PalArch's Journal of Archaeology of Egypt / Egyptology

KNOWLEDGE AND AWARENESS OF TRAFFIC RULES AND THE IMPACT OF TRAFFIC EXPOSURE ON COLLEGE STUDENTS

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Ashinie .C, Sridevi .G*, Sangeetha. S. KNOWLEDGE AND AWARENESS OF TRAFFIC RULES AND THE IMPACT OF TRAFFIC EXPOSURE ON COLLEGE STUDENTS-- Palarch's Journal Of Archaeology Of Egypt/Egyptology 17(7), 961-981. ISSN 1567-214x

Keywords: Traffic exposure ; traffic rules ; traffic signs ; awareness ; knowledge

ABSTRACT

Traffic is one of the major sources of environmental pollution in megacities.long-term and short-term exposure to traffic are associated with the mortality and morbidity of many diseases. Road traffic accidents are a major cause of death in recent years . proper knowledge and awareness on traffic rules help reduce the traffic and road traffic accidents. The present study plan to investigate the knowledge and awareness on traffic signals and impact of traffic exposure on college going students . The aim of the study is to analyse the knowledge and awareness of road safety rules among dental students. Descriptive cross sectional study was conducted among the dental students of saveetha dental college to analyse their knowledge and awareness about traffic rules and their impact on college going students. The sample size included 103 dental students. A self administered questionnaire was prepared and circulated among the students and responses were collected, analysed and represented as pie charts . About 75.7% of the participants are aware of road safety rules and they practice in a proper manner. About 85.4% of the students have good knowledge on traffic signs . The current study concludes that the dental students are aware of road traffic rules and they have a good

knowledge about it but when coming to following these rules they moderately adhere to the rules.

INTRODUCTION

Traffic is one of the most significant sources of pollution in large cities. Epidemiological studies have provided strong evidence stating that both long-term and short-term exposure to traffic are associated with the mortality and morbidity of many diseases (Huang *et al.*, 2013) Traffic congestion increases vehicle emissions and degrades ambient air quality, In several places, vehicle emissions have been the primary source of air pollutants, including carbon monoxide (CO) , carbon dioxide (CO2) and carbon dioxide (CO2), volatile organic compounds or hydrocarbons , nitrogen oxides , and particulate matter(Zhang and Batterman, 2013). These environmental toxins accumulate in fatty tissue and also lead to obesity (Baheerati and Gayatri Devi, 2018) which in turn lead to change in thyroid level (Fathima and Preetha, 2016). Exposure to traffic noise has also been associated with a number of illnesses, including cardiovascular disease and diabetes as well as a range of other health issues, such as emotional stress which can provoke both acute and chronic asthma.(Dave and Preetha, 2016), irritation , hypertension (Roswall *et al.*, 2015) and sleep disturbance which is a potentially life threatening condition (Shruthi and Preetha, 2018). These various environmental factors associated with modern lifestyle have an influence on having a healthy lifestyle (Rj and R, 2016) . Due to overexposure to air pollution in traffics airflow and lung volume reduction is seen in upper airway obstruction(R and Sethu, 2018). In day to day life we encounter traffic and road traffic accidents which is a major public health problem. The increasing trend in motorization and urbanization associated with the expansion of road networks has led to another threat of adverse factors, road accidents (Mahawar *et al.*, 2013) Traffic , not only in the form of air and noise pollution but road traffic accidents are also major causes of mortality in our country.

Road accidents are a considerable concern in both developed and developing countries because of their impact on social, economic and health issues like stress which put them at risk for the occurrence of musculoskeletal disorders (Abigail *et al.*, 2019)Low back pain is a common musculoskeletal disorder (Swathy and Gowri Sethu, 2015). Myocardial infarction is also caused which causes damage to the heart tissues and the damaged tissues begin to die (Renuka and Sethu, 2015). Road Traffic Accidents (RTAs) are the leading cause of death among individuals aged 15 to 29 (Dulipala *et al.*, 2016). Previous articles have analysed the effects of exposure to traffic for a longer time but they are scarce in analysing whether they have proper knowledge on road safety rules and measures to be followed during heavy traffics (Zanobetti *et al.*, 2010) and the effect of traffic exposure on health , problems associated mentally and physically and respiratory and cardiovascular problems. Previous studies have analysed the awareness of road safety rules among school going children but they are scarce in determining the awareness of college students as they are more prone to road accidents as this age may be their first exposure to driving in heavy traffics (Singh, 2018) .

As road traffic accidents and traumas resulting from traffic exposure increase in everyday life, traffic exposure must be limited by any form for social health concerns demanding the implementation of safe and secure Community standards (Harsha *et al.*, 2015; Rj and R, 2016). Proper compliance with the rules on road safety will reduce road traffic and accidents. Effective implementation to reduce morbidity is urgently required (Choudhari and Jothipriya, 2016). In general in the younger age group it is the college students who drive more number of vehicles as they are the most agile group (Iyer, Gayatri Devi and Jothi Priya, 2019), Studies on the understanding, knowledge, awareness and practice of traffic rules among college students are highly required. This study aims to analyse the knowledge and awareness of traffic rules among dental students.

MATERIALS AND METHODS

A descriptive cross sectional study was conducted among the college students of saveetha dental college to analyse their knowledge and awareness about traffic rules. Approval was obtained from the institutional review board. A self administered questionnaire was prepared in google forms and circulated among 103 dental students of saveetha dental college. The questionnaire consists of 25 questions divided into four parts as questions on personal attributes (9), questions on knowledge on traffic signs (5), questions on non compliance to traffic rules (5) and questions on road safety awareness (6) . The responses from the online google forms were collected , analysed and represented as pie charts . The data was analyzed using SPSS version 22 and statistical test used was Chi square test .The confidence interval was 95% and statistical significance was $p<0.05$. The association between awareness level and abiding the rules of the traffic was correlated with the gender.

