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A cross-sectional study to assess the knowledge, attitude and risk- behaviour towards Road Safety among Undergraduate Medical Students, Kanchipuram, Chennai

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ABSTRACT

Road traffic accidents/injuries in recent times have become a major global epidemic and the most important cause of death among younger population of age group 15-29 years. Countries that have undergone extensive and rapid development face an increase in the number of road accidents. This is due to the motorisation associated with urbanisation and development. A cross-sectional study was conducted among the Undergraduate Medical students of a private medical college in Chennai. Two hundred and three participants were studied by convenient sampling method. Participants were from 1st year to 4th year, and the duration of the study was for three months. A pre-tested, semi-structured and self-administered questionnaire was given, and the desired information was elicited. Data was then analysed with the help of statistical package for the social sciences software (SPSS). Chi-square test was done to test the significance ($p < 0.05$). Among 203 study participants, 121 (59.6%) of them had a driving license. The mean age of participants was found to be 19.99, and the standard deviation equals + 1.3 years. Significantly more number of participants having driving license stopped the vehicle for pedestrians to cross the road and stopped their vehicle at a zebra crossing. The highest positive response was seen in giving way to an ambulance in those with and without a license. The number of participants wearing helmet and seat-belt was less, and the knowledge about the speed limit on national highways was also low. Significant increase in the number of female participants wearing a seat-belt, helmet, following traffic rules, avoiding drunken driving and following speed limit was observed when compared to male participants. A multi-disciplinary approach towards creating more awareness and enforcing stringent laws is the urgent need of the hour to prevent mortality and morbidity due to Road Traffic Incident.



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INTRODUCTION

In the current world, transport has become an integral part of every human life. Every one of us is a road user in one way or the other. Every year road traffic accidents result in loss of lakhs of lives and serious injuries. A road traffic injury is an injury that occurs due to crashes involving vehicles partially or wholly on the public road. (nhp.gov). Developing countries like India are facing an additional problem of non-communicable diseases, including RTA on

top of already existing communicable diseases (Jogdand *et al.*, 2013). It is no longer considered accidental, relatively, a price we pay for misusing our progression in technology (www.dw.de/india). Like any other disease, even accident has agents, hosts and environmental factors. These work together to produce injury or damage (Park and Park, 2019).

Among the leading causes of the global disease burden, it is projected that road traffic accidents will move up to the third position by the year 2020 (Mahawar *et al.*, 2013). In India, motor vehicle sales are growing at a faster rate than the population and economic growth (Mahawar *et al.*, 2013). Road traffic mortality rate (per 100,000 population) in 2016 globally is 18.8 and in India is 8. Every year in India, about 80,000 people are killed in road crashes. This is about 13% of total RTA fatality all over the world (Dulipala and Gujjarlapudi, 2016). Pedestrians, cyclists, motorcyclists account for half of all road traffic deaths. Adults aged between 15 to 44 years account for 59% of deaths (Reang and Tripura, 2014). It has been found that RTA has become the second leading cause of mortality among 20-24 years of age (Dulipala and Gujjarlapudi, 2016). The leading cause of death due to injury is road traffic injury, followed by suicide, falls, and interpersonal violence (Hogarth, 1978). Males are more likely to be involved in road traffic accidents compared to females (WHO, 2015). Among young drivers, males under the age of 25 years are three times more likely to be involved in a car accident as young females (WHO, 2015). Drunken driving has found to be one of the major causes of RTAs in highways among commercial vehicle drivers. Failure to use seat belts, helmets and child restraints in have also found to be a significant contributing factor to RTAs and deaths. (nhp.gov). In low- and middle-income countries, it is found that 93% of worlds fatalities occur on the roads, though these countries have only 60% of worlds vehicles. (WHO 2020).

Unlike the past, people using personal transportation has been increasing drastically, concomitantly the rise of traffic on the roads and risk exposure. Based on the WHO report, approximately 1.35 million people die annually as a result of this. With annually 130,000 deaths occurring, India has overtaken China and now has the highest RTA rate worldwide (dw.de/India). Driving at great speed increases the possibilities of road crashes occurring, and therefore the severity of the implications. Based on the WHO report, for each 1% increase in speed, fatal crash risk increases by 4% as speed increases the chance of death for the pedestrians to be hit by motorised vehicles increases significantly. While driving at 65 kilometres per hour, the chance

of a pedestrian being hit by a vehicle is 4.5 times more than hit by a vehicle travelling at 50 kilometres per hour (WHO 2020). According to the report of National Highway Authority of India, road accidents and death on the expressway of our very own state, Tamilnadu is 25.17% and 26.8% respectively (morth.nic). As stated by, National Health Portal of India, comprehensive road safety laws are present only 28 countries which include measures on significant risk factors like speeding, drunken driving, and failing to use seat-belts, helmets and child restraints (nhp.gov). Road safety is one among the issues that have never been stressed enough, thereby endangering people's lives on the road.

