

Original Research Article

A study on knowledge, attitude and practice of road safety measures among selected college students, Bengaluru

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ABSTRACT

Background: Road traffic accident fatalities are rising in India, making them a significant public health concern. They are a leading cause of death among adolescents and young adults. The United Nations General Assembly aims to reduce traffic-related deaths and injuries globally by 2030.

Methods: A cross-sectional study was conducted among students from medical, engineering, and other disciplines. Data was collected using a structured questionnaire assessing knowledge, attitude, and practice regarding road safety measures. The chi-square test was used to determine associations between variables. Ethical approval was obtained, and informed consent was taken from all participants.

Results: Among participants, 97.3% of medical students, 86.7% of engineering students, and 100% of students from other disciplines knew that wearing a seat belt while driving is compulsory. Awareness regarding the mandatory use of seat belts for front seat passengers was 97.3% among medical students, 76.7% among engineering students, and 100% among other students. Awareness of the correct side to overtake was higher among those who drove vehicles (80.7%) compared to non-drivers (62%). Following lane discipline was reported by 97.3% of medical students, 70% of engineering students, and 90.5% of students from other disciplines.

Conclusions: Medical students demonstrated better awareness and adherence to road safety measures than engineering and other students. Despite high awareness of key rules, certain unsafe behaviors, such as listening to music while driving, persisted. Non-day scholars and non-drivers exhibited lower awareness. These findings highlight the need for targeted educational programs to improve road safety awareness and practices among students.

Keywords: Accident prevention, Driving practices, Road safety, Traffic rules

INTRODUCTION

Accidents are unforeseen and unintended events that result in injury or damage. Among the main causes of the growing incidence of road traffic accidents (RTAs) are the growing number of vehicles, careless driving under the influence of alcohol, bad road conditions, overconfidence, distracted driving, ignorance, excessive speeding, and lack of child restraints.¹

Any injury resulting from a crash involving a vehicle- either partially or totally- on a public road is known as a

road traffic accident (RTA).² Multiple elements pertaining to the traffic system affect RTAs: road users, the road environment, and vehicles.³ Road traffic accidents account for almost 1.35 million deaths annually worldwide, fourth among all causes of death globally.⁴

Acknowledging the increasing weight of RTAs, the United Nations General Assembly decided 2011-2020 as the “decade of action for road safety”, with an aim to stop millions of deaths by better road and vehicle safety, enhanced road user behavior, and improved emergency response services. Under five main pillars- road safety

management, safer road infrastructure, vehicle safety, responsible road user behavior, and post-crash care- this effort concentrated.⁵

The number of vehicles on roadways has greatly changed with fast industrialization and urbanization. Reducing the gap between knowledge and practice in road safety among the society will help to significantly lower the RTAs.¹

Men are also disproportionately impacted by RTAs as opposed to women. Reading suggests that almost 73% of all road traffic deaths take place among young men, who are almost three times more likely to be killed in a road traffic accident than their female counterparts. What's more, around 93% of all road traffic deaths take place in low- and middle-income countries. But not every accident causes fatal injuries- many people acquire temporary or permanent disabilities as a result of their injuries.⁶

Around 62% of road traffic deaths that are reported are in only ten countries: India, China, the United States, Russia, Brazil, Iran, Mexico, Indonesia, South Africa, and Egypt. Worldwide, a high percentage of road traffic deaths- about 46%- are of pedestrians, cyclists, and motorized two-wheeler passengers and drivers.⁷ Interestingly, India has the largest number of road traffic deaths globally.⁸

It is important to understand the particular risks to which young road users are exposed in order to create specific interventions that can decrease RTA-related mortality and morbidity among this high-risk group. Most of the strategies that prevent road traffic injury in the general population also reduce risks among young people.⁹

The aim of this study was to evaluate and educate students in road safety, closing the knowledge-practice gap and encouraging them to adopt safer road behavior.