RESULTS AND DISCUSSION

The results of the study were represented as pie charts . The study included 103 college students of which 39.8% are males and 60.2% are females . when they were asked whether they have systemic heart or pulmonary disease 30.1% are affected by either or both and 69.9% are not affected (figure 1). 26.2% of the participants are alcoholics or smokers and 73.8% do not have these habits (figure 2) with chi square p value 0.052. 62.1% of the respondents have driving licenses while others do not have any (figure 3, figure 23) with chi square p value 0.022. From them 69.9% own any vehicle and 30.1% of them do not own any (figure 4). The majority of them about 56.3% own a two wheeler while 32% own a car (figure 5). when they were asked about their frequency of driving 32% of them drive everyday , 40.8% of them drive once in a week , 17.5% of them drive very rarely and 9.7% of them do not drive (figure 6). Among the participants 63.1% of them use spectacles while driving and 36.9% of them do not use any (figure 7).

Among the participants 75.7% of them are aware of the road traffic rules while 24.3% are not aware of it (figure 8). 71.8% of them are aware of road signs and 28.2% are not aware of it (figure 9). when they were asked to identify no entry road sign 85.5% of them replied correctly as no entry and 11.7% of them said as one way (figure 10). when they were asked to identify U turn

prohibited signs 86.4% responded correctly while 8.7% of them said as one way (figure 11, figure 24) with chi square p value 0.009. when they were asked what should be the speed limit in a heavy traffic 41.7% of them said as 50-60KMPH and 36.9% said as
60-70 KMPH (figure 12) .

Among the 103 dental students 50.5% of them wear a helmet or seatbelt regularly while driving and 16% of them follow it only sometimes (figure 13). 63.1% of the participants do not use mobile while driving while 36.9% use mobiles while driving (figure 14, figure 25) with chi square p value 0.00. 71.8% of the participants do not drink and drive while 28.3% of them drink and drive (figure 15). 61.2% of the participants followed the speed limit while driving (figure 16). 34% of the participants responded that they overtake vehicles from the wrong side while others do not do it (figure 17, figure 26) with chi square p value 0.045. When they were asked about their frequency of following traffic rules 37.9% of them said that they always follow traffic rules , 50.5% of them said that they follow it sometimes and 11.7% of them said that they never follow traffic rules (figure 18).

When they were asked about what could be the reason for road related accidents 35% replied as due to drivers lack of awareness on road safety rules 19.4% of them said as drivers noncompliance to road safety rules, 14.6% of them said high traffic and 31.1% said that all these reasons play a major role (figure 19). 65% of the participants motivate others also to follow traffic rules (figure 20). 63.1% of them think that awareness on road traffic rules will improve driving capacity and 36.9% of them do not think so (figure 21). When they were asked why awareness on traffic rules should be done 43.7% said as to motivate people to follow traffic rules , 15.5% said as to teach people the proper traffic rules , 14.6% said as to prevent accidents , 26.2% said that all these can be achieved by awareness on road traffic awareness (figure 22).

In the present study majority of the respondents belong to the age group of 18 to 22 years . In India the legal age for driving two wheelers and cars is 18 completed years . Considering that most of the study population are early birds who have just entered the legal age for driving their driving knowledge and behavior is directly going to affect society . from the study it is seen that the majority of them only drive once a week so their exposure to traffic is less.Depending on the level of exposure, the effects range from clinically unnoticeable to severe (Harsha *et al.*, 2015)

In the present study about 62.1% of them have a driving licence , similar findings are seen in the study by Ishrat riaz (Riaz and Shahid, no date) where 93% had a driving licence . only with proper driving capacity a driving licence is issued so most of them have good driving practice. In the present study majority of them about 85.4% identified the signs correctly similar findings are seen in study by Manjula . R (R., Vijaylaxmi and Dorle, 2017) , where the majority of them identified the signs correctly . awareness on speed limit in the present study is only average where only 41.7% of them are aware but in study by neelima chakrabarty (Chakrabarty, Gupta and Bhatnagar, 2019)

about 82% are aware of the speed limits as the study is on drivers they are professionals and they know about it precisely . In the present study about 50.5% are aware of wearing helmets while driving in study by Swathi Padankatti(Padankatti *et al.*, 2014) , similar findings are seen where majority of them are aware of wearing helmets . as many awareness on usage helmets are done people are aware of it .

In the present study about 63.1% of them do not use mobile phones while driving similar findings are seen in study by Ranjan (Ranjan, Fahim and Kirte, 2018) . as they are educated they are aware of the effects of using mobile phones while driving which can be the major cause of accidents . In the current study 71.8% of them do not drink and drive similar findings are seen in the study by Sharon Anoush (Chekijian and Truzyan, 2012) where 62% of them do not drink and drive . as the rules are followed strictly drinking and driving may result in severe punishments which they are aware of . In present study about 66% of them do not overtake vehicles from the wrong side similar results are seen in study by Ishrat riaz (Riaz and Shahid, no date) . In the present study about 65% of them motivate others also to follow traffic rules , similarly in study by HA .Yahia (Yahia *et al.*, 2017) where the majority of the people involved in motivating others follow traffic rules. In the current study only 14.4% of them said that high speed is the cause of accidents but in the study by Baniya sujeeta (Yahia *et al.*, 2017; Baniya and Timilsina, 2018) majority of them said high speed is the major reason for accidents . This opposing finding may be due to varied geography and population .

