

Original article

A cross sectional study to assess the knowledge, attitude and practice towards road safety rules and regulations among Higher Secondary school students in Chennai

Dr. A. Evangeline Mary, Dr. A. Chitra, Dr. R. Arunmozhi , Dr. T. Sheila Doris

Name of the Institute/college: Govt. Stanley Medical College , Assistant Professor in Community Medicine, Department of Community Medicine, Stanley Medical College, Chennai - 1.

Corresponding author: Dr. A. Evangeline Mary

INTRODUCTION:

“Road Safety is no Accident”

Accident is as an unfortunate incident that happens unexpectedly and unintentionally, resulting in damage or injury. Increased number of vehicles, drink driving, inadequacies of the road, over confidence, distracted driving, ignorance, increased speed of the vehicles and child restraints are the commonest causes for increased road accidents.^[1] Industrialization and urbanization has enormously increased the number of vehicles on the roads. According to the WHO, every year the lives of nearly 1.24 million people are cut short due to road traffic crash and 20 to 50 million people suffer non-fatal injuries. Half of those dying on the world’s roads are “vulnerable road users”: pedestrians, cyclists and motorcyclists with 27% of all road traffic deaths among pedestrians and cyclists^[1,2] and young adults accounting 59% of all global road traffic deaths.^[1]

Globally, road traffic injuries are estimated to be the leading cause of death among young people aged 15–29 years, and second leading cause of death in 10–14 years and 20–24 years age groups. Every hour, forty youngsters die due to road traffic crashes.^[2] As a result, accident takes a heavy toll on the people entering their most productive years.^[1] Economically disadvantaged families are hardest hit by the losses arise from cost of treatment and reduced/lost productivity for the killed or disabled, and for their family members who need to take time off to care for the injured. Road traffic injuries are increasing, notably in low- and middle-income countries, rates being twice than those in high-income countries. Over a third of road traffic deaths in low and middle-income countries occur among pedestrians and cyclists. Current trends suggest that road traffic injuries will become the fifth leading cause of death by 2030.^[1]

The UN General Assembly declared 2011- 2020 as the "Decade of Action for Road Safety" with a goal to stabilize and reduce the increasing trend in road traffic fatalities. This declaration holds significance, as road traffic accidents are a major cause of morbidity and mortality, especially among young adults who constitute the most productive age groups of society. Improving the knowledge practice gap among the people in the community can lead to a drastic reduction in road traffic accidents.^[1] Developing countries, like India face a double burden of already existing communicable diseases and increasing burden of non-communicable diseases including RTAs. In the South East Asian region of the WHO, India alone accounts for 73% of RTA burden. More than 231,000 people

are killed in road traffic crashes in India every year. One fatal accident occurs every 3.7 minutes and one accident every minute.^[1]

For past 10 years, Tamil Nadu has topped the National Crime Record Bureau's (NCRB) charts for road accidents in the country with 16,175 deaths in 67,757 accidents in 2012, about 44 deaths every day. Close to eight accidents occur every hour, and the state accounts for 15.4% of all road accidents in the country. Chennai recorded the highest number of accidents amongst the 53-mega cities on the NCRB list followed by Delhi and Bangalore. In 2012, it registered 9,663 accidents; of which 1,401 were fatal. Thus prevention of RTAs becomes very crucial to improve the longevity and quality of life of the individuals concerned.^[3] Simple measures like awareness and practice of road safety measures can effectively reduce the impact of RTAs on the lives of people. Road safety deals exclusively with road traffic crashes – how to reduce their number and their consequences. Road safety aims to reduce the harm resulting from crashes of road vehicles and to convey information to road users to enhance their knowledge about road safety issues, influence their behavior on the road and prepare them for new safety measures.^[4] Road safety-educated students will grow to be leaders of communities forming opinions. The chances of road traffic accidents can be averted to a large extent, if school children who are going to be adults of tomorrow are made aware of road safety measures.

AIMS & OBJECTIVES:

The aim of the current study is to know the knowledge, attitude and practice level of the higher secondary school students on road safety rules and regulations.