Need for the study

Road traffic accidents (RTAs) are a significant public health problem, with young adults, including college students, being the most vulnerable populations. Bengaluru, with dense traffic of vehicles, reports high RTAs and hence awareness regarding road safety is the need of the hour. Even after there are rules in place for traffic and numerous campaigns for raising awareness, knowledge, attitude, and practice gaps persist for road safety practices among students. Evaluation of their knowledge and attitude will reveal misconceptions, and assessment of their practice will give an indication of compliance with safety measures. The results of this study can be used to devise focused interventions for enhancing road safety awareness and conduct among college students. Building road safety knowledge and encouraging responsible practices will eventually lead to a decrease in accidents and the creation of a safer traffic environment.

METHODS

A cross-sectional study was conducted among 200 college students from the Rajarajeswari Group of Institutions, Bengaluru. The study was carried out from June to August 2023. It aimed to assess the students' knowledge, attitude, and practice regarding road safety. The study is preceded by the rising burden of road traffic accidents as emphasized by WHO and other international studies. Using a convenience sampling technique, students from various disciplines including medical (149), engineering (30), and other courses (21) were enrolled. Students who were not willing to participate were excluded from the study. A pre-tested, semi-structured questionnaire was administered to gather information on demographic characteristics like age, year of study, education of parents, and area of study, as well as questions to evaluate road safety related awareness, perceptions, and practices. The questionnaire was framed following available literature, including WHO recommendations and past studies on road traffic injuries and road safety interventions. The collected data were entered into Microsoft Excel and analyzed using SPSS version 23, with results presented as frequencies and percentages. The association between the attributes were found using the Chi-square test. P value of <0.05 was considered as significant.

RESULTS

Table 1 shows the distribution of study participants by their field of study, type of accommodation, and driving status. Out of the 200 college students who were studied, 74% were from the medical field, followed by engineering students (15%) and other students (11%). In terms of accommodation, 51% were day scholars, and 49% lived in hostels. Regarding driving status, 75% of the study participants reported having driven, and 25% did not report driving. The distribution indicates that medical students in the study are dominant and allows insight into how college students drive, which is essential in order to evaluate their road safety awareness, attitude, and behavior.

Table 1: Distribution of study participants according to the discipline, place of residence, and driving status.

Variables	N (%)
Discipline of study	
Medical	149 (74)
Engineering	30 (15)
Others	21 (11)
Place of residence	
Day scholar	103 (51)
Hostel	97 (49)
Driving or not driving	
Driving	150 (75)
Not driving	50 (25)

*Others- Nursing, Paramedical.

Table 2: Comparison of knowledge, attitude, and practice of road safety measures among male and female students.

Sections- male and female	Male (n=93)	Female (n=107)	Chi-square	P value
Knowledge				
Is it mandatory to get a valid driving license before you start driving?	84	99	0.309	0.577
Is it compulsory to use seat belts while driving?	87	106	4.483	0.034
Is it compulsory for the front seat passenger to wear seat belt while travelling in car?	83	106	9.227	0.002
Is right side is the ideal side to overtake?	84	68	19.55	<0.00001
Is it safe to overtake other vehicles in curves and bends?	81	103	5.678	0.017
Is it mandatory to obey the road signs while driving?	87	105	2.72	0.099
Is it safe to use mobile phones while driving?	84	107	0.0008	<0.05
Attitude				
Do you feel following the road signs help in reducing the accidents?	89	107	0.045	<0.05
Do you feel exceeding the speed limit is safe?	63	92	9.429	0.002
Do you feel driving is safe after taking alcohol?	84	107	0.0008	<0.05
Do you feel attending phone calls while driving without stopping the vehicle is correct?	78	99	3.659	0.283
Do you feel regular maintenance of vehicle is essential?	90	100	1.152	0.283
Do you feel it is safe for children to play on roads?	85	106	7	0.009
Practice				
Do you follow the lane discipline?	82	103	4.693	0.03
Do you use zebra crossing to cross the road?	72	95	4.665	0.03
Do you listen to music while driving?	35	59	6.121	0.013
Do you wait for bus at designated bus stop?	83	100	1.134	0.286
Do you use dim and dip signals in night?	81	98	0.068	0.301
Do you use indicator lights before turning?	75	85	0.045	0.831
Do you stop the vehicle for pedestrians to cross even when there are no traffic signals or traffic police?	75	102	10.538	0.001

*p<0.005 is considered as significant.

