

Knowledge of Road Traffic Accidents among Taxi Drivers in Kathmandu Valley

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ABSTRACT

Background: Kathmandu Valley experiences over 5,500 road traffic accidents annually, causing significant fatalities. Despite taxis being a safer transport option, they are still involved in accidents that is attributed to compromised knowledge related to road traffic accidents (RTAs). This study investigates taxi drivers' knowledge on road traffic accident prevention in Kathmandu Valley.

Methods: The study used a cross-sectional design and was conducted across various junctions in Kathmandu Valley during the period of October to December, 2022. A sample of 322 taxi drivers was selected using a purposive method. Data were collected through semi-structured interviews, with pre-testing conducted beforehand. Data were entered into Epi-Data and analyzed using SPSS version 16, with all ethical considerations strictly adhered.

Results: The study found that 98% of the drivers were male, with a mean age of 37 years. Most were married, and over half identified as Janajatis. About half had secondary education, and 80% earned less than 50,000 per month. Despite 86% being satisfied with their income, knowledge gaps were evident. On average, 42% had poor knowledge of human-related factors, 62% lacked understanding of vehicular factors, and 20% were incorrect about environmental factors affecting RTAs.

Conclusions: The study highlights significant gaps in taxi drivers' knowledge about factors contributing to RTAs. The findings suggest that targeted education programs and stricter regulations could help improve drivers' understanding and potentially reduce RTAs in the future.

Keywords: Environmental Factors, Epidemiological Triad, Human factors, Knowledge, Road Traffic Accidents (RTAs), Taxi Drivers, Vehicular factors.

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INTRODUCTION

Road traffic accidents (RTAs) pose a significant public health challenge and require effective, sustainable prevention strategies [1]. In Nepal, transport injuries are a major concern, ranking as the second leading cause of death among individuals aged 15-49 years. During the period of 2017-2018, it was noted that 40% of road traffic fatalities involved individuals under the age of 26 [2]. The number of road traffic deaths has been steadily increasing, with a staggering 1.35 million fatalities reported globally in 2016 [3]. In Nepal, the most vulnerable demographic for road traffic deaths is males aged 16-35 years, with a male-to-female fatality ratio of 3:1. Additionally, road traffic accidents result in significant disability, with approximately 1,084 people affected per 100,000 individuals due to crash-related injuries [4].

A study highlighted that 77% of taxi drivers face difficulties while operating their vehicles, which suggests a substantial impact on their driving performance and safety [5]. Nepal is also plagued by issues of rule violations and general carelessness on the roads. Despite these concerns, there is a notable lack of comprehensive research on the knowledge of taxi drivers regarding RTAs. This study aims to address this gap by assessing taxi drivers' understanding of vehicular, environmental, and human factors that contribute to road traffic accidents. By assessing their knowledge, the study seeks to provide insights that could inform targeted interventions and enhance road safety practices among taxi drivers in Nepal.

MATERIALS AND METHODS

A cross-sectional descriptive study was conducted at various taxi stations throughout the Kathmandu Valley (including Kathmandu, Lalitpur and Bhaktapur districts) during October to December, 2022. The sample size was calculated based on Cochran's formula as follows:

$n = z^2pq/e^2$ where $z = 1.96$, $p = 0.29$ [6], $q = 1-p$ and $e = 5\%$ (allowable error)

The sample size was computed to be 316 however total of 322 total responses were recorded. The study employed a purposive sampling technique to select taxi drivers from various taxi stations across the Kathmandu valley, addressing the large population and sample size. Taxi stations were chosen using an equal weighing method, dividing the total sample into three parts for Kathmandu, Bhaktapur, and Lalitpur, with approximately 105 taxis allocated to each area (Figure 1)

Data collection involved 15 major taxi junctions, from which seven taxis were selected in each city. Due to an increased number of respondents in Kathmandu, the total sample size reached 322. Questionnaire was designed and customized aligning with epidemiological triad of road traffic accidents and then translated into Nepali language and back translated to English language. Pre testing was done among 15 taxi drivers at Lalitpur who were excluded from main analysis. Face to Face interviews were conducted with taxi drivers at the visited junctions of respective districts of Kathmandu valley. Inclusion criteria encompassed taxi drivers from the selected stations who consented to participate, while exclusion criteria included drivers with less than three months of driving experience. Ethical clearance was secured from the Annapurna Neurological Institute & Allied Sciences (ref no: IRC-ANIAS-2022/23-101), and written informed consent was obtained from all participants. For statistical analysis, data were validated, examined, and organized for accuracy, then entered into Epi data version 3.1. For the purpose of categorizing knowledge levels, a median score of 10 out of 17 questions was used as the cutoff point. This threshold was established to differentiate between individuals with good and poor knowledge levels. Analysis was conducted using IBM SPSS 16 (Statistical Package for Social Sciences), and the chi-square test was employed to explore significant relationships between dependent and independent variables at 95% confidence interval (CI).