METHODOLOGY:

This is a cross sectional study done between October to December 2014 among Higher Secondary School Students in Chennai. The study population was defined as follows: -

Inclusion criteria:

1. Both sexes studying 11th and 12th standard at Government and Private schools in Chennai
2. Students who were present during the time of data collection.

Exclusion criteria:

Students who were sick and absent during the time of data collection.

The sample size was calculated based on the pre interventional knowledge on road safety rules and regulations ($p=54\%$) in a study among School Going Teenagers in Indore by Mahawar P et al^[5] using the formula $N = \frac{Z_{1-\alpha/2}^2 pq}{d^2}$ and was derived as 359. (CI- 95%, $d=10\%$ of p , 10% non-response rate).

The study subjects were selected by two-stage stratified sampling method. After obtaining permission from The Institute Ethics Committee and the school authorities, One Higher Secondary School was selected from each administrative region (North, South and Central) in Chennai randomly by lots method to provide a representative sample. Out of the three selected schools, two were Government schools and one was a Government-aided school. 120 students from each school were selected randomly from the student lists obtained from these schools. After explaining the purpose of the study, informed consent was obtained from the selected participants and strict confidentiality was maintained. A pre-tested, semi structured questionnaire containing questions on the socio-

demographic details of the participants and knowledge, attitude and practice of road safety rules and regulations, developed based on review of related literature and opinion from experts in Community Medicine, was distributed to the selected participants in their local language and collected on the same day. The participants were asked to complete the questionnaire without leaving any question incomplete.

In this study, 10 questions were asked to assess the knowledge of the students on road safety rules and regulations. It included questions on traffic signals, road safety laws and road signs (50 km speed limit, overtaking prohibited, no U-turn and pedestrians prohibited). The knowledge level was scored into two categories viz. inadequate knowledge (0-5) and adequate knowledge (6-10).

Questions like ‘You can drive motor vehicle on road even before acquiring driver’s license’, ‘Pedestrians must be given prime importance regarding their security’, ‘Owning a driving license for driving a vehicle is necessary’ and ‘Road signs and symbols put up by the Chennai Traffic Police helps to reduce road accidents’ assessed attitude towards road safety rules and regulations . Practice was evaluated by asking the age they started driving, whether they followed traffic rules and regulations (crossing on pedestrian crossing, obeying signals, wearing helmets and seat belts) and whether the Traffic Police had held them and the reason for it. Data was entered in Microsoft Excel and analyzed using SPSS Version 21. The level of statistical significance was defined as a two-sided p-value of <0.05.

RESULTS:

The study included 360 respondents with 120 students selected randomly from the three selected schools. All the participants returned their completely filled questionnaire. Among them, 187 participants belonged to 11th standard (51.9%) and 173 participants belonged to 12th standard (48.1%). The age of the participants ranged from 15 to 19 years. The mean age was 16.206 years with a standard deviation of 0.9031. The socio- demographic details of the respondents are shown in table 1.

Table 1: Socio demographic details of the participants:

Characteristic	Category	Frequency (N=360)	Percentage
Age of the participants	15 years	79	21.9
	16 years	163	45.3
	17 years	86	23.9
	18 years	29	8.1
	19 years	3	0.8
Sex of the participants	Male	181	50.3
	Female	179	49.7
Father’s Educational Status	Illiterate	99	27.5
	1 st to 5 th Std	47	13.1
	6 th to 10 th Std	180	50
	11 th ,12 th Std	25	6.9
	Graduate	9	2.5

Mother's Educational Status	Illiterate	122	33.9
	1 st to 5 th Std	61	16.9
	6 th to 10 th Std	159	44.2
	11 th ,12 th Std	13	3.6
	Graduate	5	1.4
Socio economic Status (BG Prasad Scale – November 2014)	Class I (Rs.5775 & above)	42	11.7
	Class II (Rs.2887-5774)	23	6.4
	Class III (Rs.1733-2886)	65	18.1
	Class IV (Rs.866-1732)	160	44.4
	Class V (Rs.< 866)	70	19.4

Knowledge:

