Research Article

# Road Safety Perceptions and Practices among Undergraduate Medical Students

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**Background**

**The global epidemic of road traffic injuries is on the rise in most regions of the world, ranking as the 8th leading cause of death globally, and bringing about 1.35 million deaths every year, most which are among the 5-29 years age group. Researchers across the globe have identified a glaring gap between the knowledge and the practices of road safety among young adults, with focus on students with commute as a part of their daily routine.**

**Objectives**

**1. To assess the knowledge, attitudes and practices of undergraduate medical students towards road safety.**

**2. To evaluate the factors associated with exposure to RTAs among undergraduate medical students.**

**Materials and Methods**

**This was a cross-sectional study was conducted among a purposive sample of 525 undergraduate medical students, studying from first year to final year MBBS, at EISC Medical College, Sanathnagar. Data was obtained on the sociodemographic profiles as well as the knowledge, attitudes and practices of these students towards road safety using an online pre-tested semi-structured questionnaire.**

**Results**

**Mean age of the respondents was 20.7 + 4.5 years, about 60% were females, and majority were studying 2nd year MBBS. Of the 63% respondents that drive vehicles, 80% possess a valid driving license. More than 7% did not consider owning a valid driving license as necessary and only 23.6% were aware of the penalty charged for driving without license. About 12% reported the use of mobile phones while driving. Harmful practices such as driving without parents' knowledge, jumping the**

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**red signal and history of being held by traffic police were all significantly higher among males (p=0.003, 0.000, and 0.000 respectively).**

**Conclusions**

**There is an alarming degree of risky practices among the undergraduate medicals students, especially males. Their knowledge and perceptions of road safety did not adequately translate into practices.**

## Introduction

Roads have been a boon and a bane to humans. While they greatly aid in transportation and commute, roads have also been associated with unexpected and unintentional accidents resulting in irreversible injury, damage or premature loss of life[1]. The global epidemic of road traffic injuries is on the rise in most regions of the world[2]. Road traffic accidents is the 8$^{th}$ leading cause of death globally, bringing about 1.35 million deaths every year[3], and these rates are highest among the 5-29 years age group[4]. The victims include motor vehicle users as well as pedestrians. Researchers across the globe have identified a glaring gap between the knowledge and the practices of road safety among young adults, with focus on students with commute as a part of their daily routine. Indian researchers working on road safety concluded that alcohol-related RTAs were a foremost threat to civilization, which could be reduced by appropriate policy making by the governments[5].

Although governments have been making constant efforts to reduce the occurrence and impacts of road traffic accidents, the numbers still remain high especially in metropolitan cities and heavily populated towns. Besides legislations, individual's road safety knowledge, attitudes and practices play a major role in prevention of such untoward incidents. While perceptions and practices are subjective and change with the individual's level of literacy, the attitudes and practices of healthcare givers affect the behaviours of the general population. Demographic characteristics, driving history and perceptions also influence the efficacy of speed compliance and enforcement strategies[6]. Regional studies have reported that the main reasons for RTAs are poor adherence to traffic rules, over speeding, drunken driving, poor road design, not using seatbelts and helmets and using mobile phones while driving[7].

The present study was thus conducted with the following objectives:

- To assess the knowledge, attitudes and practices of undergraduate medical students towards road safety.
- To evaluate the factors associated with exposure to RTAs among undergraduate medical students.

## Materials And Methods

This was a Cross-sectional survey conducted over a period 1 month (November 2021) among undergraduate medical students (1st year to final year) and interns from ESIC Medical College and Hospital, Sanathnagar, Hyderabad. In order to provide equal opportunity to participate in the study to all the students, a purposive sample of 525 was chosen, taking into consideration all the 100 students in each batch from 2nd year to final year MBBS and interns, and all the 125 students in the 1st year MBBS batch (number of enrolments per year was 100 during 2016 to 2020, and increased to 125 in 2021). A pre-tested, semi-structured, online questionnaire was shared with the study participants through a Google forms' link. Responses collected were retrieved in the form of a spreadsheet. Microsoft Excel 2010 was used for data cleaning and descriptive statistical analysis, and IBM SPSS version 20.0 was used for performing inferential statistical analysis. Results are expressed as proportions. Chi-square test was done for testing associations and a p-value less than 0.05 was considered statistically significant. Odds' ratio was estimated to identify the factors associated with history of RTAs among the students.

