Knowledge and Practice of Traffic Rules and Regulations among Secondary Level Students

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Abstract

Road traffic accidents (RTAs) are a leading cause of injury and mortality among adolescents, especially in rapidly urbanizing areas like Butwal Sub-Metropolitan City, Nepal. This study aimed to assess the knowledge and practice of traffic rules and regulations among higher secondary students. A cross-sectional survey design was employed, with a sample of 255 students selected through proportional stratified random sampling from four secondary schools. Data were collected using a structured questionnaire and analyzed using SPSS version 25. The findings revealed that while a majority of students demonstrated good theoretical knowledge for example, 94.5 percent understood traffic light signals, practical adherence was inconsistent. Only 61.2 percent of respondents stated never wearing seat belts when traveling in four-wheelers, indicating a gap between knowledge and practice. Statistical analysis showed a significant association between gender and knowledge of traffic rules, though no significant difference was found between boys and girls regarding their road safety practices. The study highlights the crucial need for school based traffic education programs that not only impart knowledge but also promote behavioral change through experiential learning. Consolidation road safety awareness at the secondary level could contribute to reducing adolescent involvement in RTAs and improving community traffic safety overall.

Introduction

Road traffic accidents (RTAs) remain a major global public health problem, excessively affecting low- and middle-income countries (LMICs). These countries account for about 93 percent of global road traffic deaths, despite owning only about 60 percent of the world's vehicles (Peden et al., 2004; World Bank, 2020). Nepal, as an LMIC, has seen a stable increase in road traffic related injuries and fatalities. In 2021, a projected 8,479 individuals died due to road accidents in Nepal, with a mortality rate of 28.2 per 100,000 population among the highest in South Asia (World Health Organization, 2023; Global Burden of Disease Collaborative Network, 2022).

Urban centers like Butwal Sub-Metropolitan City have seen particularly sharp increases in road related incidents. The city's rapid population growth, unplanned urban expansion and increase in motor vehicle registration have severely strained the present infrastructure. According to the National Statistics Office (2024), Butwal's population has reached 194,335, with a high population density of 1,913 people per square kilometer. The junction of two national highways the Siddhartha and East- west highways through the city has increased traffic congestion and sharp the risk of accidents (Butwal Traffic Police Office, 2023).

Multiple studies have identified environmental and physical risk factors such as poorly maintained roads, inadequate lighting, lack of pedestrian walkways, and adverse seasonal conditions as major contributors to RTAs in Nepal (Poudel et al., 2018; Gaire et al., 2022; Huang et al., 2016). Among road users, motorcyclists and pedestrians are especially vulnerable, with adolescents representing a high-risk group due to their increased mobility, limited risk perception, and tendency toward unsafe behaviors (Karkee & Lee, 2016).

Despite these known risks, awareness and practice of road safety measures among adolescents remain limited. Many students, particularly in urban environments like Butwal, commute daily without sufficient knowledge of traffic rules or exposure to structured road safety education (Gautam et al., 2021). Weak enforcement of traffic laws and the absence of school-based safety interventions exacerbate this issue (Gopalakrishnan, 2012). Additionally, studies show that adolescents often misjudge road hazards, particularly in areas with blind spots, poor visibility or complex intersections (Ampofo-Boateng & Thomson, 1991; Russell et al., 1999).

In light of these concerns, the present study aims to investigate the level of knowledge and practice regarding traffic rules and regulations among higher secondary students in an urban Nepalese setting. It specifically seeks to assess students' understanding of road safety principles and their application of these principles in daily commuting practices. Furthermore, the study examines the potential association between gender and knowledge of traffic rules and explores whether there is a statistically significant difference in road safety practice scores based on gender. These research objectives and hypotheses are intended to generate evidence that may inform the development of targeted educational and

policy interventions to enhance road safety among adolescents in urban areas of Nepal.