Among the 360 participants, 186 participants (51.7%) had adequate knowledge and 174 participants (48.3%) had inadequate knowledge on the road safety rules and regulations. According to the Motor Vehicle Act (MVA) 1988,⁶ the age to get a valid driving license was 18 years. This was known by majority of the participants. Maximum penalty for driving without a valid driver's license was known by only 56.9% as Rs.500 and /or imprisonment for 3 months. 98.1% and 99.4% participants knew that it is compulsory to put on the seat belt while in a moving car and wear helmet while travelling in two wheeler respectively. 54.4% participants knew that 40 kmph is the normal driving speed limit in the city and only 24.4% participants knew that the permissible blood alcohol limit for driving in India is <30 mg/100 ml. Only 6 participants knew all the 4 road signs. 184 participants (51.1%) were not able to identify even one of the four road signs. Only 33.1% participants had correct knowledge of traffic lights. (Table 2)

Table 2: Knowledge regarding road safety rules and regulations

Knowledge regarding road safety rules and regulations	Number correct response (N=360)	Percentage
Age to get major driving license	351	97.5
Is it compulsory to put on the seatbelt while you are in a moving car	353	98.1
Normal speed limit for driving in Chennai city	196	54.4
Permissible Blood alcohol limit for driving in India	88	24.4
Wear a helmet while travelling in a two-wheeler	358	99.4
Road signs (>=3 signs correct)	34	9.4
Indication of amber (yellow) light	119	33.1
From where do you overtake a vehicle	102	28.3
On which side of the road you must walk to reduce accidents	195	54.2
Maximum penalty for driving without driver's license	205	56.9

Attitude:

Among the study participants, more than half of the participants had a positive attitude towards road safety rules and regulations. (Table 3)

Table 3: Attitude regarding road safety rules and regulations

Attitude regarding road safety rules and regulations	Number of respondents who agreed (N=360)	Percentage
Pedestrians must be given prime importance regarding their security	318	88.3
You can not drive motor vehicle on road before acquiring driver's license	227	63.1
Owning a driving license for driving a vehicle is necessary.	253	70.3
Road signs and symbols put up by the Chennai Traffic Police helps to reduce road accidents.	211	58.6

Practice:

Among the 360 participants, only 45% used zebra crossing for crossing roads, 77.5% followed the road signs and symbols and only 201 participants (55.8%) had the habit of wearing seat belt while in a moving car. 293 participants were driving vehicles. (Table 4) Among them, 18 drove four wheelers, 10 drove three wheelers and all of them drove two wheelers. Only 28 participants (9.6%) were driving with a valid driving license.

Table 4: Practice regarding road safety rules and regulations

Practice regarding road safety rules and regulations	Number of respondents who practice (N=360)	Percentage
Use zebra crossing to cross roads	162	45
Obey the road signs and symbols	279	77.5
Drive vehicles	293	81.4
Exposed to a road traffic accident	167	46.4
Wear seat belt when travelling in a four-wheeler	201	55.8

Among 46.4% participants who had been exposed to road traffic accidents, pedestrian accidents accounted for only 7.2%, the remaining were motor vehicle accidents. The most common reason for motor vehicle accidents was high speed in 58 participants (37.4%), followed by overtaking in 41 participants (26.5%) and bad roads in 38 participants (24.5%).

Table 5: Practice regarding road safety rules and regulations among those who drive vehicles

Practice regarding road safety rules and regulations	Number of respondents who practice (N=293)	Percentage
Borrow vehicles from friends	123	42
Ever been held by traffic police	78	26.6
Drive vehicles without license	265	90.4
Driving speed of <40 km/hr in the city	180	61.4
Drive vehicle without parent's knowledge	88	30
Stop vehicle for pedestrians to cross even with no traffic signals or traffic police around	223	76.1
Wear helmet while driving	152	51.9

Among those who drive, 42% had the habit of borrowing friend's vehicles and 30% drove vehicles without their parent's knowledge. Only 51.9% wore helmet while driving. Only 61.4% participants drove their vehicles within the normal diving speed in the city. 78 participants accepted that the traffic police had held them. Among them, 64 participants were caught for driving without their driving license, 9 for going in triples and 2 for not wearing helmets. (Table 5)

Association between knowledge adequacy about road safety rules and regulations and socio demographic details:

Among the socio demographic details, sex of the participants and educational status of their parents had statistically significant association with adequate knowledge regarding road safety rules and regulations. (Table 6)