## Observations

The study questionnaire received responses from 207 students and interns i.e., 39.4% response rate. Majority of the respondents were females (59.5%) and the mean age of the respondents was 20.7 + 4.5 years. Nearly half (45%) of the respondents belonged to MBBS second year, followed by 32% belonged to third year (final year part-I). More than 63% of the respondents reported that they drive vehicles. Out of them, 72.5% drove 2-wheelers and 27.5% drove 4-wheelers; 79.4% possessed a valid driving license, 73% had a driving experience of 2 – 5 years and 31% had more than 5 years of driving experience.

Although 94.2% of the respondents had knowledge of the correct age for acquiring a driving license, 77.3% knew about the fines imposed for violation of traffic rules, 72% knew the safer side for overtaking, 67.2% knew the average speed permissible in the city limits, and, 37.2% knew the limit of blood alcohol concentrations that were safe for driving. However, only 23.6% of the respondents were

aware of the recently updated penalty charged for driving without a license and 15.5% correctly answered the indication of amber yellow light at the traffic signals (Table 1). Empty road was the most common reason for speeding-up as perceived by the respondents (75.8%), followed by delay in routine (66.7%) and morning attendance (54.1%). The most commons reason quoted by them for accidents was high speed (88.9%), driving under the influence of alcohol (86.5%), mixed traffic (41.1%) and defective layouts (40.1%).

All the respondents (99.1%) had a positive attitude towards the safety of pedestrians. Majority of them believed that following traffic rules and regulations (96.1%), and appropriate road signs (96.1%) would help reduce road traffic accidents. However, 7.25% did not think owing a valid driving license was necessary.

More than 93% reported the use of helmet or seatbelt while driving a vehicle and nearly 86% practiced walking on the left side of the road. The use of zebra crossing was reported by 77.3% and about 75% maintain a speed less than 40 km per hour within the city limits (Table 1). Higher proportions of females reported these practices, as compared to males. Risky practices such as borrowing vehicles from friends and driving without a valid driving license were reported by 42% and 38% of the respondents (Table 1). The proportion of males who borrowed vehicles from friends was twice as the proportion of females (62% and 28.5% respectively), and this difference was found to be statistically significant (p=0.000). Similarly, 52.4% males and 28.5% females reported driving without a valid driving license and this difference was also statistically significant (p=0.000). Other risky practices such as driving without parents' knowledge, jumping the red signal and history of being held by traffic police were all higher among males (28.6%, 26%, and 33.3% respectively) as compared to females (12.2%, 7.3%, and 3.3% respectively), and the association of these practices with gender was statistically significant (p=0.003, 0.000, and 0.000 respectively) (Table 2). Another concerning finding was the usage of mobile phone during driving reported by 12% respondents (Table 1).

A history of exposure to, or, involvement in road traffic accidents was reported by 36.2% respondents (pedestrians and vehicle users), among which 52% were females and 48% were males. A majority of them were using 2-wheelers. Chi-square test showed that use of vehicle, type of vehicle and driving experience have statistically significant association with history of RTA (p=0.005, 0.01, and 0.03 respectively).

On assessing the relationship between the knowledge, attitude and practice domains, about half (50%) of the subjects who chose driving under the influence of alcohol as a major reason for RTAs

reported a history of driving under the influence of alcohol. This association was statistically significant (p=0.008). Similarly, 36.5% of the subjects who said owing a driving license is necessary reported driving without a valid driving license, and this finding was statistically significant (p=0.018).