The injuries and deaths have caused an immeasurable impact on the families affected. This can be the primary explanation for concern, and both the society as well as the government should work together to scale back this preventable cause of death. A simple measure such as following road safety rules and regulations and having basic awareness on road safety can reduce RTA's significantly. Within the last decade in India, 1.3 million people died due to preventable road crashes, and another 5.3 million are disabled for all times. (save life foundation). Prevention of RTAs and death becomes mandatory and vital to boosting the life span and also the quality of life of individuals. Hence this study was done to assess and evaluate the knowledge, attitude and risk behaviour on road safety among undergraduate medical students using motorised vehicles.

MATERIALS AND METHODS

The study was designed to be a cross-sectional study, and the study was conducted at a Tertiary Care Medical College and Hospital, Kanchipuram Tamilnadu. The participants chosen for the study were the undergraduate medical students studying at this college, and the study was done for three months with data collection followed by analysis and discussion. The participants were selected by convenient sampling method. Those who consented for the study, which included students from 1st year to 4th year of Saveetha Medical College and Hospital were included in the study. The participant not available at the time of the study, and who didn't give responses to specific questions in the questionnaire were excluded. According to the report given by the Ministry of Road Transport and National Highways of India, Transport Research Wing, Tamilnadu has contributed 14.1 per cent of total road accidents in the country. Taking this as prevalence (14.1%) of road traffic incident and assuming 95% confidence limit with a 5% allowable error, with the formula

$(4pq)/L^2$, the sample size is, $N=193$. To account for the non-response rate (about 10%), a total of 203 subjects with inclusion criteria were chosen for the study.

Before proceeding with the study, pilot testing was done, and the necessary changes were made in the questionnaire. The students were visited in their classrooms and explained about the purpose of the study and pre-tested, pre-validated, semi-structured questionnaires comprising the demographic details like, age, sex, year of study and along with questions which were needed to assess their knowledge, attitude and risk behaviour towards road safety was distributed and collected from a dropbox kept outside the classroom or wards after 15 mins to maintain the anonymity of the information shared by them. The data collected was entered in Microsoft Office Excel sheet (MS Excel). Informed written consent was obtained before collecting the data. The participants were explained the option to withdraw at any time without any penalty or loss of benefit. Before beginning with the study, approval was obtained from the ethical committee of the Institution. After completion of data collection, the frequencies of all variables were checked for completeness at regular intervals. Data was then analysed with the help of statistical package for the social sciences software (SPSS) for windows version 21. The descriptive statistics were shown in appropriate tables and figures. Association between categorical variables was determined using the Chi-square test. P-value was calculated at a 95% confidence interval with significant levels at $p < 0.05$.

RESULTS AND DISCUSSION

The current study was undertaken to evaluate the knowledge, attitude and risk behaviour towards road safety. Table 1 showed that among 203 study participants 121 (59.6%) of them had a driving license. The majority of the 144 (70.93%) were less than 20 years of age, and 59 (29.06%) were above 20. The mean age was found to be 19.99 ± 1.3 years (Mean + SD). There were more female respondents 123 (60.6%) when compared to male respondents, 80 (39.4%). More than half the participants 115 (56.65%) belonged to the 3rd year of under graduation.

On analysis, Table 2 of this study shows the general knowledge about the legal age for a license was high at 97% that is, no of males who knew the correct answer was 77(37.93%) and females knowing the correct answer was 122(60.09%) and 65 (32.01%) of males and 87 (42.85%) together, 74% of all participants had correct knowledge about the side of

overtaking. The knowledge about permissible alcohol level, the maximum penalty for driving without a license and speed limit on national highways of all participants was low at 49.25%, 48.76%, 25.12%. These are essential parameters, and yet the knowledge was lacking and therefore not a good sign. This lack of knowledge could be one of the reasons for increasing RTA. The knowledge of the speed limit on highways was very low in our study. Similar to our study Jogdand K et al. have also published that more than 40% of the students did not have correct knowledge of road safety rules and the overall knowledge was marginally higher in females, but it was not significant (Jogdand et al., 2013). In another study, 86% knew the correct side of overtaking, whereas our study showed only 74% knew the correct side (Mukhopadhyay, 2017). This could be because, in Mukhopadhyay's study, the majority (76%) of the participants were above 20 years. In a study by Manjula, only 47.8% knew the legal limit of alcohol for driving that was similar to our study, which was 49.25% (Manjula, 2017). In our study compared the knowledge between the sex, regarding legal age for license, permissible alcohol level, side of overtaking, maximum penalty for driving without a license, and average speed limit on National highways, gender differences were not statistically significant in our study.

