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Original Research Article

Knowledge, attitude and practice on road traffic safety among the motorbike riders of Lalitpur metropolitan, Nepal

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ABSTRACT

Background: Motorbike riders are among the most vulnerable road users, and road safety plays a primary role in eliminating road traffic accidents (RTAs). The objective of the study was to determine the level of knowledge, attitude and practice of road safety among motorbike riders and to identify the factors associated with their knowledge, attitude and practices.
Methods: This was a cross-sectional study was conducted among 151 motorbike riders utilizing face-to-face interview. Systematic sampling technique was applied to 1516 households of the selected ward. Socio-demographics and KAP were obtained using structured questionnaire. Bivariate and multivariate analysis was done to find out the association between independent and dependent variables.
Results: Overall, only (62.9%) respondents had adequate knowledge of road safety; (73%) of riders had a favorable attitude toward road safety; while only (44.37%) followed good road safety practices. The practice of drunken-drive was reported by total of 33.2% of respondents. Results showed that over speeding practices were (5 times) higher in males, mobile use was seen more (7.4 times) among age group 18-24. The more the years of riding experience the more the speedy driving, i.e. (1.08 times) higher among those having more than 2 years of riding experience.
Conclusions: To address RTA through, we conclude that traffic police and other stakeholders should implement robust legislation concerning road safety. This should include periodic training and examinations for vehicle users to ensure their understanding and compliance with road safety measures.

Keywords: Attitude, Knowledge, Motorbike riders, Practices, Road safety, RTA

INTRODUCTION

Road ways are the primary mode of travel in Nepal, but is very risky because of the steep uphill terrain, congested urban areas, and a relentless surge in the number of vehicles every day. Tragically, road traffic accident has now emerged as a major public health concern in the world, ranking as the ninth leading cause of death across all age groups and leading cause of death for those aged 15 to 29.[1] Every year, 1.25 million people are killed and up to 50 million are injured in road accidents. Pedestrians, cyclists, and motorcyclists accounts for nearly half (49%) of all global road traffic-related deaths worldwide.[2] Beyond the immediate and often devastating personal tragedies that these accidents inflict, they represent a grave public health and well-

being concern, with far-reaching and profound consequences that extend to both health and socioeconomic realms.[3]

Nepal has one of the highest fatalities on road in south Asia. Study conducted by world bank in Nepal among 13000 individuals involved in RTAs found that more than 10,000 were injured with 2700 fatality in the year 2019.[4] Every day, Nepal witnesses an average of seven fatalities and 40 injuries due to traffic accidents.[5] Surprisingly, more lives are lost on Nepal's roads than in all-natural disasters combined. The fatality rate from traffic accidents has surged, rising from a 142% increase in the past decade to an alarming 178% at present.[6] However, the number of vehicles in Nepal has significantly increased over the past decade, with the highest number of registered vehicles being motorbikes.[7]

Besides scooters and motorbikes are the most frequently involved vehicles in road traffic accidents within the Kathmandu valley.[8] In comparison to other types of vehicles, motorbikes offer significantly less protection to their riders in the event of any road accidents. This heightened vulnerability often leads to severe injuries and even death, surpassing the risks associated with any other vehicle types. Speeding, drinking while riding, not wearing protective gear, overloading, poor visibility, and inadequate motorbike training are the major risk factors for road traffic injuries among motorcyclists. The majority of traffic accidents (70-90%) are caused by the unsafe practices of human. Motorcyclists often enjoy the advantage of maneuvering through tight roadways and gaps between other vehicles, but such overtaking increases the risk of a crash. This risk is further heightened by the low visibility of other heavy vehicles to motorcyclists, making them the most vulnerable road users. Many researches have acknowledged the significance of finding the links between personality and demographic characteristics, demonstrating that attitude might be associated with motorcyclists' adherence to road safety.[1,9-11] Drivers' knowledge, attitudes, and practices concerning traffic rules are key attributes in reducing traffic injuries and deaths, and human factors, such as driver mistakes, appears major factor causing accidents.[9]

There are number of interventions placed by traffic police and MOPIT to reduce the incidents of RTA including minimum age to get driving license, use of speedometer in city areas, neon strips clothing at night, and traffic monitoring in the city. RTA occurs frequently which is the result of poor attitude and unsafe practices followed by the road users which causes the crashes. Thus, better knowledge is important to bring the change in the attitude of the person and the practice indeed. RTAs injuries and death are most preventable public health problem which mostly occur due to negligence and carelessness of the road user either that may be a driver or pedestrians.[3] The KAP on road safety are the key to decrease the accidents, reduce injuries and death.