Table 2 contrasts male (n=93) and female (n=107) participants on different knowledge, attitude, and practice items concerning road safety. There were significant differences in knowledge for seat belt use (p=0.034, p=0.002), the proper side to overtake (p<0.00001), overtaking bends (p=0.017), and mobile phone use (p<0.05). Attitude items differ significantly for speeding (p=0.002), driving after drinking alcohol (p<0.05), and children playing on the road (p=0.009). Practice variation comprises lane control (p=0.03), crossing over at zebra crossings (p=0.03), playing music while driving (p=0.013), and slowing down for pedestrians (p=0.001). Generally, females show more cautious reactions, which implies that both groups would benefit from special interventions aimed at enhancing road safety behavior.

Table 3 contrasts knowledge, attitude, and practice items for medical (n=149), engineering (n=30), and other (n=21) students. There were knowledge differences for the use of seat belts (p=0.005), front seat passenger seat belts (p=0.00001), passing in curves (p=0.002), compliance with road signs (p=0.015), and using a mobile phone when driving (p=0.037). Attitude questions vary

significantly in relation to driving after drinking (p=0.0004), taking phone calls while driving (p=0.01), and playing children on roads (p=0.001). Practice-based differences reflect in lane discipline (p<0.00001), employing dim and dip signals at night (p=0.0007), and pedestrian stopping (p=0.029). These results indicate that discipline-specific interventions might be needed to improve road safety awareness and adherence.

Table 4 contrasts day scholars (n=103) and non-day scholars (n=97) with respect to road safety knowledge, attitude, and practice. The majority of knowledge items, for instance, the utilization of valid driving permits and wearing seat belts, were found to have no differences between the two groups. A difference was observed in the attitude regarding stopping to receive phone calls while driving (p=0.022). Practice-wise, non-day scholars vary significantly in employing zebra crossings (p=0.004), listening to music while driving (p=0.031), and stopping for pedestrians (p=0.031). These results indicate that although general knowledge is similar, certain attitudes and practices are different between day scholars and non-day scholars, pointing towards targeted road safety interventions.

Table 3: Comparison of knowledge, attitude, and practice of road safety measures among medical, engineering, and other students.

Sections- medical, engineering, others	Medical (n=149)	Engineering (n=30)	Others (n=21)	Chi-square	P value
Knowledge					
Is it mandatory to get a valid driving license before you start driving?	136	28	19	0.167	0.919
Is it compulsory to use seat belts while driving?	146	26	21	10.325	0.005
Is it compulsory for the front seat passenger to wear seat belt while travelling in car?	145	23	21	21.851	0.00001
Is right side is the ideal side to overtake?	113	22	17	0.401	0.818
Is it safe to overtake other vehicles in curves and bends?	142	23	19	11.856	0.002
Is it mandatory to obey the road signs while driving?	145	26	21	8.351	0.015
Is it safe to use mobile phones while driving?	145	26	20	6.593	0.037
Attitude					
Do you feel following the road signs help in reducing the accidents?	147	28	21	4.09	0.129
Do you feel exceeding the speed limit is safe?	117	21	17	1.2008	0.548
Do you feel driving is safe after taking alcohol?	146	24	21	19.904	0.0004
Do you feel attending phone calls while driving without stopping the vehicle is correct?	136	20	21	68.23	0.01
Do you feel regular maintenance of vehicle is essential?	141	28	21	1.323	0.515
Do you feel it is safe for children to play on roads?	145	25	21	12.4	0.001
Practice					
Do you follow the lane discipline?	145	21	19	26.99	<0.00001
Do you use zebra crossing to cross the road?	127	21	19	5.035	0.08
Do you listen to music while driving?	74	10	10	2.677	0.262
Do you wait for bus at designated bus stop?	136	26	21	2.861	0.239
Do you use dim and dip signals in night?	139	21	19	14.435	0.0007
Do you use indicator lights before turning?	118	25	17	0.28	0.869
Do you stop the vehicle for pedestrians to cross even when there are no traffic signals or traffic police?	137	33	17	7.041	0.029

*p<0.005 is considered as significant

Table 4: Comparison of knowledge, attitude, and practice of road safety measures among day scholars and non-day scholars.