Traffic congestion also results in increased emotional health risks; mostly stress and aggressive behavior, while long driving hours due to traffic can also lead to higher physical health effects; mostly back pain and leg pain. Traffic exposure also has its adverse effects on academic performances of children. Children who are exposed to high traffic have lower test scores and a higher likelihood of behavioral incidents and missing school than other children (Heissel, Persico and Simon, 2019)**.** It is Important that the education in and the application of ergonomic principles should begin early on so these awareness should be given as early as possible to the students .(David *et al.*, 2019)

LIMITATIONS OF THE STUDY

The principal limitation of the study is the sample size is lower. Only 103 students' knowledge and awareness on traffic rules has been analysed and it's restricted to only college students of particular institutions

FUTURE SCOPE

Future extensive study can be done on a varied population as some variances may be due to their geographic location also (Samuel and Devi, 2015), so the results can be more specifically analysed. Further research could be done on this topic to further establish the relation between awareness on traffic rules and prevalence of accidents (Timothy, Gayatri Devi and Jothi Priya, 2019) . It can also be done on a large sample size for precise results .

Questions on personal attributes

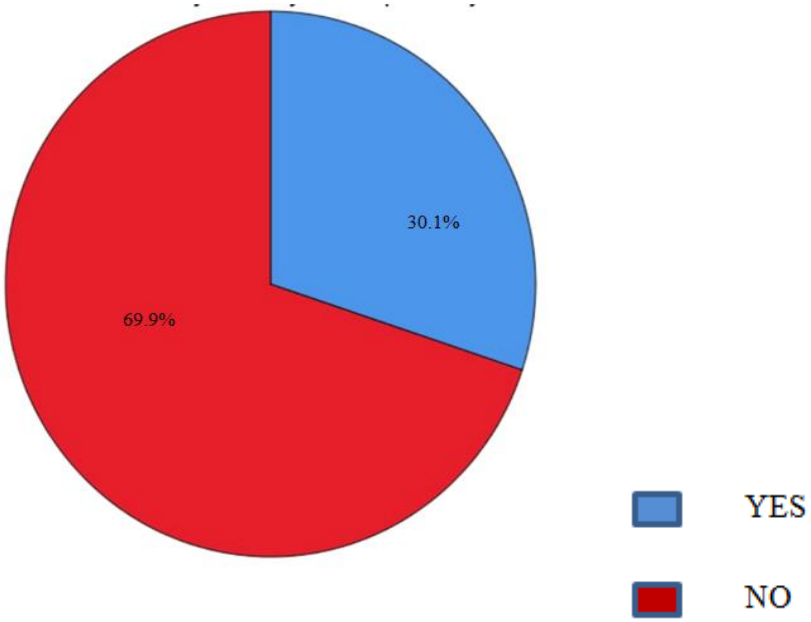


Figure 1 representing the prevalence of systemic or pulmonary heart disease among college students . 69.9% of the students do not have any systemic or pulmonary heart disease (red) and 30.1% do have systemic or pulmonary diseases (blue).

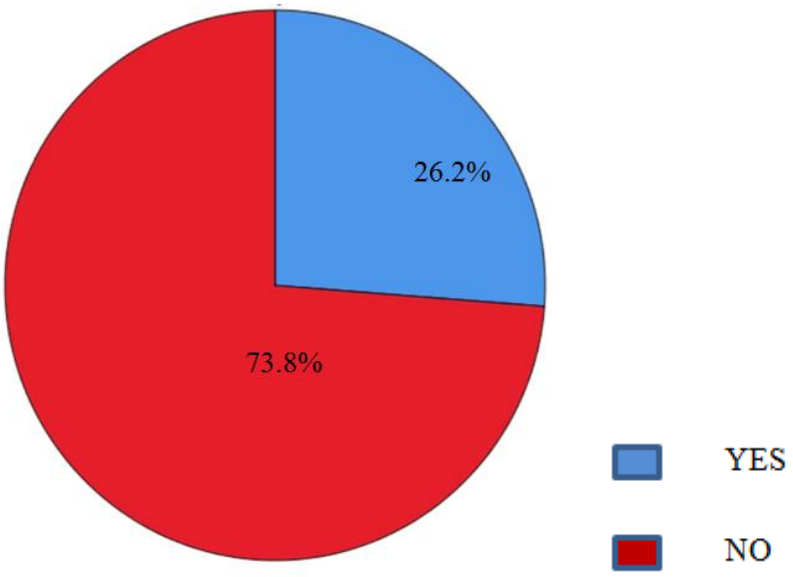


Figure 2represents the percentage of alcoholics or smokers among the college students .The result is significant at p value 0.052 correlating with the gender of the students . 73.8% are not alcoholics or smokers (red) while 26.2% are alcoholics or smokers (blue).