## Discussion

Road usage has become an integral part of our lives for various purposes like transport, commute, micro-business and bread-earning jobs, etc. In India, the motor vehicle population is growing at a faster rate than the economic and demographic growth[2]. This, combined with callous and uninformed vehicle users and road users, eventually led to increased road traffic and road traffic accidents thereof. The present study was an attempt to assess the road safety perceptions and practices among undergraduate medical students who will be the health care providers of the future.

Females comprised of more than half of the study participants and majority of the respondents belonged to MBBS second year and third year. More than one-third of the respondents reported that they did not drive vehicles. 2-wheelers were the most common type of vehicle used. Eight in ten respondents possessed a valid driving license and most of them had 2 to 5 years of driving experience. Similar to our study, Kalbandkeri LR et al (2018)[8] found that 82.5% of the respondents drove motorbikes and more than 90% had license and Ramya MS et al (2017)[9] also reported that most of the study participants used 2-wheelers. On the contrary, Emmily MK et al (2016)[10] reported that only 50.8% undergraduate medical students had a driving license. In another study conducted by Das BR et al (2021)[3], the most common type of vehicle driven was 4-wheelers.

Almost all the respondents had good knowledge of the correct age for acquiring a driving license, the fines imposed for violation of traffic rules, the safer side for overtaking, and the average speed permissible in the city limits. Surprisingly, less than a quarter of the respondents were aware of the recently updated penalty charged for driving without a license and only few students were aware about the indication of amber yellow light at the traffic signals. The study done by Ramya MS et al (2017) [10] found high levels of awareness on traffic rules among medical students. Phanindra D et al (2016) [11] reported that the awareness of road safety measures among college students was good but their knowledge of road traffic signs was not satisfactory. Ranjan DP et al (2018)[1] found that only half of

the adolescent pre-university students had adequate knowledge on road safety rules, and that males had significantly better knowledge than females.

In the present study, the most common reasons for speeding-up were empty roads, delay in routine and morning attendance. Similarly, the most common reasons quoted by them for accidents were high speed, driving under the influence of alcohol, mixed traffic and defective layouts. Majority of them believed that following traffic rules and regulations and appropriate road signs would help reduce road traffic accidents. Kalbandkeri LR et al (2018)[8] also found that high speed and influence of alcohol were the most commonly quoted reasons for accidents but in less than $1/5^{th}$ of their respondents said that road traffic rules could prevent RTAs.

Safe practices such as the use of helmet or seatbelt during driving, and walking on the left side of the road were reported by more than three-quarters of the study respondents. Three in four students reported maintaining a speed less than 40 km per hour within the city limits. Phanindra D et al (2016) [11] found that only 46% college going students wore helmet while driving and around half admitted to exceeding speed limits. Kalbandkeri LR et al (2018)[8] reported that majority of the undergraduate medical students were overtaking from the right side and exceeded the speed limits.

In the present study, risky practices such as borrowing vehicles from friends, driving without a valid driving license, and using mobile phone while driving were reported by 42%, 38% and 12% of the respondents, respectively. Other risky practices such as driving without parents' knowledge, jumping the red signal and history of being held by traffic police were all higher among males as compared to females. In a study done by Kasulkar and Gupta (2017)[12] more than a quarter medical students reported driving without license and about three-quarters reported using mobile phones while driving.

A history of road traffic accidents was reported by 36.2% of our respondents, among which majority drove 2-wheelers while a quarter did not drive vehicles at all. In the study done by Ramya MS et al (2017)[10], 46% reported jumping signals, 9% gave a history of RTA and 2.4% reported driving under the influence of alcohol. Phanindra D et al (2016)[11] reported that around half the college students in the study reported the use of mobile phones while driving. Tests of association showed 50% of the respondents who believed that driving under the influence of alcohol was a major reason for RTAs, admitted to having driven under the influence of alcohol. Similarly, more than one-third of the

subjects who said owing a driving license was necessary reported driving without a valid driving license.

