaigns aimed at addressing the various factors contributing to road traffic accidents.

Figure 1

Distribution of Respondents on Their Response in Impact of Different Factors on Road Traffic Accidents.



Source: Field Survey, 2024

Figure 1 illustrates that speeding, the behavior of other drivers, driving while intoxicated, and distracted driving are the primary factors contributing to traffic accidents along the Hetauda-Narayanghar route. Additionally, the condition of vehicles and instances of overloading significantly contribute to the rise in traffic accidents. Weather conditions and the state of the roads also positively influence the occurrence of accidents.

Table 7 presents the breakdown of respondents regarding their training in the safe driving practices. A significant majority, accounting for 95%, reported that they have not undergone any formal training related to safe driving. This lack of training raises concerns about the preparedness of drivers to navigate the roads safely. Additionally, three-quarters of the respondents expressed the belief that engaging in safe driving training could contribute to a reduction in road traffic accidents.

Table 7

Distribution of Respondents by Their Training

Variables		Frequency	Percent
Received Training on Safe Driving Practice	Yes	4	5
	No	76	95
Respondent perception about receiving training would decrease accident	Yes	20	25
	No	60	75
Total		80	100

Source: Field Survey, 2024

These findings suggest a critical gap in driver education that could be addressed through comprehensive training programs. The overwhelming sentiment among the respondents hints at a widespread recognition of the importance of safety training in promoting responsible driving behaviors. It indicates an opportunity for policymakers and driving institutions to implement the targeted training initiatives that could potentially lead to safer roads. As the data suggests a clear link between training and accident prevention, investing in the educational programs for the drivers may prove beneficial not only for the individual drivers but for a society as a whole by reducing the incidence of traffic-related injuries and fatalities.

Discussion

The goal of the study on the Mahendra Highway's Hetauda-Narayanghar section was to determine the main causes of traffic accidents in this route. According to the study, in order to increase road safety, it is imperative that driver conduct, road conditions, and vehicle maintenance be improved. With 98.98% of the respondents being men and a sizable percentage of them being in the 40–50 age range, the demographics of the participants revealed a skewed gender representation. According to the data, bus drivers were the most common occupation among the respondents, followed by the drivers of minibuses, big trucks, and private automobiles.

Approximately 65% of the drivers in this study admitted that driver weariness had a negative impact on their ability to drive, underscoring the significance of tackling this issue. The study also underlined the necessity of thorough training programs to teach the drivers safe driving practices and the dangers of speeding, distracted driving, and bad road conditions. Accordingly, using a mobile phone while driving was the main cause of driver distraction, and exceeding 80 km/h was a significant risk factor for accidents. The survey also discovered that poor road conditions—potholes, uneven surfaces, and insufficient signage—were a major cause of traffic accidents. All of the results point to the need for a multipronged strategy to increase road safety, including increased infrastructure, tougher enforcement, and greater driver education.

The study also found that other drivers' actions, like careless driving and disregard for traffic laws, contributed significantly to collisions. The survey also revealed that driving while intoxicated was a significant cause of collisions, highlighting the necessity of continual education and initiatives to prevent impaired driving. The study's conclusions can be used as a starting point for the upcoming initiatives and legislative initiatives meant to lower the number of traffic-related accidents. A more knowledgeable and safety-conscious driving culture can eventually result from the stakeholders developing the focused initiatives to reduce the risks and encourage a safer road usage by addressing the intricate interactions between the elements that contribute to traffic

accidents. The installation of speed cameras and the execution of speed-reduction regulations are among the study's suggestions.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The transportation system is crucial for the socio-economic progress, enabling the movement of goods and people. In light of the imperative role transportation plays in the socio-economic development, the alarming rise in road traffic accidents—especially in low and middle-income nations like Nepal—underscores the necessity for the sustainable transport policies that address the local dynamics and prioritize safety to foster the overall growth and well-being. However, rising urbanization and vehicle numbers have led to a significant increase in the road traffic accidents, influenced by the driver behavior, road conditions, and environmental factors. Road accidents represent the leading cause of global mortality, particularly in the low and middle-income countries like Nepal. The study on the Hetauda-Narayangarh road highlights the urgent need to understand the local traffic dynamics and accident causes.