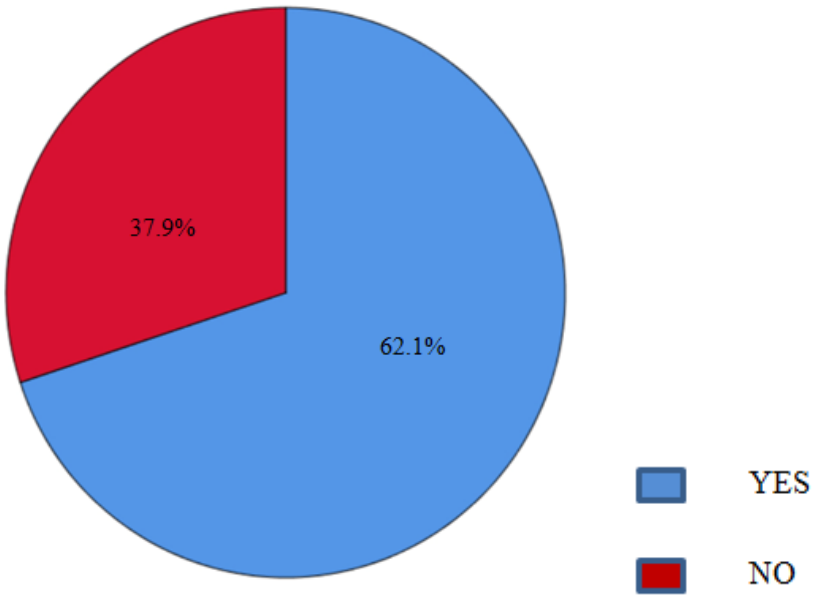


Figure 3 represents the percentage of college students having a driving license 62.1% of the students have a driving license (blue) while 37.9% do not have any (red)

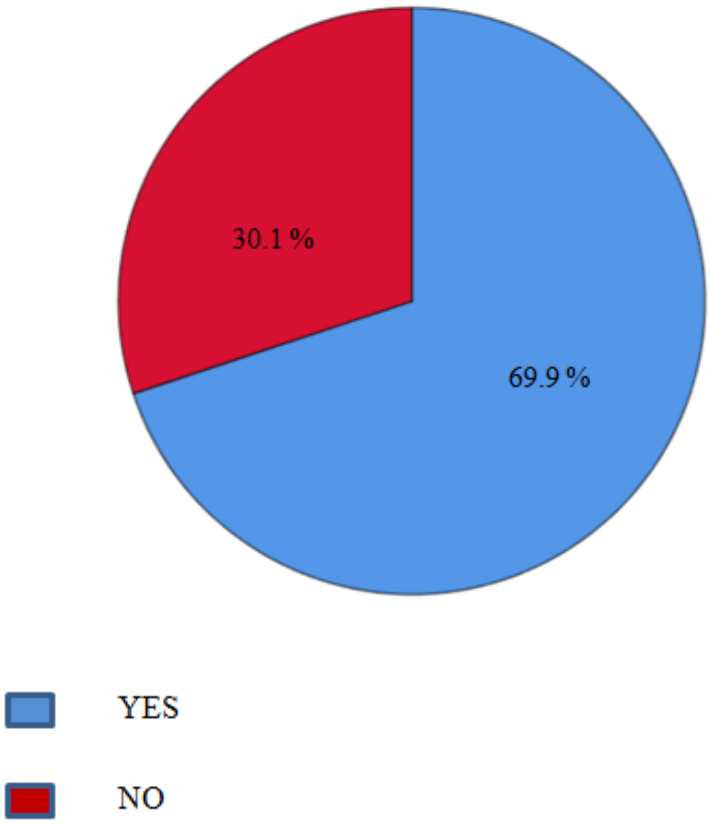


Figure 4 represents the percentage of college students driving or owning a vehicle . 69.9% of the students drive or own a vehicle (blue) and 30.1% do not drive or own a vehicle (red).

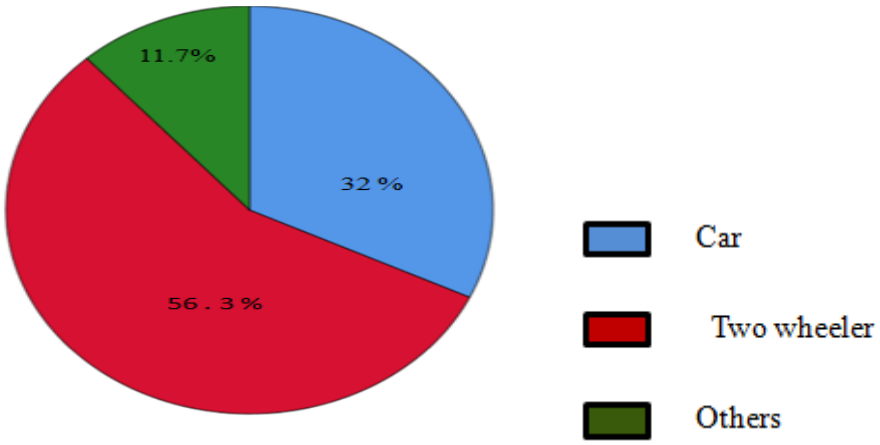


Figure 5 represents the type of vehicle the college students own 56.3% of the college students own a two wheeler (red) , 32% own a car (blue) and 11.7% own any other vehicle (green).

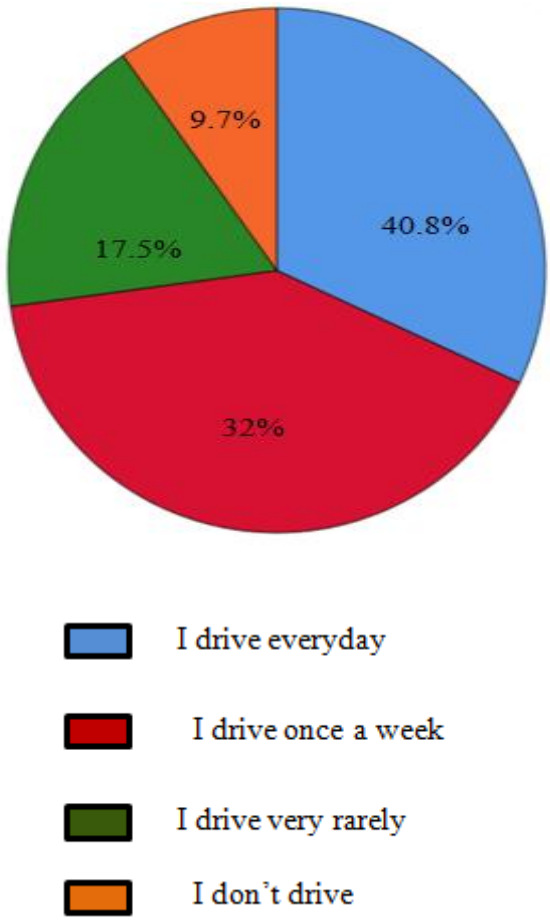


Figure 6 represents the frequency of driving vehicles among college students 40.8% of them drive almost everyday (blue), 32% drive once in a week (red), 17.5% drive very rarely (green) and 9.7% don't drive (orange).