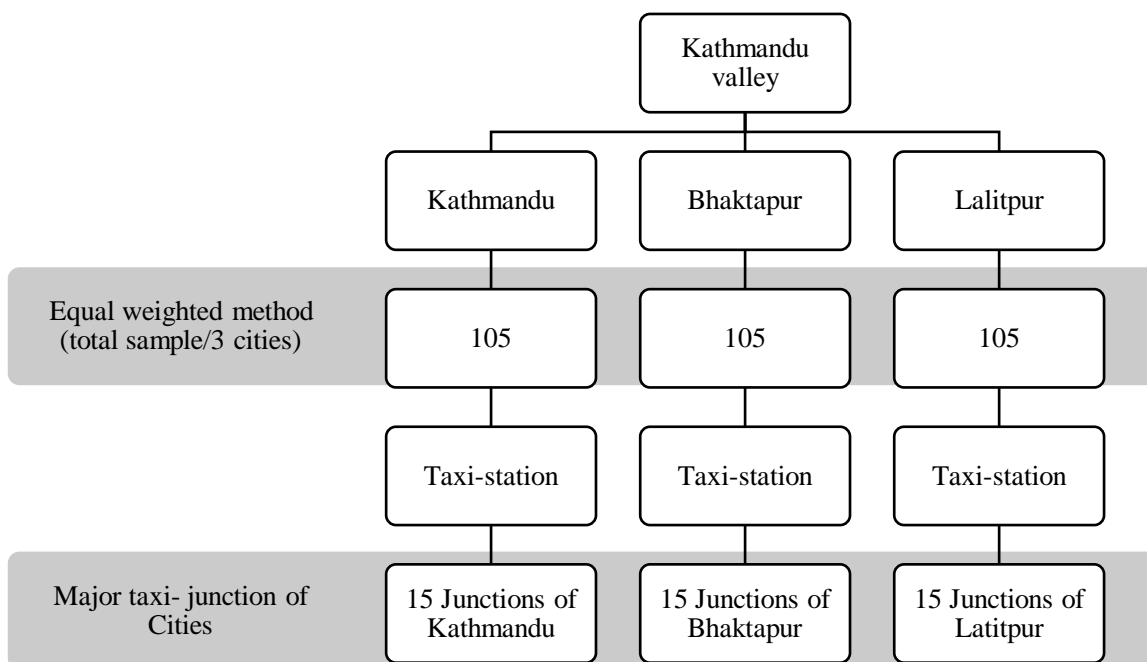


Figure 1: Sample Selection Process

RESULTS

The mean age of the respondents was 37 years, majority of participants are under 40 years old (64.0%), with a significant majority being male (97.8%). Most are married (82.0%) and belong to the Chhetri (35.1%) and Newar (26.4%) ethnic groups. Hindus make up the largest religious group (68.9%), followed by Buddhists (21.1%) and Christians (9.9%). In terms of education, 67.4% have completed up to secondary education, while 32.6% have pursued education beyond that level. The majority live in joint families (80.7%) and earn less than or equals 50,000 (80.4%) monthly. Most participants are satisfied with their current job (86.0%) and more than half own a taxi (55.3%) (Table 1). About two-third of the respondents have poor knowledge (66.1%) about road traffic accident. The categorization had been made based on median cut off score of ten (10) based on the scores obtained from scores from the questions from three different domains of epidemiological triad of RTA (Table 2).

There were questions related to human factors that could lead to RTA as described in epidemiological triad. Still 14% respondents said that it's acceptable to drink and drive and there were 11% respondents who didn't want to give

the answer about the same. Similarly, it's interesting to note that around 30% respondents accepted that one can answer phone calls while driving and in emergency. Moreover, more than a half (57%) respondents said it's acceptable to over speed sometimes while driving. Surprisingly, around a third respondents (35%) said it's true that insurance on accidents is mere a liability rather than security. Still, around one fifth (24%) respondents responded it's true that the seatbelt is just a formality rather than a security. however, majority (74%) said it's not true. Moreover, there are majority (80%) of the respondents who assume that experience in driving could stop or could prevent from RTA however rests of the remaining didn't believe this. In addition, about 90% of the respondents finds truth that the driver's experience could reduce RTA. Surprisingly, more than half respondents (56%) didn't find true that experience driver could ride vehicles that are not in an ideal condition to drive. Similar proportion (55%) of the respondents also didn't believe that experienced driver could ride vehicles when in harsh environmental conditions. Lastly, still there were around 72% respondents who said that they could take a ride throughout the day and night (Table 3).