Among the 203 participants, 121 (59.6%) of them had a driving license. We analysed the association between driving license among study participants and their attitude towards road safety. As shown in Table 3 significantly more no of participants having driving license 113 (93.38%) stopped the vehicle for pedestrians to cross the road even if there was no sign of police watching than those not having license 65 (79.26%). In a similar trend, a more significant number of licence holders 105(86.77%) stopped their vehicle at a zebra crossing when compared to those who did not have license 61 (74.39%), and it was statistically significant. Significantly lesser no of license holders 18 (14.88%) felt that they were distracted by loud music when compared to those without license 25 (30.49%). In general, the majority of the participants (84.5%) with or without a license had the right attitude towards road safety. This positive attitude was seen in their response towards questions on whether road signs and symbols reduce road traffic accidents, the need to follow traffic rules at night, being in a calm and relaxed state of mind while driving, wearing a seat belt and giving way to an ambulance when hearing the siren. Similar to our study Manjula too observed that in their study, 88.9% had a right attitude about RTA (Manjula, 2017). The highest positive response

Table 1: Demographic characteristics of study participants

S. No	Characteristics	Frequency (N=203)
1.	Age group	
	<20	144 (70.93%)
	>20	59 (29.06%)
2.	Sex	
	Male	80 (39.4%)
	Female	123 (60.60%)
3.	Year of study	
	1st year	32 (15.76%)
	2nd year	32 (15.76%)
	3rd year	115 (56.65%)
	4th year	24 (11.82%)
4.	Participants having a driving license and drive	121 (59.60%)

Table 2: Association between Gender and Knowledge of study participants (N= 203) on road safety

S. No	Variable		N (%)			P-value (<0.05)
			Total	Male N=80	Female N =121	
1	Legal age for a license	Know	97%	77(37.93%)	122 (60.09%)	0.002664*
		Don't know	3%	3 (1.47%)	1 (0.49%)	
2	Permissible alcohol level	Know	49.25%	45 (22.16%)	55 (27.09%)	0.006874*
		Don't know	49.75%	35 (17.24%)	68 (33.49%)	
3	Side of overtaking	Know	74%	65 (32.01%)	87 (42.85%)	0.208824
		Don't know	26%	15 (7.38%)	36 (17.73%)	
4	The maximum penalty for driving without a license	Know	48.76%	35 (17.24%)	64 (31.52%)	0.486168
		Don't know	51.24	45 (22.16%)	59 (29.06%)	
5	The average speed limit on highways	Know	25.12%	20(9.85%)	31 (15.27%)	0.024891*

*chi-square has been applied and p-value <0.05 is considered to be significant

Table 3: Association between driving license among study participants and their attitude towards road safety

S. No	Variable	Driving license		P-value (<0.05)
		Present N=121	Absent N =82	
1	Stopping the vehicle for pedestrians to cross the road even if there is no sign of police watching	Yes	113 (93.38%)	0.002664*
		No	8 (6.6%)	
2	Following traffic rules and regulations reduce the incidence of accidents?	Yes	93(76.85%)	0.006874*
		No	28 (24.14%)	
3	Road signs and symbols reduce road traffic accidents	Yes	100 (82.65%)	0.208824
		No	21 (17.35%)	
4	The need to follow traffic rules at night	Yes	107 (88.42%)	0.486168
		No	14 (11.57%)	
5	Stopping the vehicle before zebra cross	Yes	105(86.77%)	0.024891*
		No	16 (13.22%)	
6	Being in a calm and relaxed state of mind while driving	Yes	94 (77.69%)	0.587638
		No	27 (22.31%)	
7	Wearing a seat belt while driving the car	Yes	100 (82.64%)	0.606119
		No	21 (17.35%)	
8	Giving way to an ambulance when hearing the siren	Yes	117 (96.69%)	0.892488
		No	4 (3.30%)	
9	Distracted when listening to loud music while driving	Yes	18 (14.88%)	0.007558*
		No	103 (85.12%)	

*chi-square has been applied and p-value <0.05 is considered to be significant

in our study was seen in giving way to an ambulance at (117 in males and 79 in females) 96% in both groups. (Table 3). Emmily et al. published that in their study, 98.2% of participants gave way to ambulance (Emmily et al., 2016).