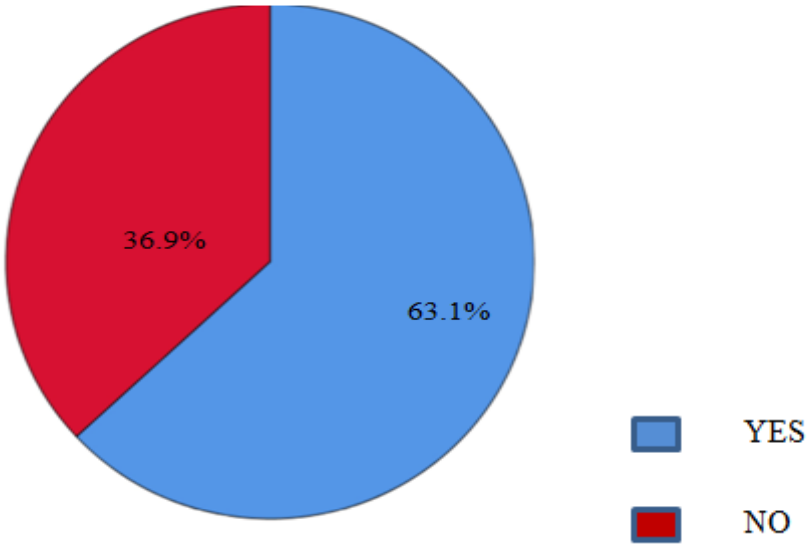


Figure 7 represents the percentage of college students who wear spectacles while driving . 63.1% of the students wear spectacle while driving (blue) and 36.9% do not wear any (red)

Questions on knowledge on traffic signs :

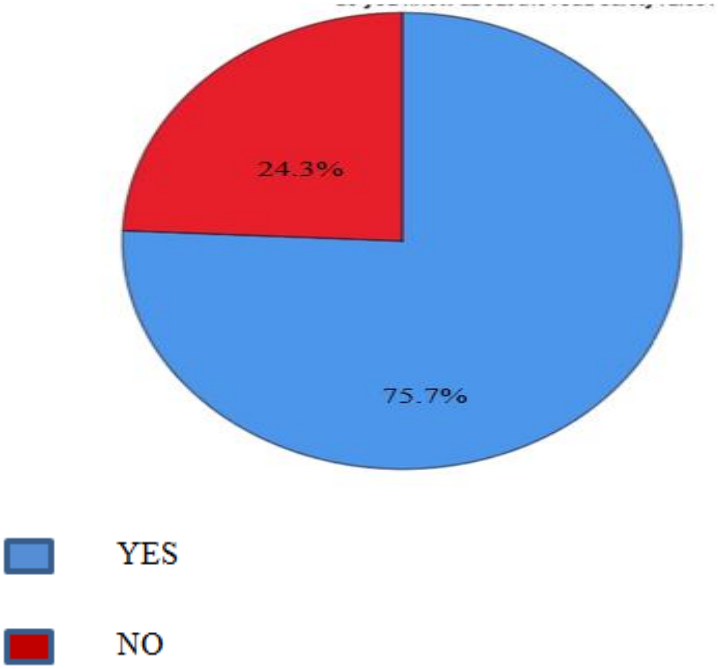


Figure 8 represents the percentage of college students aware of road safety rules . 75.7% of the college students are aware of road safety rules (blue) and 24.3% are not aware (red).

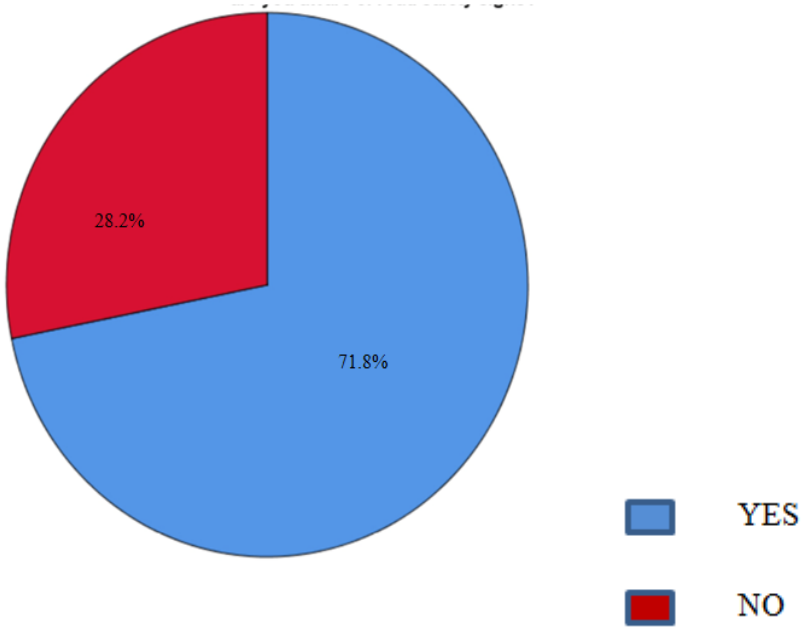


Figure 9 represents the percentage of awareness on road safety signs among college students. 71.8% of the college students are aware of road safety signs (blue) and 28.2% are not aware (red).