Recommendations

The key findings reveal that most accidents stem from the driver errors, with reckless driving, speeding, and impaired vehicle use being the major contributors; 80% of accidents were linked to driver faults. Distraction from the mobile phone use and inattentiveness were the significant factors, with many respondents noting fatigue's impact on driving performance, pointing to the need for the proper rests and regulations on the driving hours.

Vehicle maintenance also plays a crucial role in the accident prevention. While many respondents maintained their vehicles regularly, the perceptions of vehicle conditions suggest the systemic issues that require improved infrastructure, consistent vehicle checks, and owner awareness. The environmental factors, particularly light rain and fog, were reported as the significant contributors to accidents, indicating a need for better road signage and driver education.

The study underscores the poor condition of the Hetauda-Narayangarh road, with the respondents highlighting the issues like potholes and lack of signage, emphasizing the need for infrastructural improvements. The necessity for driver education is evident, with 95% of respondents lacking formal training in safe driving; this highlights a potential avenue for enhancing road safety through the policy reforms.

The study highlights the critical need for enhanced infrastructure, systematic vehicle maintenance, and comprehensive driver education to promote sustainable development and improve road safety, thereby addressing socio-economic challenges associated with the traffic accidents in the Hetauda-Narayangarh region.

In summary, the study indicates that the road traffic accidents on the Hetauda-Narayangarh route can be minimized through improved infrastructure, regular vehicle maintenance, and driver training. Collaboration among government, community organizations, and the drivers is essential for developing the effective strategies to reduce accidents, with the findings serving as a foundation for further studies, enhancing transportation safety in Nepal and comparable regions.

CONFLICT OF INTEREST DECLARATION

I hereby wish to declare that I do not have any conflict of interests to disclose.

AUTHOR CONTRIBUTIONS

I declare that this manuscript is originally produced by me.

ACKNOWLEDGEMENTS

I would like to express my heartfelt gratitude to Professor Dr. Min Pun, whose guidance and expertise were invaluable throughout this research journey. His insightful feedback and unwavering support encouraged me to delve deeper into the complexities of road safety and traffic management. I would also like to extend my thanks to all the individuals and organizations that contributed to this research. A special mention goes to the drivers who participated in the study, sharing their experiences and insights, which were crucial for the analysis. Their willingness to engage in this research demonstrates a commendable commitment to improving road safety. Finally, I recognize the efforts of all those working toward improved transportation safety and infrastructure. Their ongoing dedication plays a vital role in fostering the safer driving environments and reducing the traffic incidents. I would like to thank everyone for their contributions and support throughout this academic endeavor.

ABOUT THE AUTHOR

Subarna Prasad Ghimire *is a PhD candidate at the Faculty of Humanities and Social Sciences under Pokhara University, Nepal. He has a long experience of working in transportation research and road safety, focusing on sustainable development practices and their socio-economic effects.*

REFERENCES

Atreya, A., Shrestha, D. B., & Budhathoki, P. (2021). Epidemiology of road traffic accidents in Nepal from 2009/10 to 2019/20: A 10-year study. *Journal of Nepal Health Research Council, 19*(2), 343-348. https://doi.org/10.33314/jnhrc.v19i2.3432

Bener, A. (2005). The neglected epidemic: Road traffic accidents in a developing country, State of Qatar. *International Journal of Injury Control and Safety Promotion, 12*(1), 45-47. https://doi.org/10.1080/1745730051233142225

Brázdil, R., Chromá, K., Zahradníček, P., Dobrovolný, P., & Dolák, L. (2022). Weather and traffic accidents in the Czech Republic, 1979–2020. *Theoretical and Applied Climatology, 149,* 153-167. https://doi.org/10.1007/s00704-022-04042-3

Giri, O.P., Shahi. P. B., & Poddar, S. (2023). Analysis of road traffic crashes in the Narayanhghat to Mugling road segment in Nepal (pp. 82-90). AIP Conference Proceedings. https://doi.org/10.1063/5.0162469