Indian Journal of Basic and Applied Medical Research

Is now with

IC Value 91.48

Table 6: Relationship between knowledge adequacy and socio demographic details of the respondents:

Factors	Knowledge			TEST	p-Value
	Adequate	Inadequate	Total		
Age of the participants					
15 years	47 (25.3%)	32 (18.4%)	79 (21.9%)	Fisher's exact test	0.168
16 years	73 (39.2%)	90 (51.7%)	163 (45.3%)		
17 years	47 (25.3%)	39(22.4%)	86 (23.9%)		
18 years	17 (9.1%)	12 (6.9%)	29 (8.1%)		
19 years	2 (1.1%)	1 (0.6%)	3 (0.8%)		
Sex of the participants					
Male	105 (56.5%)	76 (43.7%)	181 (50.3%)	$\chi^2_{(0.05)} = 5.867$ df = 1	0.015
Female	81 (43.5%)	98 (56.3%)	179 (49.7%)		
Father's education					
Illiterate	48 (25.8%)	51 (29.3%)	99 (27.5%)	Fisher's exact test	0.012
1 st -5 th	20 (10.8%)	27(15.5%)	47 (13.1%)		
6 th -10 th	93 (50%)	87 (50%)	180 (50%)		
11 th , 12 th	16 (8.6%)	9 (5.2%)	25 (6.9%)		
Degree/ Diploma	9 (4.8%)	0	9 (2.5%)		
Mother's education					
Illiterate	62 (33.3%)	60 (34.5%)	122 (33.9%)	Fisher's exact test	0.033
1 st -5 th	25 (13.4%)	36 (20.7%)	61 (16.9%)		
6 th -10 th	84 (45.2%)	75 (43.1%)	159 (44.2%)		
11 th , 12 th	11 (5.9%)	2 (1.1%)	13 (3.6%)		
Degree/ Diploma	4 (2.2%)	1 (0.6%)	5 (1.4%)		
Socio Economic Status of the respondents					
Class I (Rs.5775 & above)	22 (11.8%)	20(11.5%)	42 (11.7%)	$\chi^2_{(0.05)} = 1.143$ df = 4	0.887
Class II (Rs.2887-5774)	11 (5.9%)	12 (6.9%)	23 (6.4%)		
Class III (Rs.1733-2886)	37 (19.9%)	28 (16.1%)	65 (18.1%)		
Class IV (Rs.866-1732)	82 (44.1%)	78 (44.8%)	160 (44.4%)		
Class V (Rs.< 866)	34 (18.3%)	36 (20.7%)	70 (19.4%)		
Total	186 (100%)	174 (100%)	360 (100%)	360	

Relationship between knowledge adequacy and practice:

Table 7: Relationship between knowledge adequacy and practices among the respondents:

Practices	Knowledge		TEST	p-Value
	Adequate	Inadequate		
Cross the roads at the zebra crossing				
Yes	93 (57.4%)	69 (42.6%)	$\chi^2_{(0.05)} = 3.887$ df = 1	0.049
No	93 (47%)	105 (53%)		
Obey the road signs and symbols				
Yes	150 (53.8%)	129 (46.2%)	$\chi^2_{(0.05)} = 2.183$ df=1	0.140
No	36 (44.4%)	45 (55.6%)		
Wearing seat belt while travelling in 4 wheeler				
Yes	129 (64.2%)	72 (35.8%)	$\chi^2_{(0.05)} = 28.532$ df = 1	<0.001
No	57 (35.8%)	102 (64.2%)		
Total	186 (51.7%)	174 (48.3%)	360	

The road safety practices were better in participants with adequate knowledge compared to those with less knowledge. The differences in knowledge and practice of crossing roads at zebra crossing, driving at less than 40 km/hr in the city, wearing seat belt while travelling in a car and helmet while travelling in a two wheeler were found to be statistically significant. (Table 7,8)

Table 8: Relationship between knowledge adequacy and practices among respondents who drive vehicles:

Practices	Knowledge		TEST	p-Value
	Adequate	Inadequate		
Wearing helmet				
Yes	103 (67.8%)	49 (32.2%)	$\chi^2_{(0.05)} = 25.534$ df = 1	<0.001
No	54 (38.3%)	87 (61.7%)		
Driving speed in the city				
<40 km/hr	104 (57.8%)	76 (42.2%)	$\chi^2_{(0.05)} = 10.722$ df = 2	0.005
40-60 km/hr	42 (56%)	33 (44%)		
>60 km/hr	11 (28.9%)	27 (71.1%)		
Stop vehicles for the pedestrians to cross				
Yes	123 (55.2%)	100 (44.8%)	$\chi^2_{(0.05)} = 0.929$ df=1	0.335
No	34 (48.6%)	36 (51.4%)		
Total	157 (53.6%)	136 (46.4%)	293	

DISCUSSION:

Road traffic awareness among school going adolescents is one of the most important aspect towards safety concerning traffic rules. The students in adolescence may derive a thrill out of taking risks on road not realizing the consequences such risks may have. This age group is rapidly emerging as a major population of vehicle owners and also constitutes major number of accidents, making it very important to sensitize this population about road traffic rules, as they are future of the nation. In the present study, only half of the students had adequate knowledge on road safety rules. This finding is similar to the study in Indore among school going teenagers.^[5] In a study in Chandigarh, 60% students had correct knowledge on the road safety rules.^[4] In the current study, males had significantly better knowledge than females, similar to the study among high school students in rural community in Tamil Nadu and medical college students in Agartala.^[7,8] Probably because boys have a habit of going out more frequently and have more exposure to media, traffic signals in the cities and people around them, than girls who are confined to homes most of the time.

97.5% participants knew the legal age for driving geared vehicles and 54.4% respondents had correct knowledge on the correct speed limit for driving in the city, much higher than the studies in Chandigarh and rural Tamil Nadu.^[4,7] This could probably be due to urbanization and high literacy rate. Only 33.1% participants had correct knowledge of traffic lights. This finding was similar to the study among school going teenagers in Indore.^[5] The inability to correctly identify the traffic lights need to be addressed immediately as road traffic accidents can be reduced drastically if the knowledge towards traffic lights improve. More than 50% participants were not able to identify any of the road signs correctly. Similar findings were found in a study among high school students in rural area of Tamil Nadu.^[7] Knowledge of traffic sign and speed limit was poor even among commercial bus drivers whereas good knowledge on road signs was observed among medical students.^[8-10] The poor knowledge of traffic signs among participants might be due to the reduced exposure to IEC activities displayed in various occasions while moving around and road safety education is not a part of their school curriculum.

In the present study, only 28.3% knew that one should overtake from right side of the road, similar to the study conducted among students in Chandigarh.^[4] In the study among school going teenagers in Indore, 35.2% students had correct knowledge.^[5] Half of the participants believed that pedestrians should walk on the left side of the road. This could be a major contributor towards high rate of road traffic accidents among pedestrians. According to the WHO report, 27% of all road traffic deaths occur among pedestrians and cyclists.^[1] Knowledge regarding use of seat belts and helmets was high among the participants, which was similar to the knowledge of medical students.^[8] This is due to the mandatory seat-belt laws and motorcycle helmet laws enforced in the State. Only half of the respondents knew the maximum penalty for driving without a valid license and about one third felt driving license was not necessary to drive vehicles. This is because the punishment for driving without license is not implemented effectively in India. Among those who drove vehicles, 90% did not have a valid driving license and more than four fifth were held by the traffic police for driving without a valid license.

Regarding practice, half of the students who ride motorized two-wheelers did not wear helmets. Use of helmet prevents the risk of fatalities among motorcycle riders. Similarly half of the participants did not wear seat belts regularly. Above data indicates that despite good awareness students do not practice them. This shows the alarmingly wide knowledge practice gap, which needs immediate attention to ensure road safety.

Two fifths of the participants agreed to have exceeded their speed limits while driving and there is a significant knowledge practice gap regarding the driving speed in the city in the present study. Study among medical students in Agartala reported that one third of them exceeded their speed limits while driving.^[8] Among those who had been exposed to road traffic accidents, 7.2% were pedestrian accidents and remaining were motor vehicle accidents. There was a positive association between road safety education and participants' road crossing behaviors. Ibrahim JM et al also reported similar findings in their study.^[11] Thus showing a better knowledge and practice among pedestrians. Prevalence of motor vehicle accidents was found to be significantly associated with male gender. A recent study of accidents involving motorcyclists in Taiwan also found that male riders were more likely to disobey traffic regulations.^[12] Males are more likely to show off to impress their friends and prove their individuality and freedom by breaking traffic rules.