Findings on the knowledge on vehicular factors for RTA divulged that more than half (53%) respondents said that safety protocols on road could be violated when in emergency. Similarly, around 58% said they could sometimes carry weights exceeding the capacity of their taxi too. Likewise, more around 75% said that the repairing of the taxi could be compromised when in emergency situations. With respect to environmental factors for RTA, interestingly, more than 90% of drivers said that the poor condition of the road pose risk to RTA. Exact 96% had knowledge that climatic situations could sometimes lead to RTA. Still more than a half (58%) of the drivers said the rules of the traffic need not be followed when in emergency all the time. Acceptably, more than 90% respondents said that lack of foot paths for pedestrians could lead to RTA. More than two third (69.3%) said the

current traffic condition of Kathmandu is not reliable (Table 4).

The analysis of socio-demographic factors related to knowledge levels reveals several key findings. sex does not significantly influence knowledge ($p = 1.000$). Age and marital status also do not show significant differences, as indicated by their respective p-values ($p = 0.857$ and $p = 0.100$). Ethnicity presents a significant p-value of 0.047, suggesting that Brahmins tend to have lesser knowledge compared to other ethnic groups. Religion and education levels do not significantly affect knowledge, with p-values of 0.218 and 0.891, respectively. Family type also shows no significant difference in knowledge levels ($p = 0.997$). However, monthly income and taxi ownership are significantly associated with knowledge level as indicated by p-values of 0.002 and 0.008, respectively. (Table 5)

Table 1: Knowledge level of respondents on road traffic accident (n=322)

Background Characteristics	Frequency (%)	Background Characteristics	Frequency (%)
Age		Education Status	
>40	206 (64.0)	Up to secondary	217 (67.4)
<40	116 (36.0)	Above secondary	105 (32.6)
Sex		Type of Family	
Male	315 (97.8)	Nuclear	62 (19.3)
Female	7(2.2)	Joint	260 (80.7)
Marital Status		Monthly Income	
Married	264 (82.0)	≥ 50,000	259 (80.4)
Unmarried	58 (18.0)	<50000	63 (19.6)
Ethnicity		Satisfaction with the current job	
Brahmin	35 (10.9)	Satisfied	277 (86.0)
Chhetri	113 (35.1)	Not Satisfied	45 (14.0)
Newar	85 (26.4)	Ownership of Taxi	
Janajati	82 (25.5)	Yes	178 (55.3)
Dalit	7 (2.2)	No	144 (44.7)
Religion			
Hindu	222 (68.9)		
Christian	32 (9.9)		
Buddhist	68 (21.1)		

Table 2: Level of Knowledge of the respondents (n=322)

Level of knowledge	Frequency (%)
Poor Knowledge	213(66.1)
Good Knowledge	109(33.9)

Table 3: Knowledge on human related factors (n=322)	
Inquiries	Frequency (%)
Is it acceptable to drink and drive?	
Yes	47(14.6)
No	238(73.9)
Don't want to say	37(11.5)
Answering phone while driving is acceptable while in emergency	
Acceptable	94(29.2)
Unacceptable	209(64.9)
Don't know	19(5.9)
Is it acceptable to over speed sometimes while driving?	
Acceptable	184(57.1)
Unacceptable	136(42.2)
Don't know	2(0.6)
Is it true that insurance on accident is just a liability?	
True	114(35.4)
Not True	203(63)
Don't know	5(1.6)
Is it true that seatbelt is just a formality rather than for safety?	
True	80(24.8)
Not True	239(74.2)
Don't know	3(0.9)
Can experience in driving could stop or could prevent from RTA?	
Yes	267(82.9)
No	55(17.1)
Is it true that experienced driver has a smaller number of RTA?	
True	288(89.4)
Not True	31(9.6)
Don't know	3(0.9)
Is it true that experienced driver could ride vehicles which are less than in ideal conditions too?	
True	114(35.4)
Not True	183(56.8)
Don't know	25(7.8)
Is it true that experienced driver could ride vehicles when in harsh environmental conditions?	
True	116(36)
Not True	180(55.9)
Don't know	26(8.1)

Can your taxi able to run and take a ride throughout the day and night?	
Yes	234(72.7)
No	83(25.8)
Don't know	5(1.6)