METHODS

Study setting and study design

Lalitpur metropolitan is a busy city comprising 29 wards with total of 2,84,922 people residing with more than 70000 households in the city along with the congested road areas during the peak hours.[12] 37.4% of the households owns a motorbike in the Lalitpur metropolitan city.[13] This study was a cross-sectional study

Study population and sampling

The study population were the residents of the Lalitpur metropolitan city aged 18-49 years, utilizing motorbikes as a means of transport. The sample size was 151, which was calculated using the Cochran's formula for infinite population with probability of occurrence 0.9 and 95% confidence interval with permissible error of 0.05.[14-16] Ward number 5 was chosen through a simple random sampling method from a total of 29 wards. The household list was obtained from the Metropolitan's profile, and then systematic random sampling was applied to the total of 1516 households. The sampling interval, calculated using the formula for systematic random sampling, was determined as 11, which resulted from dividing 1516 by 151. The first household was selected by simple random sampling technique from the first 20 households on the list, and subsequently, others were chosen at intervals according to this calculated sampling interval.

Tools and techniques

The study tool was adapted from a study conducted by J Silvano among commercial motorcyclists in Tanzania.[11] The validation of the tool was done using the guidelines for developing, translating and validating the questionnaire adapted from the guideline provided by Tsang.[17] The questionnaire, originally obtained from Silvano's study, had its English language questions which was translated into Nepali by a bilingual individual proficient in both English and Nepali. Subsequently, the Nepali version of the questionnaire was provided to another anonymous bilingual person, and they were tasked with translating the Nepali questions back into English to the best of their understanding. The re-translated English version was then compared to the original English questionnaire used in the Tanzanian study. This process was repeated until we got the fine results. The study tool was further reviewed by experts from the department of community medicine and public health, Gandaki medical college teaching hospital and research center. Study tool was translated into the Nepali language and was pre-tested among 13 riders from adjacent ward and Cronbach's alpha value was obtained to be above 0.7 which signifies the acceptable reliability of the questionnaire. The

questionnaire was categorized into 5 parts comprising socio-demographic, vehicular, knowledge, attitude and practice of the respondents. Socio-demographic characteristics of the respondents included age in years, gender, ethnicity and educational background. Vehicular characteristics include driving school training, presence of driving license and years of riding experience. To assess the knowledge 12 related questions with 8 pictorial questions about traffic signs, traffic rules and regulations were used. knowledge consisted of 12 questions; the responses to the knowledge questions were noted as three common answers: right answer, wrong answer, and don't know. Correct answers for knowledge-related variables were acquired from the Ministry of Physical Infrastructure and Transport's official website.[5] the highest score per question was 1 and the lowest score was 0, the total score per respondent was converted into, the cut-off of 50%. The riders who scored below <50% and categorized as having inadequate knowledge on road safety.[18]

To measure attitude statements on traffic rules, mobile phone use, helmet wearing, drunken driving and speed limits were used. Likert scale was used with 5 options (strongly disagree, disagree, neutral, agree, strongly agree) consisting 8 questions with 40 total score, where the highest score per question was 5 and the lowest score was 0. The mean of attitude was computed by the software analysis, and it was 32. Riders who scored <32 were categorized as having unfavorable attitude towards road safety.[19]

The areas on practice were examined using variables such as over-speeding, distracted driving, drunken driving, adherence to traffic rules and regulations. These were drawn from relevant literature.[1,9,11,20,21] Using Likert Scale with 3 options (always, sometime, never) practice consisted 7 items with total score of 10 where the mean score was 30. The highest score was 2 for positive marking question while 1 for negative marking question and the lowest score was 0. For those who scored <7 was categorized as having poor practice measures while those who scored ≥7 was categorized as having good practice.[22]

Data collection was done from 21st February to 20th March 2022 utilizing face-to-face interview with the respondents. The households with no motorbike riders were excluded from the study however to meet the targeted sample, adjacent household with motorbike riders was included in the study.