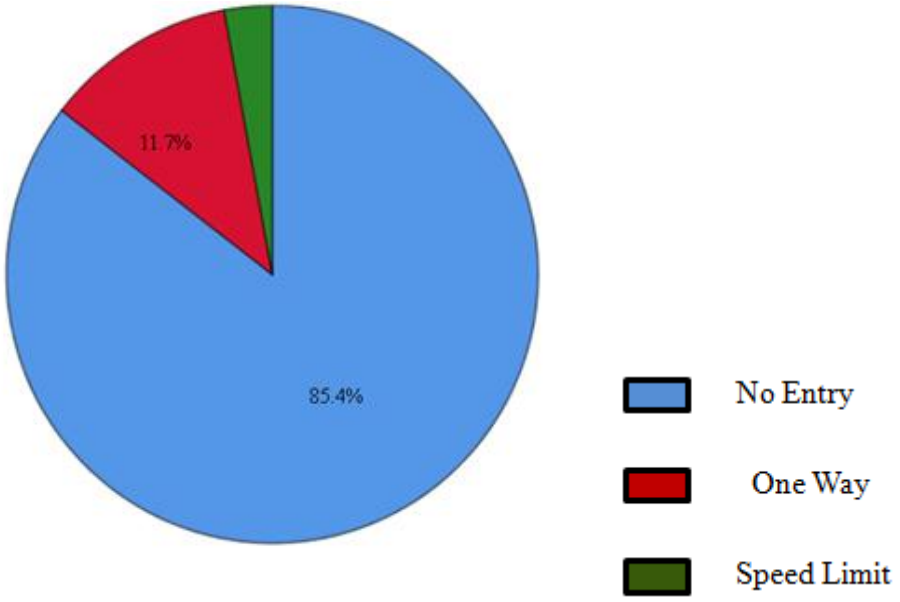


Figure 10 represents the percentage of college students who identified the no entry sign . 85.4% of the college students identified the road sign as no entry (blue), 11.7% said as one way (red) and 2.9% said as speed limit (green)

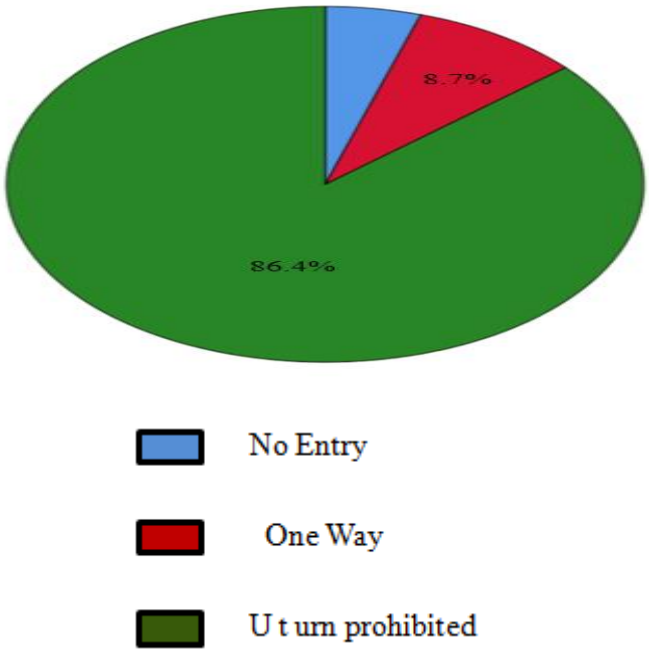


Figure 11 represents the percentage of college students who identified the U turn prohibited sign. 86.4% of the college students identified the road sign as U turn prohibited (green), 8.7% said as one way (red) and 4.9% said as no entry (blue).

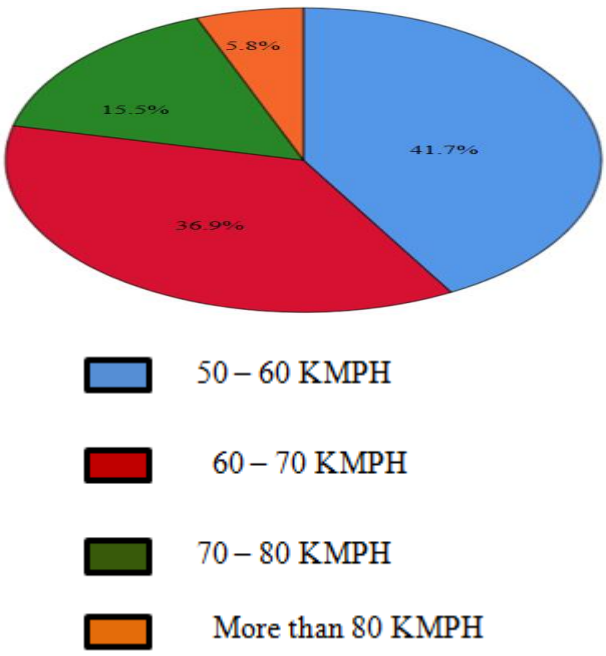


Figure 12 represents the knowledge of college students on the speed limit to be followed during traffic . 41.7% of the students said the speed limit was 50 - 60 KMPH(blue) , 36.9% said as 60-70 KMPH (red) , 15.5% said as 70-80 KMPH (green) and 5.8% said as more than 80 KMPH (orange).