Table 4: Knowledge on vehicular factors and environmental factors (n=322)	
Vehicular factors	
Inquiries	Frequency (%)
When in emergency, can safety protocols could be violated when driving a vehicle?	
Yes	172(53.4)
No	146(45.3)
Don't know	4(1.2)
Can a taxi sometimes could carry weights/passenger exceeding its capacity?	
Yes	187(58.1)
No	131(40.7)
Don't know	4(1.2)
When in emergency, could repairing up of a vehicle sometimes could be compromised?	
Yes	242(75.2)
No	78(24.2)
Don't know	2(0.6)
Environmental factors	
Do poor condition of the road pose risk to RTA?	
Yes	294(91.3)
No	28(8.7)
Do climatic situations sometimes could lead to RTA?	
Yes	309(96)
No	13(4)
When in emergency, traffic rules need not be followed all the time?	
Yes	187(58.1)
No	134(41.6)
Don't know	1(0.3)
Lack of foot paths for pedestrians could lead to RTA?	
Yes	295(91.6)
No	27(8.4)
In your opinion, current traffic management condition of Kathmandu is reliable?	
Yes	99(30.7)
No	223(69.3)

Table 5: Association between the level of knowledge and background characteristics					
Socio-Demographic characters	Level of knowledge		Chi-square value (χ^2)	degree of freedom	p-value
	Poor Knowledge	Good Knowledge			
Sex					
Male	208(66%)	107(34%)	-	-	1.000**
Female	5(71.4%)	2(28.6%)			
Age					
≤40	137(66.5%)	69(33.5%)	0.032	1	0.857
>40	76(65.5%)	40(34.5%)			
Marital Status					
Married	180(68.2%)	84(31.8%)	2.705	1	0.100
Unmarried	33(56.9%)	25(43.1%)			
Ethnicity					
Brahmin	28(80%)	7(20%)	7.953	3	0.047*
Chhetri	78(69%)	35(31.0%)			
Newar	47(55.3.1%)	38(44.7%)			
Marginalized (Dalits & Janajatis)	60(67.4%)	29(32.6%)			
Religion					
Hindu	142(64%)	80(36%)	3.043	2	0.218
Christian	20(63.5%)	12(37.5%)			
Buddhist	51(75%)	17(25%)			
Education					
Up to secondary	143(65.9%)	74(34.1%)	0.019	1	0.891
Above secondary	70(66.7%)	35(33.3%)			
Family type					
Nuclear	41(66.1%)	21(3.9%)	0.000	1	0.997
Joint	172(66.2%)	88(33.8%)			
Monthly income					
Less than or equal to 50,000	161(62.2%)	98(37.8%)	9.397	1	0.002*
More than 50,000	52(82.5%)	11(17.5%)			
Satisfaction with income earned					
Satisfied	180(65%)	97(35%)	1.206	1	0.272
Not Satisfied	33(73.3%)	12(26.7%)			
Owner of taxi					
Yes	129(72.5%)	49(27.5%)	7.106	1	0.008*
No	84(58.3%)	60(41.7%)			

*p value reported from Pearson chi square test significant at 95% confidence interval (CI)

**p value reported from fisher exact test at 95% confidence interval (CI)

DISCUSSION

The aspiration of this descriptive study was to probe the knowledge among the taxi drivers about the road traffic accident. Present study showed that 33.9 percent of the respondents have good knowledge about road traffic accident. This study is analogous with the findings of the study conducted in Nepal that revealed 34.2 percent of the respondents have adequate knowledge [7]. Quite similarly, the study done in Iran and Pakistan [13, 14], showed a similar finding aligning with our study revealing the driver's inadequate knowledge regarding road traffic and vehicular rules & accidents.

On assessing the knowledge on human factors related to RTA, current study showed that around 74% respondents said it's not acceptable to drink and drive which was similar to the study done in Ethiopia among taxi drivers where around 90% said it's not acceptable to drink and drive, which actually is a gospel that drinking and driving kills the life [1]. With regard to over speeding, about half (51%) said it's acceptable to over speed sometimes which is more or less similar to the findings of the study done in Nigeria where about one third drivers strongly disagreed about the penalization of over speeding which inferred that they might had over speed in past and have intentions of over speeding in future too [8]. Similarly, current study revealed that about one fourth of respondents said it is just a formality to use seat belts while driving, which is somewhat analogous to the findings of the study done in tertiary intuitions among professional drivers at Nigeria where around 15% drivers were not agreeing about the actual utility of seat belts while driving [8]. Referring to experience in driving, it's true that the experienced drivers could or have control over the maneuvers of driving and gained skills through the experiences to control the dynamics of vehicles like steering and braking however it's not always only the experience factor that could lead or prevent accidents but there are some unexpected mechanical factors that could potentially lead to accidents where the

experience along couldn't be sufficient [9]. Also, the tendency of drivers to be overconfident over their experience is one of the factors of accidents. In line with this, current study intends to question on knowledge on experiences related factors among drivers where more than 90% said the experience could lead to a smaller number of accidents however little more than a third believed that experience drivers could run the vehicles in less than an ideal conditions too and could run in harsh environmental conditions.