In our study when we analysed the risk behaviour towards road safety among the 121 license holders, more male respondents agreed to drive the vehicle rashly, being intoxicated while driving a vehicle and using a mobile phone while driving when compared to female respondents. In Table 4 for the figures were 38 (57.57%), 9 (13.64%) and 18 (27.27%) in males and 12 (21.82%), 2 (3.64%), 6 (10.90%) in females respectively which was statistically significant. When compared to our study, Reang T in their study showed that lesser number of students

crossed speed limit (27.5%), did drunken driving (3.3%) and used mobile phones (8.3%) (Reang and Tripura, 2014). In our study, more no of female participants, 30 (45.54%) wore a helmet while riding a two-wheeler compared to males 20 (30.37%). Ratna et al. in their study observed that overall, 74% wore a helmet (Ratna et al., 2017). The number of participants wearing a helmet in our study was far less, and this can be attributed to the relaxed law on helmet usage in our city and state. In our study, there was more percentage of male participants 47 (71.21) who exceeded the speed limit, drove a vehicle without the knowledge of parents, met with RTA, involved in racing and skipping traffic signal when compared to female participants. There was statistical significance between the genders in response to all the questions in table 4.

Table 4: Association between gender with a driving license (N=121) and their risk behaviour towards road safety

S. No	Variables	Gender		P-value (<0.05)	
		Male having driving license N= 66 N (%)	Female having a driving license N =55 N (%)		
1	Driven vehicle rashly	Yes	38 (57.57%)	12 (21.82%)	0.00007*
		No	28 (42.42%)	43 (78.18%)	
2	Been intoxicated while driving a vehicle	Yes	9 (13.64%)	2 (3.64%)	0.056747*
		No	57 (86.36%)	53 (96.36%)	
3	Using a mobile phone while driving	Yes	18 (27.27%)	6 (10.90%)	0.024597*
		No	48 (72.73%)	49 (89.09%)	
4	Wearing a helmet while riding 2-wheeler	Yes	20 (30.30%)	30 (45.45%)	0.007006*
		No	46 (69.70%)	25 (54.54%)	
5	Has exceeded the speed limit	Yes	47 (71.21%)	18 (32.73%)	0.000024*
		No	19(28.79)	37 (67.27%)	
6	Driven a vehicle without the knowledge of parents	Yes	33 (50%)	10 (18.18%)	0.000271*
		No	33 (50%)	45 (81.81%)	
7	Has met with a road traffic accident	Yes	38 (57.58%)	12 (21.82%)	0.00007*
		No	28 (42.42%)	43 (78.18%)	
8	Been involved in bike or car racing	Yes	14 (21.21%)	3 (5.45%)	0.013004*
		No	52 (78.79%)	52 (94.55%)	
9	Has skipped the traffic signal	Yes	38 (57.58%)	13 (23.64%)	0.000167*
		No	28 (42.42%)	42 (76.36%)	

*chi-square test has been applied and p-value<0.05 is considered to be significant

Table 5: Gender-based assessment of attitude towards road safety among all study participants(203)

Variables	Gender		P-value (<0.05)
	Male N =80	Female N=123	
Do you stop the vehicle for pedestrians to cross the road? Yes No	74 (92.5%) 6 (7.5%)	104 (84.55%) 19 (15.44%)	0.09223
Following traffic rules and regulations reduces the incidence of accidents? Strongly disagree Disagree Neutral Agree Strongly agree	13(16.25%) 3 (3.75%) 7 (8.75%) 20 (25%) 37 (46.25%)	4 (3.25%) 2 (1.63%) 6 (4.88%) 39 (31.71%) 72 (58.54%)	0.000435*
Does road signs and symbols reduce accidents? Yes No	68 (85%) 12 (15%)	105 (85.37%) 18 (14.63%)	0.942781
Do you feel the need to follow traffic rules? Yes No	73 (91.25%) 7 (8.75%)	109 (88.61) 14 (11.38%)	0.547351
Do you stop the vehicle before zebra crossing? Yes No	14 (17.5%) 66 (82.5%)	100 (81.30%) 23 (18.70%)	0.00001*
Have you been in a calm and relaxed state of mind? Yes No	59 (73.75%) 21 (26.25%)	96 (78.05%) 27 (21.95%)	0.481199
Have you worn the seat belt while being a passenger as well when you drive the car? Yes No	63(78.75%) 17 (21.25%)	107 (86.99%) 16(13%)	0.119895
Do you feel distracted listening to loud music while driving? Yes No	50 (62.5%) 30 (37.5%)	93 (75.61%) 30 (24.39%)	0.045467*