RECOMMENDATIONS

School is the basic institution where we can formulate interventions towards health promotion and prevention of accidents.

- To improve road safety among school-going adolescents, a multi dimensional program requiring efforts and coordination from students, parents, teachers, law enforcement agencies and policy makers on prevention of traffic injuries should be organized.
- Comprehensive measures to improve conditions of roads and road environments to provide safer environments for pedestrians and drivers and the use of seat belts and helmets should be promoted.
- Measures imposed on violators of traffic rules; checks on driving vehicles without license; focus on drunk driving should be strengthened.
- The attitudes and practices, which negatively affect traffic safety, should be changed. Information and education campaigns and the role of media should be effectively utilised to disseminate information to community and topics on traffic safety should be included in the compulsory training program of secondary schools.

CONCLUSION

The study reveals moderate knowledge and attitude regarding traffic rules and road signs among the higher secondary school students, whereas knowledge regarding risk factors associated with road accidents was found to be adequate. A limitation of the present study is that the findings and their interpretations are restricted to school going adolescents only. Further studies are needed to cover the adolescents that are out of school and in college, as the prevalence of health-risk behaviors is likely to be higher among such adolescents.

Mere knowledge does not necessarily translate into improved traffic behaviour as was seen in this study. Continuous reinforcement and education reminding them of traffic rules can bring about a positive change and motivate them to strictly adhere to the traffic norms and help reduce the morbidity and mortality regarding road traffic accidents.

Acknowledgements: We thank all the participants for their co-operation and the Institute of community medicine for the help and support.

References:

1. WHO | Road traffic injuries. [Internet]. [cited 2014 Dec 22]. Available from: <http://www.who.int/roadsafety/about/resolutions/download/en/index.html>
2. Toroyan T, Peden M (eds), Youth and Road Safety, Geneva, World Health Organization, 2007.
3. Statistics - National Crime Record Bureau. [Internet]. [cited 2014 Dec 22]. Available from: <http://ncrb.nic.in/CD-CII2012/Statistics2012.pdf>
4. Swami HM, Puri S, Bhatia V. Road safety awareness and practices among school children of Chandigarh. *Indian J Commun Med* 2006;31:199.
5. Mahawar P et al. An Education Intervention to Improve Awareness on Road Safety: A Study among School Going Teenagers in Indore. *Natl J Community Med* 2013; 4(3): 529-532.
6. List of Penalties [Internet]. [cited 2014 Dec 23]. Available from: <http://transport.bih.nic.in/Penalties.htm>.
7. Raj C, Datta S, V J, Singh Z, V S. Study of knowledge and behavioural patterns with regard to road safety among high school children in a rural community in Tamil Nadu, India. *Indian J Med Spec.* 2011;2(2).
8. Reang T, Tripura A. Road Safety: Knowledge, practice and determinants among undergraduate medical students of Agartala Government Medical College and Govinda Ballabh Pant hospital. *International Journal of Medical Science and Public Health.* 2014;3(8):1.
9. Ifeoma P, Kofoworola A, Duro C. Knowledge of commercial bus drivers about road safety measures in Lagos, Nigeria. *Annals of African Medicine.* 2013;12(1):34.
10. Kulkarni V, Kanchan T, Palanivel C, Papanna M, Kumar N, Unnikrishnan B. Awareness and practice of road safety measures among undergraduate medical students in a South Indian state. *Journal of Forensic and Legal Medicine.* 2013;20(4):226-229.
11. Ibrahim J, Day H, Hirshon J, El-Setouhy M. Road risk-perception and pedestrian injuries among students at Ain Shams University, Cairo, Egypt. *J Inj Violence Res.* 2012;4(2):71-78.
12. Chang H, Yeh T. Motorcyclist accident involvement by age, gender, and risky behaviors in Taipei, Taiwan. *Transportation Research Part F: Traffic Psychology and Behaviour.* 2007;10(2):109-122.