Methodology

This study employed a cross-sectional survey design to assess the knowledge and practice of traffic rules and regulations among secondary level students in Butwal Sub-Metropolitan City, Nepal. The target population included students from grade twelve enrolled in both private and government schools within the municipality. Out of the 33 eligible schools, four (two private and two government) were selected using a simple random sampling method. The estimated total population was 703 students, from which a sample of 255 students was drawn using a proportional stratified random sampling technique to ensure representativeness across school type and gender. Among the selected participants, 118 were girls and 137 were boys, reflecting a gender balanced distribution aligned with the population structure. Data were collected using a structured questionnaire that included both closed and open ended items. To ensure the validity of the instrument, a pretest was conducted in schools not included in the final sample and necessary modifications were made based on the feedback received to improve clarity and relevance. The primary variables of interest were knowledge and practice of traffic rules. Knowledge was measured using factual questions on traffic signs and regulations while practice was measured through self-reported behaviors related to obedience to road safety rules. Both variables were scored and categorized into levels based on predetermined criteria. The data were coded, entered and analyzed using SPSS version 25. Ethical procedures included obtaining formal permission from selected schools and securing informed verbal consent from all participants. Anonymity and confidentiality were strictly maintained throughout the research process.

Results and Discussion

Socio-demographic Details of the Participants

In this study, 46.1 percent girls and 53.5 percent boys were participated and their average age was 17.97 years. Among the respondents, Brahain were 51.2 percent, chhetri were 32.8 percent, Janajati were 9.8 percent and others were 5.9 percent. In religion, 84 percent respondents were Hindu, equal 5.5 percent respondents were Buddhist and Muslim; and 4.7 respondents were Christian. The main occupation of family of respondents,23.4 percent were involved in agriculture, 13.7 percent were in business,19.1 percent respondents were government jobs and 43.4 percent family of respondents were involved in private jobs. The average monthly income of the family of respondents was NRs. 22847.51.

Table 1. *Socio - demographic Details of the Participants*

Characteristics	Category	Number (%)
Gender	Girls	118(46.1)
	Boys	137(53.5)
Age	17	84(32.8)
	18	101(39.5)
	19	70(27.3)
Cast of Respondents	Brahamin	131(51.2)
	Chhetri	84(32.8)
	Janajati	25(9.8)
	Others	15(5.9)
Religious of Respondents	Hindu	215(84)
	Buddist	14(5.5)
	Muslim	14(5.5)
	Christian	12(4.7)
Main Occupation of Family	Agriculture	60(23.4)
	Business	35(13.7)
	Government jobs	49(19.1)
	Private Jobs	111(43.4)
Monthly Income of Family	NRs. 20000	124(48.4)
	NRs. 22000	38(14.8)
	NRs. 23000	29(11.3)
	NRs. 25000	14(5.5)
	NRs. 30000	50(19.5)

Knowledge Regarding Road Safety Rules and Regulations

Knowledge is the foundational element required to follow traffic rules and regulations. When individuals are aware of traffic rules, they are more likely to apply them in practice. In this study, a set of structured questions was administered to assess respondents' knowledge of traffic rules and regulations. The key questions along with the corresponding responses are presented in the table below

Table 2. *Knowledge Regarding Road Safety Rules and Regulations*

Knowledge Regarding Road Safety Rules and Regulations	**Number with correct response (N=255) (%)**
Eligible age to get driving license	121(47.3)
Normal Speed Limited for Driving in City	107(41.8)
Safe Walking Practices and Pedestrian Road Behavior	214(83.6)
Indication of Traffic Light	243(94.9)
Recently Updated Maximum Penalty for Driving Without Driver's License	76(29.7)

The above table shows that only 47.3 percent of respondents correctly identified the eligible age (18 years) for obtaining a driving license. Similarly, 41.8

percent of respondents were aware of the normal speed limit (40 km/h) for driving in the city. Most respondents (83.6 and 94.5 percent) knew the correct side of the road to walk on and the meaning of traffic light signals. However, only 29.7 percent of respondents were aware of the recently updated maximum penalty for driving without a driver's license. The findings suggest that respondents demonstrated relatively stronger theoretical knowledge of traffic rules and regulations than practical application. This indicates a potential need for orientation and training programs focused on translating knowledge into safe road practices.