Data management and analysis

After the data were collected, they were recorded, coded and edited in Ms Excel. Before data analysis the cleaning was done for refinement. The missing data were excluded from the raw data. Data analysis was performed using the STATA version 13 software. Univariate analysis was performed between the dependent variables and the background variables (sociodemographic and vehicle-related factors). Chi-square test was used for univariate analysis. Binomial logistic regression was used to perform bivariate and multi variate analysis. The significant association was set at <0.05 after which bi-variate analysis was performed for those with significant results. Unadjusted OR and 95% CI was computed for all the independent variables specifically with each dependent variable. The p values of the bivariate analysis were observed and taken into account for multi-variate analysis. Variation inflation factors (VIF) was checked to test multicollinearity for all the eligible variables for multivariate analysis.[23,24] Variables which showed VIF less than two were taken into regression analysis.[25,26]

Ethical approval

Ethical approval was obtained prior to the research from the GMCIRC (ref. no. 39/78/79). Permission letter from Lalitpur Metropolitan city, and verbal agreement from Ward chairman was taken. Written informed consent was obtained from the respondents to be the part of the study. Study objectives were clearly informed to each of the respondents before the interview. The researchers ensured that the study would not harm the respondents or those who were not participated in the study by adhering to ethical standards.

RESULTS

Socio-demographic characteristics of the respondents

The research had 151 participants, all of whom were between the ages of 18 and 49 years. A total of (34.4%) were between the age group of 18 and 31, (28.5%) of participants were between the age group of 18 to 24, followed by the age-group 32-38 with (17.9%), 39-45 with (11.9%) and lastly 46-49 with 7.3% of total participants. The majority (79%) were male; furthermore, most of the participants (53%) were Brahmin/Chhetri, followed by Janajati (36.4%), (6.6%) of them were Madhesi followed by other minority of (4%) among the participants. The majority of participants (76.8%) had educational level beyond SLC while (23.2%) had completed their basic education. None of them were illiterate.

Vehicle related characteristics of the respondents

The study showed a greater number of respondents (76.8%) had taken training in a driving school. Most of them had driving license (74.1%). More than half of the respondents (56.9%) had the experience of riding a motorbike for more than 2 years followed by the respondents having less than one year of bike riding experience 22% followed by the respondents with experience of 1-2 year 21.1%.

Table 1: Factors associated with knowledge Attitude and Practice mean scores.

Variable (n=151)	Knowledge		AOR	P value
	Good	Poor		
Ethnicity				
Brahmin/Chhetri	44	36	Ref	0.015
Janajati	38	17	1.910037 (9.143883, 3.989818)	
Others	13	3	4.079363 (1.044626, 15.9303)	
Driving school training				
Taken	78	38	Ref	0.030
Not Taken	17	18	2.417811 (1.091007, 5.358177)	
Variable (n=151)	**Attitude on road safety**		**OR (CI)**	**P value**
	Favorable	**Unfavorable**		
Age (years)				
18-24	24	19	Ref	0.0049
25-31	38	14	2.14881 (0.9102878, 5.072442)	
32-38	24	3	6.333333 (1.653917, 24.25219)	
39+	25	4	4.947917 (1.653917, 24.25219)	
Knowledge	**Practice**			
	Good	**Poor**		
Good	48	47	ref	0.049
Poor	19	37	2.014 (0.9970632, 4.071678)	
Years of experience of riding				
≤1 year	15	16	ref	0.013
1-2 year	21	13	1.08694 (0.4151383, 2.845889)	
>2 years	31	55	4.147047 (1.476582, 11.64717)	

Table 2: Drunken drive practice among respondents.

Variables (n=151)	Drunken drive practice		OR (CI)	P value
	Never done	Done once or more		
Ethnicity				
Brahmin/Chhetri	59	21	Ref	0.038
Janajati	34	21	0.576271 (0.2756277, 1.204845)	
Others	8	8	0.355932 (0.1185657, 1.068502)	

Knowledge on road safety

The mean±SD knowledge of the respondents was 8±1.6. Majority of the participants (62.9%) had good knowledge on road safety.

Factors associated with knowledge

This study demonstrated ethnicity (0.015, OR: 1.91, CI: 9.14-3.98) and driving school training (0.03, OR: 2.41, CI: 1.01-5.35) were significantly associated with the knowledge. The odds of having good knowledge on road safety was higher among ethnic group brahmin/Chettri. In comparison to other ethnic groups Brahmin/Chettri had 1.91 times higher road safety knowledge than those of ethnic group Janajati and 4.07 times greater than those of other ethnic groups. The odds of having good knowledge of road safety are 2.41 times higher among those who had training in the driving school than those who didn't have it (Table 1).

Attitude on road safety

The overall result showed that 73% of riders had favorable attitude on road safety. Among 151 respondents all of them agreed that drunken drive is high risk to RTA (100%). Similarly, 88% agreed that high speed increases the chances of accident; 81% of the riders strongly agreed that using mobile phone while riding increases the risk of RTA. While 88% of respondent had good attitude toward importance of helmet during a ride.