## Conclusions

From the present study we can conclude that undergraduate medical students have partly satisfactory knowledge and attitudes regarding road safety, their practices regarding the same were not satisfactory. There is an alarming degree of risky practices such as jumping signals, using mobile phone while driving and drunken driving among them. Four in ten undergraduate medical students drove without a valid driving license. The students driving 2-wheelers were at highest risk of road traffic accidents. Their knowledge and perceptions of road safety did not adequately translate into practices.

## Limitations

- In spite of ensuring anonymity, there was a low response rate in the study.
- The results of this study are not generalisable to the overall population as the focus was strictly on medical undergraduate students.

## Recommendations

The following recommendations may thus be made based on this study:

- Road safety awareness generation, periodic reorientation and training sessions with the involvement of the traffic police, psychologists, sociologists and vehicle experts along with doctors.
- Student activities such as street plays and road shows based on road safety themes can better instill the necessary attitudes and practices in the students as well as the community.
- Strict law enforcement with respect to traffic rules and regulations can be potentially beneficial.

These measures can help the medical students understand and practice highest levels of road safety, abide by road traffic rules and protect themselves and the community from road tragedies.

# Figures

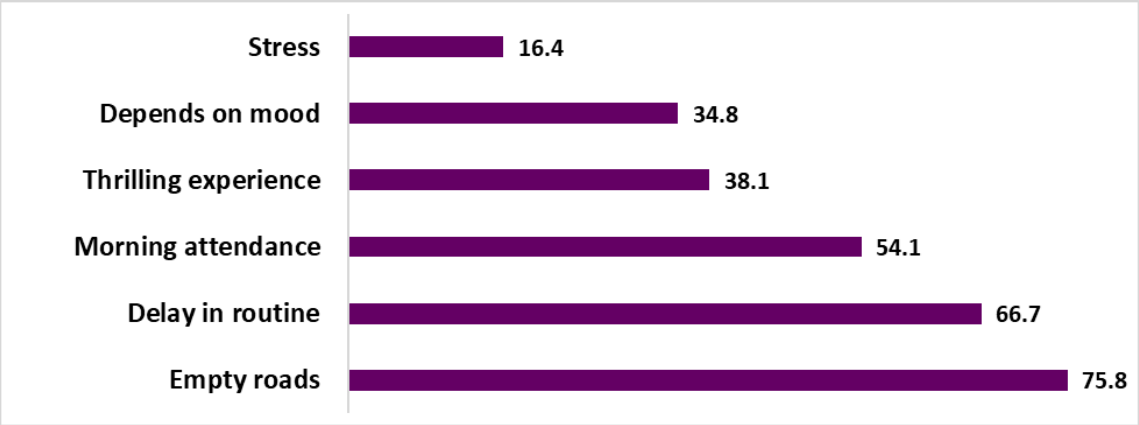


**Figure 1.** Reasons for speeding-up as perceived by the respondents (multiple options question)

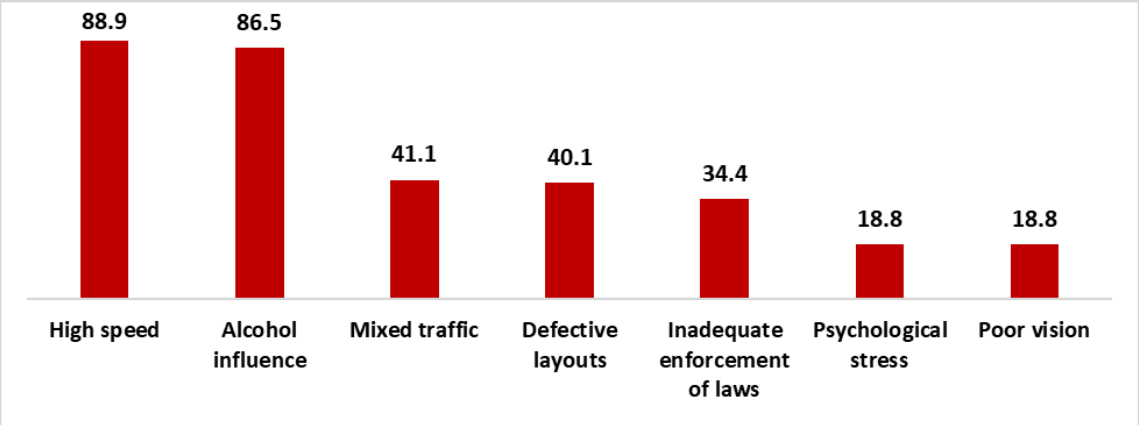


**Figure 2.** Reasons for occurrence of RTAs as perceived by the respondents (multiple options question)


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## Tables

| Knowledge domain | Responses (n=207) | | |