Association between Gender and Knowledge on Traffic rules and Regulations

The researcher examined the hypothesis stating that there is no significant difference in average practice scores based on gender. To test this hypothesis, a comparative analysis was conducted between male and female participants. The results of this analysis are presented in the following table:

Table 3. *Association between Gender and Knowledge on Traffic rules and Regulations*

Knowledge on Traffic rules and Regulations	Chi-Square Value	Df	Significance (2- Sides)	Phi
Eligible age to get driving license	60.76	1	.000	-.488
Normal Speed Limited for Driving in City	38.92	1	.000	-.391
Indication of Traffic Light	14.62	1	.000	-.239
On Which Side of the Road, You must Walk to Reduce Accidents	5.68	1	.017	.149
Recently Updated Maximum Penalty for Driving Without Driver's License	6.33	1	.012	-.158

Table 3 shows that the significance value is less than .05 for all five levels of knowledge on traffic rules and regulations, so the null hypothesis cannot be accepted. The findings indicate a statistically significant association between gender and knowledge of traffic rules and regulations. Additionally, the value of Phi indicated that the association between gender and knowledge of traffic rules and regulations in the eligible age to get a driving license and in the normal speed limit for driving in the city is modest. Similarly, the association is weak in the areas of knowledge regarding the indication of traffic lights, on which side of the road you must walk to reduce accidents, and the recently updated maximum penalty for driving without a driver's license.

Practice Regarding Road Safety Rules and Regulations

Practice represents the most observable level of behavioral change among individuals. The primary goal of health education is to bring about positive behavioral change at the practical level. Typically, when individuals gain knowledge about traffic rules and regulations, it can influence their attitudes, which may then be reflected in their practices. However, it is important to note that there is not

always a direct or linear relationship between knowledge, attitude, and practice (KAP). In the study, a set of practice-level questions related to traffic rules and regulations was administered to the respondents, and the responses are presented in the table below.

Table 4. *Practice Regarding Road Safety Rules and Regulations*

Statements	Responses	Number (%)
Use Zebra Crossing to Cross the Road	Always	124(48.6)
	Sometime	131(51.4)
Obey the Road Signs and Signals	Always	69(27.1)
	Sometime	186(72.9)
Wear the Seat Belt When Travelling in a Four Wheeler	Usually	99 (38.8)
	Never	156 (61.2)

The table 4 shows that 48.6 percent respondents always and 51.4 percent respondents usually used zebra crossing for crossing road. Similarly, 27.1 percent respondents always and 72.9 percent respondents usually obey the road signs and signals. Same ways, 38.8percent respondents usually and 61.2 percent respondents never wear seat belt when travelling in a four wheeler.

The practice level of respondents on traffic rules and regulations is not found satisfactory because less than half respondents' always used zebra crossing to cross the road, similarly nearly one fourth half percent respondents obey the road signs and signals of the road and no any respondents always used seatbelt when travelling in a four wheeler. All the respondents of study are the students of grade twelve and they have already studied contents related traffic rules and regulations in school level but their practice level responses are not found satisfactory. So, there is needed more orientation programmed to increase their practice level on traffic rules and regulations.

Significance Difference on Average Practice Score on Traffic Rules and Regulations

The researcher tested the hypothesis there is no association between gender and knowledge on traffic rules and regulations. The result has shown in below table.

Table 5. *Significance Difference on Average Practice Score on Traffic Rules and Regulations*

Practice on Traffic Rules and Regulations	Gender of Respondents	Number	Mean Rank	Mann-Whitney (U)	Z - Value	P-Value
Use Zebra Crossing to Cross the Road	Girls	118	126.25			
	Boys	137	129.51	7876.500	-.406	.685
Obey the Road Signs and Signals	Girls	118	130.08			
	Boys	137	126.20	7837.000	-.544	.586
Wear the Seat Belt When Travelling in a Four -Wheeler	Girls	118	126.72			
	Boys	137	129.11	7931.500	-.306	.760

The table 5 shows that the average practice level to use zebra crossing to cross the road of boys (Mdn = 129.51) did not differ significantly from the average practice level of girls (Mdn =126.25),U = 7876.500, Z = -.406, P > .05. Similarly, average practice level to obey the road signs and signals of boys (Mdn = 126.20) did not differ significantly from the average practice level of girls (Mdn = 130.08), U = 7837.000, Z = -.544, P > .05. In the same ways, average practice level to wear the seat belt when travelling in a four - wheeler of boys (Mdn = 129.11) did not differ significantly from the average practice level of girls (Mdn = 126.72), U = 7931.500 , Z =-.306, P > o,o5.