*chi-square test has been applied and p-value<0.05 is considered to be significant

It was disheartening to know that both the sexes were still involved in driving rashly, not wearing a helmet, exceeding the speed limit and skipping traffic signal in large numbers. Jogdand K et al. too, in their study observed that 39.73% of students were booked for not wearing the helmet and 32.59% were frequently using mobile phones, and 24.45% were over speeding (Jogdand *et al.*, 2013). Mukhopadhyay, in his study, published, that 26.4% had moderate RTA, whereas, in our study, the RTA was 41.32% (Mukhopadhyay, 2017). This increase

of RTA in our study can be attributed to increasing in vehicles over the past three years, and the participants of our study are from metropolitan city, whereas Mukhopadhyay did his study in a semi-urban setting. Similar to our study, he also noted more female participants followed speed limit, did not use mobile phones, wore helmet and seat belts compared to male participants.

Green et al. and Evans et al. have shown the beneficial lifesaving role of using seat belts in their

study (Green et al., 1994; Evans, 1996). Unfortunately, still, a large section of drivers and passengers do not use seat belts. In our study of 203 participants, the general use of seat belts was 170 (83.75%) out of which 107 (86.99%) were female, and 63 (78.75%) were male as seen in Table 5.

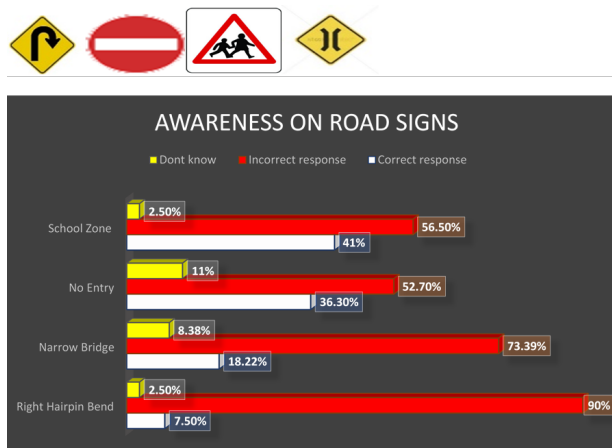


Figure 1: Awareness of road signs in all 203 study participants

Similarly, in a study by Emmily et al., 80% of the participants wore a seat belt. In our study, there was a significant gender difference in stopping the vehicle at zebra crossing with 100 (81.3%) female participants stopping compared to 14 (17.5%). However, more female participants, 93 (75.61%) agreed that they were distracted if they listen to loud music while driving compared to male participants 50 (62.5%), which was also statistically significant. There was a better positive response among female participants who agreed that following traffic rules and regulations reduce the incidence of accidents, road signs and symbols reduce accidents and the need to follow traffic rules.

Our study Figure 1 shows that a maximum number of incorrect responses was in identifying hairpin bend sign (90%) followed by a little bridge sign (73.9%). A few participants had responded answers like “turn over, turning ahead, maintain right and take a turn” instead of right hairpin bend. Likewise, for narrow bridge the participants had responded “intersection, double way, two-way, roads diverging” etc. Uncommon use of this sign could be the reason for unfamiliarity, and incorrect answers (Mukhopadhyay, 2017). Incorrect response that was seen in interpreting signs for no entry (52.70%) and school zone (56.50%) was also high. Only 41 % and 36% of participants correctly interpreted the school zone and no entry, both of which are very crucial in road safety.

CONCLUSIONS

This study brings out the deficiency in the knowledge, attitude and risk behaviour towards road safety among the undergraduate medical students. This is to be viewed seriously, and measures for increasing awareness on road safety must be taken on a large scale. This study is done in an urban population, and we can extrapolate a still low road safety awareness in rural areas. Training must start early as we see more and more youngsters handling vehicles. Stringent enforcement of rules to wear helmets, seat belt, to follow traffic rules and lights, avoid drunken driving and speeding must be enforced.

Every driver has to learn of being cautious on the road as it's a trait they have to master before they step behind the wheels of the vehicle. “Man, behind the wheels play an important role on the road”. Therefore, emphasis should be made for appropriate training of drivers through a strict driving license system. This should be considered as an effective strategy to increase the road safety attitude and bring down the incidents of RTAs.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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