Hammad, H. M., Ashraf, M., Abbas, F., Bakhat, H. F., Qaisrani, S. A., Mubeen, M., Fahad, S., & Awais, M. (2019). Environmental factors affecting the frequency of road traffic accidents: A case study of sub-urban area of Pakistan. *Environmental Science and Pollution Research, 26*(12), 11674–11685. https://doi.org/10.1007/s11356-019-04752-8

Hassan, H. M., Shawky, M., Kishta, M., Garib, A. M., & Al-Harthei, H. A. (2017). Investigation of drivers' behavior towards speeds using crash data and self-reported questionnaire. *Accident Analysis & Prevention, 98,* 348-358. https://doi.org/10.1016/j.aap.2016.10.027

Kaffash Charandabi, N., Gholami, A., & Abdollahzadeh Bina, A. (2022). Road accident risk prediction using generalized regression neural network optimized with self-

organizing map. *Neural Computing and Applications, 34*(11), 8511–8524. https://doi.org/10.1007/s00521-021-06549-8

Kakkar, R., Aggarwal, P., Kakkar, M., Deshpande, K., & Gupta, D. (2014). Road traffic accident: Retrospective study. *Indian Journal of Scientific Research, 5*(1), 59. https://doi.org/10.18203/2320-6012.ijrms20194303

Prato, G. C., Bekhor, S., Galtzur, A., Mahalel, D., & Prashker, J. N. (2010). *Exploring the potential of data mining techniques for the analysis of accidents patterns.* WCTR 2010: 12th World Conference on Transportation Research, Lisbon, Portugal, 11-15 July 2010

Sharma, G. (2017). Pores and cones of different sampling techniques. *International Journal of Applied Research, 3*(7), 749-752.

Singh, J., Sahni, M. K., Bilquees, S., Khan, S. M., & Haq, I. (2016). Reason for road traffic accidents-victims' perspective. *International Journal of Medical Science and Public Health, 5*(4), 814-818. https://doi.org/10.5455/ijmsph.2016.07112015357

Timmermans, C., Alhajyaseen, W., Al Mamun, A., Wakjira, T., Qasem, M., Almallah, M., & Younis, H. (2019). Analysis of road traffic crashes in the State of Qatar. *International Journal of Injury Control and Safety Promotion*, *26*(3), 242–250. https://doi.org/10.1080/17457300.2019.1620289

Touahmia, M. (2018). Identification of risk factors influencing road traffic accidents. *Engineering, Technology & Applied Science Research, 8*(1), 2417-2421.

Tsala, S. A., Ayissi, M. Z., Azeh, G., Noah, P. A., Ebanda, F. B., & Ohandja, L. M. (2021). An in-depth analysis of the causes of road accidents in developing countries: Case study of Douala-Dschang Highway in Cameroon. *Journal of Transportation Technologies*, *11*(3), 455-470. https://doi.org/10.4236/jtts.2021.113030

Wang, J., Fu, G., & Yan, M. (2022). Analysis of a catastrophic commercial coach crash based on an improved accident causation model: Cause classification and lessons learned. *International Journal of Occupational Safety and Ergonomics*, *28*(1), 659-671. https://doi.org/10.1080/10803548.2020.1759314

WHO. (2023). *Global status report on road safety.* World Health Organization.

Zeng, Z., Zhu, W., Ke, R., Ash, J., Wang, Y., Xu, J., & Xu, X. (2017). A generalized nonlinear model-based mixed multinomial logit approach for crash data analysis. *Accident Analysis & Prevention*, *99*, 51-65. https://doi.org/10.1016/j.aap.2016.11.008

Zhang, Y., Jing, L., Sun, C., Fang, J., & Feng, Y. (2019). Human factors related to major road traffic accidents in China. *Traffic Injury Prevention*, *20*(8), 796-800. https://doi.org/10.1080/15389588.2019.1670817

To cite this article [APA 7th edition style]:
Ghimire, S. P. (2025). Traffic accidents on the Hetauda-Narayangarh Road: Promoting safer roads for the sustainable development goals (SDGs). *Academia Journal of Humanities & Social Sciences, 2,* 165-178. https://doi.org/10.3126/ajhss.v2i1.77168