Sections- Day scholar	Day scholar (n=103)	Not a day scholar (n=97)	Chi-square	P value
Knowledge				
Is it mandatory to get a valid driving license before you start driving?	93	90	0.399	0.527
Is it compulsory to use seat belts while driving?	100	93	0.216	0.641
Is it compulsory for the front seat passenger to wear seat belt while travelling in car?	99	90	1.067	0.301
Is right side is the ideal side to overtake?	79	73	0.056	0.811
Is it safe to overtake other vehicles in curves and bends?	93	91	0.842	0.358
Is it mandatory to obey the road signs while driving?	99	93	0.007	0.93
Is it safe to use mobile phones while driving?	100	91	1.245	0.264
Attitude				
Do you feel following the road signs help in reducing the accidents?	101	95	0.0037	0.951
Do you feel exceeding the speed limit is safe?	75	80	2.672	0.102
Do you feel driving is safe after taking alcohol?	100	91	1.245	0.264

Continued.

Sections- Day scholar	Day scholar (n=103)	Not a day scholar (n=97)	Chi-square	P value
Do you feel attending phone calls while driving without stopping the vehicle is correct?	86	91	5.226	0.022
Do you feel regular maintenance of vehicle is essential?	97	93	0.304	0.581
Do you feel it is safe for children to play on roads?	97	94	0.867	0.351
Practice				
Do you follow the lane discipline?	90	89	1.017	0.313
Do you use zebra crossing to cross the road?	96	77	8.173	0.004
Do you listen to music while driving?	56	38	4.692	0.031
Do you wait for bus at designated bus stop?	93	90	0.399	0.527
Do you use dim and dip signals in night?	90	89	1.017	0.313
Do you use indicator lights before turning?	84	76	0.32	0.571
Do you stop the vehicle for pedestrians to cross even when there are no traffic signals or traffic police?	96	81	4.617	0.031

*p<0.005 is considered as significant

Table 5: Comparison of knowledge, attitude, and practice of road safety measures among students who drive and those who do not.

Sections- Do you drive any vehicle?	Drive (n=150)	Don't drive (n=50)	Chi-square	P value
Knowledge				
Is it mandatory to get a valid driving license before you start driving?	138	45	0.192	0.66
Is it compulsory to use seat belts while driving?	144	49	0.444	0.505
Is it compulsory for the front seat passenger to wear seat belt while travelling in car?	141	48	0.288	0.591
Is right side is the ideal side to overtake?	121	31	7.163	0.007
Is it safe to overtake other vehicles in curves and bends?	138	46	0.1	1
Is it mandatory to obey the road signs while driving?	145	47	0.694	0.404
Is it safe to use mobile phones while driving?	142	49	0.969	0.324
Attitude				
Do you feel following the road signs help in reducing the accidents?	146	50	0.573	0.075
Do you feel exceeding the speed limit is safe?	113	42	1.615	0.203
Do you feel driving is safe after taking alcohol?	143	48	0.038	0.843
Do you feel attending phone calls while driving without stopping the vehicle is correct?	132	45	0.147	0.701
Do you feel regular maintenance of vehicle is essential?	143	47	0.14	0.707
Do you feel it is safe for children to play on roads?	143	48	0.038	0.843
Practice				
Do you follow the lane discipline?	137	48	1.177	0.277
Do you use zebra crossing to cross the road?	125	42	0.012	0.912
Do you listen to music while driving?	62	32	7.734	0.005
Do you wait for bus at designated bus stop?	136	47	0.535	0.464
Do you use dim and dip signals in night?	135	44	0.159	0.689
Do you use indicator lights before turning?	117	43	1.5	0.22
Do you stop the vehicle for pedestrians to cross even when there are no traffic signals or traffic police?	133	44	0.016	0.898