|---|---|---|---|
| | **Correct** | **Wrong** | **Nil** |
| Correct age for acquiring a driving license | 195 (94.2%) | 8 (3.9%) | 4 (1.9%) |
| Safer side for overtaking | 149 (72%) | 39 (18.8%) | 19 (9.3%) |
| Average speed permissible in the city limits | 139 (67.2%) | 60 (29%) | 8 (3.8%) |
| Safe limit of blood alcohol concentration for driving | 77 (37.2%) | 89 (43%) | 41 (19.8%) |
| Recently updated penalty for driving without a valid license | 49 (23.6%) | 85 (41.1%) | 73 (35.3%) |
| Indication of amber yellow light at traffic signal | 32 (15.5%) | 174 (84%) | 1 (0.5%) |
| **Attitude domain** | **Responses (n=207)** | | |
| | **Yes** | **No** | |
| Pedestrians must be given prime importance regarding their safety | 205(99.1%) | 2 (0.1%) | |
| Following traffic rules and regulations will reduce RTAs | 199 (96.1%) | 8 (3.9%) | |
| Appropriate road signs will help reduce RTAs | 199 (96.1%) | 8 (3.9%) | |
| Owing a valid driving license is necessary | 192 (92.75%) | 15 (7.25%) | |
| **Practice domain** | **Responses (n=207)** | | |
| | **Yes** | **No** | |
| ***Safe practices*** | | | |
| Use of zebra crossing | 160 (77.3%) | 47 (22.7%) | |
| Walk on the left side of the road* | 178 (86%) | 24 (11.6%) | |
| Use of helmet / seatbelt while driving | 193 (93.2%) | 14 (6.8%) | |
| Maintain speed of < 40kmph within city limits | 155 (75%) | 52 (25%) | |
| ***Risky practices*** | | | |
| Borrow vehicles from friends* | 87 (42%) | 115 (55.5%) | |
| Drive without parents' knowledge | 39 (18.8%) | 168 (81.2%) | |


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| Knowledge domain | Responses (n=207) | | |
|---|---|---|---|
| | Correct | Wrong | Nil |
| Use mobile while driving | 25 (12%) | 182 (88%) | |
| Drive without a valid driving license | 79 (38.2%) | 128 (61.8%) | |
| Drive under the influence of alcohol | 6 (3%) | 201 (97%) | |
| Jump the traffic signal on red | 31 (15%) | 176 (85%) | |
| History of being held by traffic police | 32 (15.5%) | 175 (84.5%) | |