Factors associated with attitude mean score

This study found that age (0.0049, OR:2.14, CI: 0.9-5.07) was significantly associated with attitude toward road safety. In comparison to the age group 18-24 the odds of having good attitude towards road safety is 2.14 times higher among age group 25-31, 6.33 times greater among age group 32-38. The favorable attitude was seen lesser among age group above 39 than those of age group 25-38,

but was better than those of age group 18-24 with the odds ratio 4.94 (Table 1).

Practice on road safety measures

The overall result of practice of respondents showed that only (44.37%) of them had good practice. The result showed that only (66.8%) had reported that they never did drunken drive; only (37.7%) of them said they had never crossed the speed limit. 86.7% of the respondent said that they follow traffic rules always. Only (45.1%) of them reported that they have never used mobile phone while riding. More than half (56.2%) of them said that they had paid penalty once or more frequently.

Factors associated with practice mean score

The odds of having good practice were higher among those with good knowledge (0.049, OR:2.014 CI: 0.99-4.07) of road safety. The good practice was seen lesser among the riders with more than 2 years of experience (0.013, OR: 4.14, CI:1.47-11.64). In comparison to the respondents having less than 1 years of experiences, the odds of good practice were 1.08 times greater among those having 1-2 years of experience while 4.14 times less among respondents having more than 2 years of experience (Table 1).

Drunken drive practice among respondents

From this study it was found out that ethnicity was significantly associated with drunken drive practices. The respondents from Janajati (0.038, OR: 0.57, CI:0.275-1.204) and others (0.038, OR: 0.355932, CI: 0.1185-1.068) ethnic background were more likely to do drunken drive practice than Brahmin/Chettri. For Janajati and others group, odds of doing drunken drive practice was 60% and 35% more than Brahmin/Chettri ethnic group respectively (Table 2).

Speeding practice among respondents

The crossing of speed limit in the city area was significantly associated with the gender (0.002, OR:5.65, CI:2.19-14.57) and years of experience of riding (0.013, OR:1.08694, CI:0.415-2.845). The odds of following good practice of maintaining the speed limit while driving the vehicle was significantly higher among female (5 times) than male respondent. Experience of less than two years demonstrated a positive practice towards obedience to speed rules relative to these experienced over two years. Hence 1.08 times lower in the respondents having 1-2-year experience and 4.14 times lower in the respondents having >2 years of experience than those having <1 year (Table 3).

Mobile phone use while riding

We found out the significant association of sociodemographic variables, vehicle related variables and knowledge with the practice of using mobile phone during a ride. In reference to the age group 18-24 the age group of 39+ (0.002, OR:7.520039, CI:2.15-26.20) were 7.4 times less likely to use mobile phone during a ride. The practice of using no mobile phone while riding was twice higher among the respondents who didn't have driving school training (0.025, OR:2.78, CI:1.108-6.97) than those who had (Table 4).

Table 3: Over speeding practices among respondents.

Variable (n=151)	Speed limit (kmph)		AOR (CI)	P value
	≤40	>40		
Gender				
Male	35	84	ref	0.002
Female	22	10	5.65 (2.197154, 14.5765)	
Years of experience of riding				
≤1 year	23	11	ref	0.013
1-2 year	11	20	1.08694 (0.4151383, 2.845889)	
>2 years	23	63	4.147047 (1.476582, 11.64717)	

Table 4: Practice of mobile use while riding among respondents.

Variable (n=151)	Mobile use during a ride		AOR (CI)	P value
	Never used	Used once or more		
Age (years)				
18-24	18	25	Ref	0.002
25-31	14	38	0.453563 (0.185364, 1.109814)	
32-38	13	14	1.343488 (0.4936759, 3.656163)	
>39	25	4	7.520039 (2.15775, 26.20832)	
Driving license training				
Taken	61	55	Ref	0.025
Not taken	9	26	2.781218 (1.108787, 6.976248)	

DISCUSSION

The aim of the study was to identify knowledge, attitude and practice of the road safety among motorbike riders who are one of the most vulnerable road users.[3] KAP road safety plays a vital role in preventing RTAs. Study done in Saudi Arabia on the causes and effects of RTAs shows that 65% of accidents occur due to drivers behavior toward road safety.[27] Another study done in Bhutan in 2018 showed the results that 42% of accidents were due to careless and reckless driving.[28] The over view on preventing road traffic injury in Europe by shows that the compliance with safer road practices reduces the risk of injuries.[29] Similar study in Nigeria by suggests that injuries can be prevented as well as reduction in RTAs can be done by controlling the driver factors such as over speeding, drunken driving, use of safety gears, using phones and obeying traffic rules.[30]