*p<0.005 is considered as significant

Table 5 compares drivers (n=150) and non-drivers (n=50) road safety knowledge, attitude, and practice. The majority of knowledge and attitude items were equivalent across groups, with drivers significantly more aware of the optimum overtaking side (p=0.007). Attitudinal responses toward safety practices such as speed limits and

drinking were highly similar. In reality, drivers are considerably more probable to report hearing music while driving (p=0.005). Generally, overall road safety awareness was similar, but certain driving practices vary by driving status.

DISCUSSION

Kharde et al observed that rural drivers had poor knowledge of important road traffic regulations, especially with respect to the use of seat belts and overtaking behavior. Our research with Bengaluru college students, on the other hand, shows a relatively better awareness of important rules like holding a valid driving license and wearing seat belts. Nevertheless, just like Kharde et al, our findings also show gaps in certain areas, such as the proper overtaking side and safe driving habits. These could be explained by urban exposure and better education levels among our participants. Both studies underscore the importance of focused interventions to enhance road safety behavior across different segments.²

Ramya et al stated that undergraduate medical students in Bangalore were highly aware of road safety practices, yet gaps remained between knowledge and real behavior. Likewise, our survey across a wider college population in Bengaluru also showed high awareness on essential points like valid licensure and seat belt wear. Yet, both surveys described shortcomings in certain areas like proper overtaking techniques and safe driving behavior. Moreover, our findings identify major gender and driving status differences, which were not investigated by Ramya et al. Generally, the two studies emphasize that targeted interventions are imperative to close the gap between knowledge and practice in road safety.¹⁰

Ratna et al noted that although undergraduate students tend to have good road safety measure awareness, there is a significant lack of safe driving behavior among them. Likewise, our research noted high knowledge scores for important practices such as proper licensing and the use of seat belts among college students in Bengaluru. Yet, both research studies point out gaps in such important behaviors as proper overtaking and reducing distractions while driving. Our findings also indicate variations related to factors such as gender and driving status, implying that interventions could be effective if targeted. These findings collectively emphasize the ongoing requirement to bridge the road safety gap between knowledge and practice among students.¹¹

Phanindra and Chaitanya have reported high level of road safety awareness among students in Guntur, although their real-life practices failed to catch up. Likewise, this study on students in Bengaluru colleges reflects high level of awareness- specifically, of proper licensing and the use of seat belts- but reflects large differences in behaviors such as safe overtaking and distraction-minimization. In both cases, the findings serve to indicate strong knowledge-practice gap between youth drivers. In addition, our study finds differences by gender and driver status, indicating that individual characteristics further impact road safety behaviors. Overall, these results highlight the importance of targeted interventions in enhancing the translation of road safety information into safe driving practice.¹²

Reang and Tripura reported that medical students showed high awareness of road safety practices, but safe driving habits were not as uniformly practiced. Our own study with Bengaluru college students also found high knowledge scores on valid driving licenses and wearing seat belts. Yet, both studies found that there were crucial gaps in knowledge being translated into safe behavior, e.g., overtaking in the correct manner and avoiding distractions. In addition, our findings identify differences in behavior according to gender and driver status. Broadly, both studies find evidence for the necessity for targeted interventions to close the knowledge-practice gap in road safety.¹³

Majority of the students participated were medical students. A very few non-medical students were included as we could not obtain the consent from them for taking part in the study.

CONCLUSION

The study showed that medical students were more aware and followed road safety measures than engineering and other students. Though overall awareness of important rules like the use of seat belts and compliance with road signs was high, some unsafe practices like driving with music was higher. Furthermore, non-day scholars and nondrivers exhibited comparatively lower awareness. These results highlight the importance of targeted interventions to enhance road safety practices, especially among vulnerable populations. Enhancing education programs can close these gaps and encourage safer road behaviors.

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