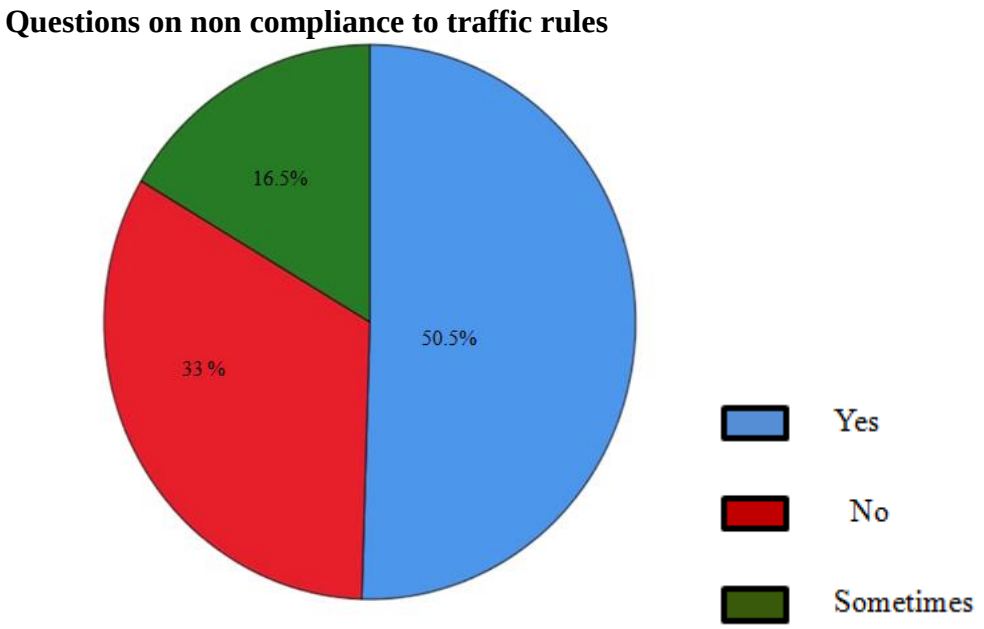


Figure 13 represents the percentage of college students wearing helmets or seatbelts while driving. 50.5% of the students wear seatbelts or helmets always (blue), 33% do not wear (red) and 16.5% wear sometimes (green).

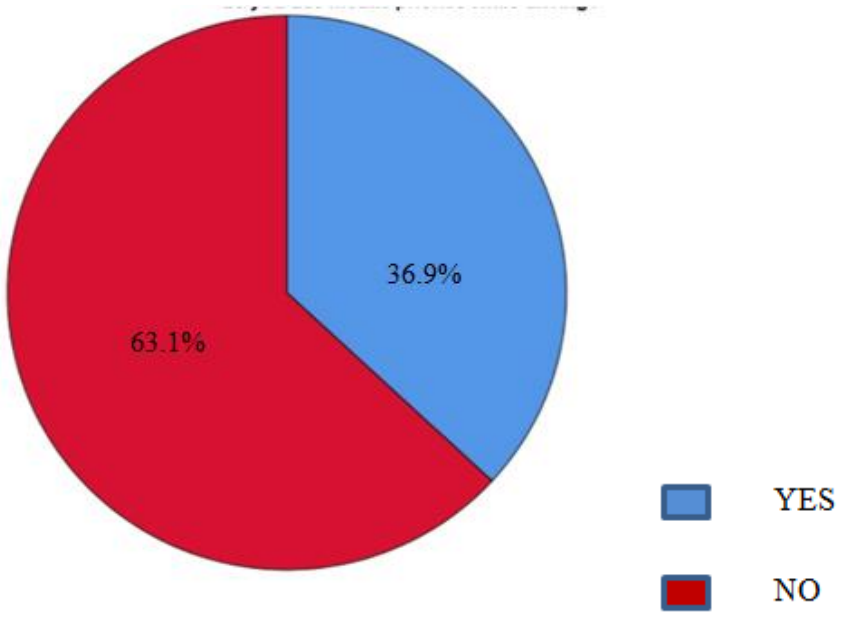
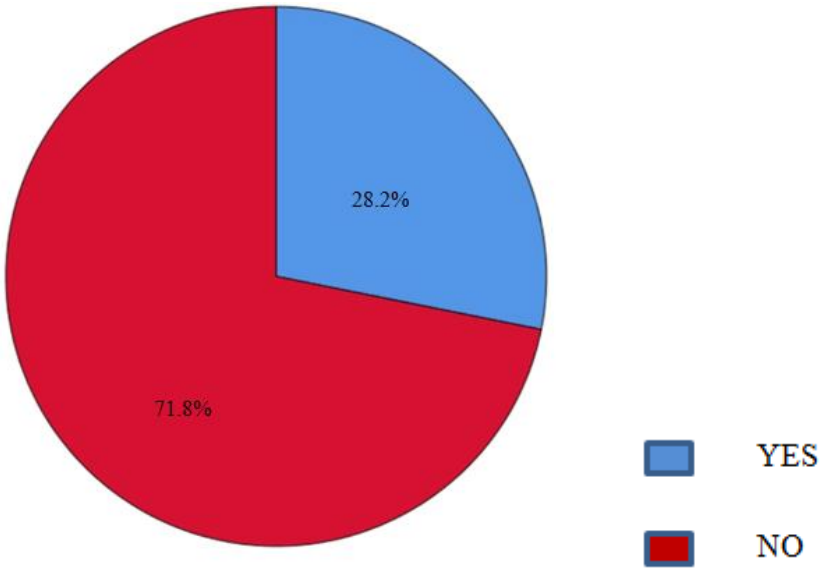