Related to vehicular factors, little more than a half agreed that violation of traffic laws when in emergency is acceptable however in the study done in Tripoli, Libya among drivers, about two third of the respondents had better knowledge on traffic law violation and its dire outcomes [10]. It shows that laws related to traffic are not that strong and abided and who violates laws would easily escape from the penalties in Nepal which might be attributed to those 50% responses who cognizes that violation is acceptable when in emergency. An epidemiological study on RTA on western Nepal showed that out of 42 fatal accidents caused by motor vehicles, 33 (78.57%) were due to old ones and low maintenance [11]. Additionally, these vehicles were also responsible for majority of non-fatal accidents i.e. 129 (43.67%). On this ground, the question was asked on the cognition of maintenance in current study which surprisingly showed that three fourth of the respondents cognize that maintenance could be compromised for vehicles sometimes. This shows the drivers had little knowledge on vehicle maintenance and its attribution for accidents.

Current study revealed that about 90% respondents had cognition that poor condition of road leads RTA which is highly similar to the findings of the study done in Columbian taxi drivers [12]. Most of the respondents (96%) had knowledge on harsh climatic conditions could bring RTA. Although overall knowledge relating to environmental factors on RTA seems good when referring to certain variables, near to a third respondents opionated that traffic

management condition of Kathmandu is reliable which in fact in current scenario is paradoxical. No associations were observed between taxi drivers' knowledge of road traffic accidents and factors such as age, gender, educational status, or other background characteristics. This finding aligns with similar research conducted among drivers in Iran [13]. However, a notable exception is the relationship between monthly income and vehicle ownership. Taxi drivers earning more than 50,000 exhibited less knowledge about road traffic accidents compared to those with lower incomes. This may be because higher earners may often focus on collecting customers & optimizing profits as a priority. Additionally, their higher earnings might be associated with longer working hours, which leaves less time for acquiring road safety knowledge compared to lower-income drivers. This has been supported by the study done in West Bengal, India among truck drivers revealing that there was an association of duty hours affecting knowledge level and further revealing those having more duty hours having inadequate knowledge [15]. This reason holds true for the ownership related findings in the current study also. The study faces some limitations that should be acknowledged. Firstly, the use of purposive sampling & self-reported data could lead to inaccuracies due to potential biases such as socially desirable responses or misunderstanding of questions.

The study may also lack diversity in ethnic and religious groups, which could limit the applicability of the results to a broader population. Non-response bias could be a concern, as the study primarily includes volunteers who consented to participate, possibly excluding those with different perspectives. Lastly, other influencing factors, such as driving experience or external socio-economic conditions, were not measured, which could also impact knowledge levels. These limitations should be considered when interpreting the study's results and conclusions.

CONCLUSIONS

The study highlights significant gaps in taxi drivers' knowledge about epidemiological triad related factors contributing to RTAs. The findings suggest that targeted education programs and stricter regulations could help improve drivers' understanding and potentially reduce RTAs in the future. To address the gaps in road safety knowledge, it's crucial to implement comprehensive driver education programs focusing on human, vehicular, and environmental factors. Future studies should include truck, bus, and private vehicle drivers for a more comprehensive knowledge assessment.

Layman summary: This study highlights an important issue in Kathmandu Valley, where traffic accidents are a serious concern. Despite taxis being a relatively safe option for getting around, taxi drivers in the area seem to lack crucial knowledge about preventing accidents. The research found that many drivers don't have a strong understanding of the factors that contribute to accidents, including issues related to drivers themselves, their vehicles, and road conditions. With more than 5,500 accidents and over 180 deaths annually in the valley, improving drivers' knowledge is essential. The study suggests that better educational programs and stricter rules could help taxi drivers be more aware and prevent accidents, potentially saving lives and making roads safer for everyone.

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Ethical Approval: This research was approved by IRC of Annapurna Neurological Institute and Allied Sciences with the reference number of IRC-ANIAS-2022/23- 101 on 16th July, 2022

Consent/Assent: Informed written consent was obtained from all the participants before data collection

Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request

Conflicts of Interest: Author(s) declare no

conflict of interest

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