The data indicates no significant differences between boys and girls in road safety practices, including using zebra crossings, obeying road signs, and wearing seat belts.

Discussion

The present study explored the knowledge and practice of traffic rules and regulations among grade twelve students in Butwal Sub-Metropolitan City. The findings reveal a inconsistency between students' theoretical knowledge and their practical application of traffic safety behaviors, consistent with prior research conducted in similar urban contexts.

Urban hubs such as Butwal have seen a sharp rise in RTAs, driven by rapid urbanization, population growth and increased motor vehicle density (National Statistics Office, 2024). The junction of two major highways, the Siddhartha and East-West has further increased traffic flow, heightening the risk of collisions (Butwal Traffic Police Office, 2023). This situation mirrors national trends, where environmental and infrastructural deficiencies such as poorly maintained roads,

inadequate pedestrian infrastructure and limited visibility have been identified as key risk factors (Gaire et al., 2022; Huang et al., 2016; Poudel et al., 2018).

The knowledge level findings of this study indicate that while a majority of students demonstrated awareness of basic traffic rules, such as the correct side of the road to walk on (83.6%) and the meaning of traffic light signals (94.5%), their knowledge was limited regarding legal specifics, such as the eligible age for obtaining a driving license (47.3%) and the normal speed limit for city driving (41.8%). Furthermore, only 29.7 percent of respondents were aware of the recently updated maximum penalty for driving without a license. This pattern suggests that while students are generally familiar with visible and commonly encountered rules, their awareness of policy level or technical regulations remains inadequate.

A key finding of this study is the statistically significant association between gender and knowledge of traffic rules and regulations. The association was modest for knowledge about the eligible age for obtaining a license and city speed limits and weaker in areas such as traffic light indications and updated penalties. These findings align with previous literature suggesting that gender may influence risk perception and exposure to traffic education (Karkee & Lee, 2016).

However, regardless of their theoretical understanding, students' practical engagement with safety behaviors was less stable. For example, while hundred percent of respondents reported either "always" or "usually" using zebra crossings and obeying road signs, a considerable percentage (61.2%) never wore a seatbelt when traveling in a four-wheeler. This gap between knowledge and practice echoes the findings of Ampofo-Boateng and Thomson (1991), who emphasized that adolescents tend to misjudge road hazards, especially in complex traffic environments.

Further, Mann-Whitney U tests showed no significant gender differences in practice levels across all three behavior indicators, use of zebra crossings, obeying road signs and wearing seat belts. Suggesting that gender may influence knowledge acquisition more than behavioral application. These results reinforce previous studies that found weak or inconsistent links between knowledge, attitude and practice (Gautam et al., 2021; Gopalakrishnan, 2012).

The findings illuminate a clear need for targeted interventions, such as structured road safety education in schools, behavior modeling and improved enforcement of existing laws. Educational programs should move beyond theoretical instruction and incorporate experiential learning, peer influence strategies, and continuous reinforcement to promote safer behaviors among adolescents.

Conclusion

This study found that secondary level students in Butwal Sub-Metropolitan City have moderate theoretical knowledge of traffic rules and regulations but demonstrate weaker practical application of these rules. A significant association was observed between gender and knowledge levels, though no gender difference was found in actual road safety practices. These findings emphasize the need for school based traffic safety education programs that not only teach knowledge but also encourage safe behaviors through practical engagement and reinforcement. Establishment such interventions may help reduce road traffic accidents among adolescents in urban settings.

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