From this study we found out that only 62.9% of the riders were knowledgeable about road safety; overall 73% of riders had positive attitude towards road safety regulations and only 44.37% had a good practice of road safety measures. This study found that the ethnicity Brahmin/Chhetri were aware about road safety. This may be due to the majority of the Brahmin/Chhetri had higher education than other ethnic groups in this study. The knowledge of road safety was high among the respondents who had a training in a driving school than those who didn't have. The study conducted among older adults on the effects of driving skill training in Japan showed enhanced driving performance of them.[31]

This study confirmed that the attitude was associated with age of the rider. The attitude towards road safety regulation was found much less among the age group 18-24 than those above 25 years. Similar to our finding the study done in Iran have shown significant relation of age with the attitude of drivers.[32] This puts light on why the age group 15-29 years is the most involved age group in RTAs worldwide.[3]

Multiple studies have shown that poor road safety practices are major risk of RTA.[33-36] The practice of road safety was better among those who had better knowledge on road safety. Identical finding was seen in the cross-sectional study to identify role of drivers to prevent accidents in Iran.[37] Better road safety practices were not followed by the riders who had more years of experience of riding. With increase in years of experiences, the odds of following the good practice are significantly low. As per our and finding from a Nigerian study on knowledge, attitude and compliance with safety protective measures and devices among commercial motorcyclists we can say that with increasing years of driving the confidence increases changing the perception of drivers toward road safety rules and regulations.[18] The practice of drunken drive is far better among the ethnic group Brahmin/Chettri as compared to Janajati and others. This may be due to cultural practices of different ethnic groups in Nepal, Brahmin/Chhetri belonging to Tagadhari community are restricted to drink alcohol. Such type of taboos does not exist in other ethnicity, in fact alcohols are banalized during auspicious occasions.[38] Over-speeding practice was higher among males as compared to females shown by our study. Similar findings are shown by an experimental study done in Malaysia where males were more likely to travel at higher speed than females.[39] Speeding practice of the riders was higher with the experience of riding over the years. Our finding has a similar result with the study done in Nigeria among commercial motorcyclist where the speeding practice of motorcyclist was high with the increased year of experience.[18] It may be due to increase in the confidence level with years of riding experiences. The practice of being on a phone call is more common among age group 25-31 years which is less likely to be practiced by the age group 32-38 with the odds ratio 1.3. Similar findings is seen among the study done among medical students in India where use of mobile phone while driving was practiced by (79.5%) of the respondents.[40] The use of mobile phone was higher among those who did not have driving school training. The practice of using no mobile phone while riding was seen more among those with poor knowledge of road safety. Study done by university of Ghana on motorcyclists had also shown similar findings where motorcyclists were involved in a phone call while riding despite being aware of the risk of using a phone while riding.[41] Studies has shown that taking phone calls while driving a vehicle increases the risk of accidents.[42]

We cannot assume a causal relationship because our study is limited to a cross-sectional design. The study was conducted in urban setting with busy road area and strict traffic rules and regulations. Similar finding cannot be assumed in rural and highways settings where there are lesser number of traffic police to regulate the road safety. We could not find any illiterate person while data collection which would give us a different finding if we had. All the responses are self-reported may have been influenced by desirability bias; that is answering what they felt acceptable and satisfactory for the question. To reduce this, the valid tool was used including the spontaneous interview of each question were done with the respondents. KAP are important aspect of road safety while other aspects such as road conditions and vehicle factors were not included in the study. The researchers were unable to add if the respondents had been involved in any type of crash in the past. We however used major variables of KAP road safety which were analyzed using standard scale. We assented the importance of respondents to give accurate responses and ensured them that their responses would be kept confidential.

CONCLUSION

From the study we can say that a training from a driving school is necessarily important not only for driving

license but also for a safe ride. We presume that attitude bridges the gap between knowledge and practice, that safe riding practice cannot be achieved without a good attitude towards road rules and regulations. Global reports on road safety by the WHO suggest strategies on road safety in various countries, including reducing road behavior such as speeding practices, intoxicated driving practice, and drug-induced practice with legislation therefore reducing the accident and increasing the road safety. KAP road safety is a cost-effective way to reduce accidents rates, injuries, and death. Periodic orientation to vehicle users about rules and regulations, strict penalty system such as license suspension, driving restrictions to violators, and award-reward and subsidies to good followers of road safety can reduce poor road safety practices eventually leading to lesser RTAs.

Recommendations

Researchers suggest qualitative research on the perception of vehicle drivers on road safety. Further research on practice can be done on field subjects to the violators of traffic rules for vivid findings.

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