**Table 1.** Responses to knowledge domain questions on road safety (n=207 for each question)

** Non-response = 5 (2.5%)*


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| | Males (n=84) | Females (n=123) | Total (n=207) | p-value |
|---|---|---|---|---|
| **Safe practices** | | | | |
| Do you use zebra crossing to cross roads | | | | |
| Yes | 63 (75%) | 97 (78.9%) | 160 (77.3%) | 0.51 |
| No | 21 (25%) | 26 (21.1%) | 47 (22.7%) | |
| Do you walk on left side of the road* | | | | |
| Yes | 72 (85.7%) | 106 (86.2%) | 178 (86%) | 0.56 |
| No | 11 (13.1%) | 13 (10.6%) | 24 (11.6%) | |
| Do you use helmet/seatbelt while driving | | | | |
| Yes | 76 (90.5%) | 117 (95.1%) | 193 (93.2%) | 0.19 |
| No | 8 (9.5%) | 6 (4.9%) | 14 (6.8%) | |
| Maintain speed < 40kmph within city limits | | | | |
| Yes | 57 (67.9%) | 98 (79.7%) | 155 (74.9%) | 0.054 |
| No | 27 (32.1%) | 25 (20.3%) | 52 (25.1%) | |
| **Risky practices** | | | | |
| Do you borrow vehicles from friends* | | | | |
| Yes | 52 (61.9%) | 35 (28.5%) | 87 (42%) | 0.000 |
| No | 30 (35.1%) | 85 (69.1%) | 115 (55.5%) | |
| Do you drive without parents' knowledge | | | | |
| Yes | 24 (28.6%) | 15 (12.2%) | 39 (18.8%) | 0.003 |
| No | 60 (71.4%) | 108 (87.8%) | 168 (81.2%) | |
| Do you use mobile phone while driving | | | | |
| Yes | 18 (21.4%) | 7 (5.7%) | 25 (12.1%) | 0.000 |
| No | 66 (78.6%) | 116 (94.3%) | 182 (87.9%) | |
| Do you / did you ever drive without a driving license | | | | |

| | Males (n=84) | Females (n=123) | Total (n=207) | p-value |
|---|---|---|---|---|
| Yes | 44 (52.4%) | 35 (28.5%) | 79 (38.2%) | 0.000 |
| No | 40 (47.6%) | 88 (75.5%) | 128 (61.8%) | |
| Did you ever drive under the influence of alcohol | | | | |
| Yes | 5 (5.9%) | 1 (0.8%) | 6 (2.9%) | 0.03 |
| No | 79 (94.1%) | 122 (99.2%) | 201 (97.1%) | |
| Did you ever jump the traffic signal on red | | | | |
| Yes | 22 (26.2%) | 9 (7.3%) | 31 (15%) | 0.000 |
| No | 62 (73.8%) | 114 (92.7%) | 176 (85%) | |
| Were you ever held by a traffic police | | | | |
| Yes | 28 (33.3%) | 4 (3.3%) | 32 (15.5%) | 0.000 |
| No | 56 (66.7%) | 119 (96.7%) | 175 (84.5%) | |

**Table 2.** Gender-wise distribution of road safety practices (n=207)

**Non-response (5/207) = 2.5%; (p<0.05 = significant).*


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| Factors | History of Exposure to RTA | | | p-value |
|---|---|---|---|---|
| | Yes (n=75) | No (n=132) | Total (n=207) | |
| Gender | | | | 0.101 |
| Male | 36 (48%) | 48 (36.4%) | 84 (40.6%) | |
| Female | 39 (52%) | 84 (63.6%) | 123 (59.4%) | |
| Do you drive a vehicle | | | | 0.005 |
| Yes | 56 (74.7%) | 73 (55.3%) | 129 (62.3%) | |
| No | 19 (25.3%) | 59 (44.7%) | 78 (37.7%) | |
| Type of vehicle | | | | 0.01 |
| 2-wheeler | 42 (56%) | 52 (39.4%) | 94 (45.4%) | |
| 4-wheeler | 15 (20%) | 21 (15.9%) | 36 (17.4%) | |
| Not applicable | 18 (24%) | 59 (44.7%) | 77 (37.2%) | |
| Driving experience | | | | 0.03 |
| < 1 year | 10 (13.3%) | 17 (12.9%) | 27 (13%) | |
| 2 – 5 year | 33 (44%) | 38 (28.8%) | 71 (34.3%) | |
| > 5 year | 13 (17.3%) | 18 (13.6%) | 31 (15%) | |
| Not applicable | 19 (25.4%) | 59 (44.7%) | 78 (37.7%) | |

**Table 3.** Factors associated with History of exposure to RTA

*(p<0.05 = significant).*

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## Declarations

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