Figure 14 represents the percentage of college students using mobile phones while driving. 63.1% of the students do not use mobile phones while driving (red) and 36.9% use mobile phones while driving (blue)



.Figure 15 represents the percentage of students who are involved in drinking and driving . 71.8% of the college students do not drink and drive (red) and 28.2% drink and drive (blue)

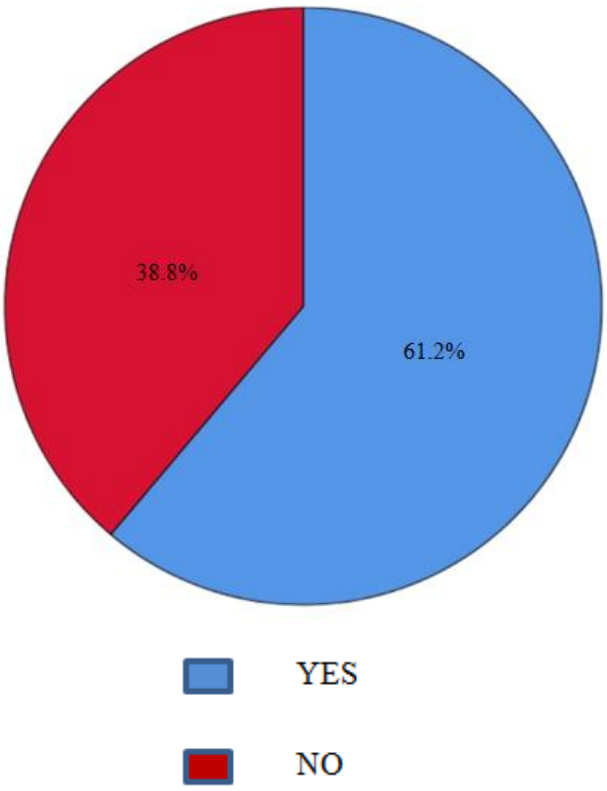


Figure 16 represents the percentage of students who follow speed limits according to road safety rules . 61.2% of the college students follow the speed limit according to road safety rules (blue) and 38.8% do not follow (red) .

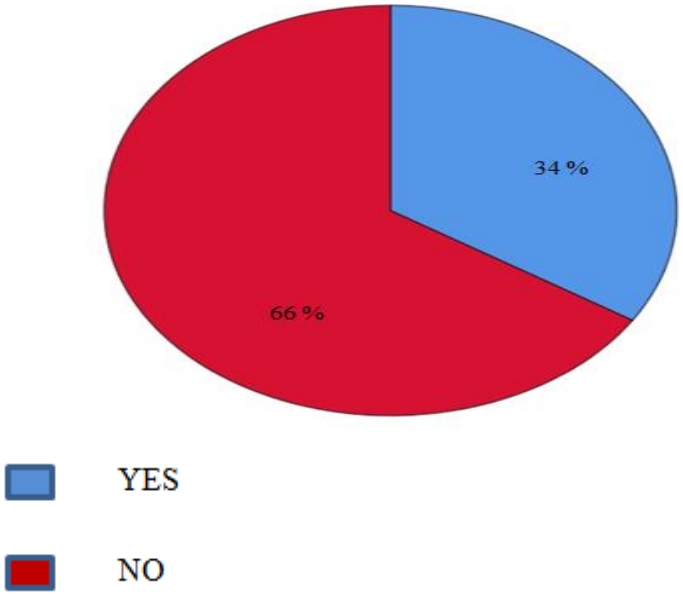


Figure 17 represents the percentage of students overtaking vehicles on the wrong side. 66% of the college students do not overtake vehicles on the wrong side (red) while 34% overtake vehicle in wrong side (blue).

Questions on road safety awareness :

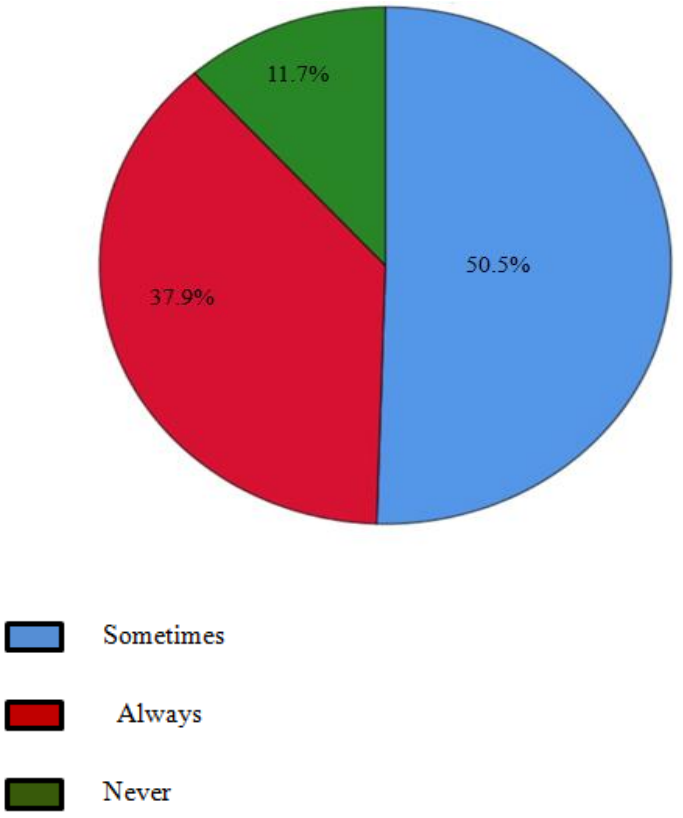


Figure 18 represents the percentage of students following proper traffic rules . 50.5% of the college students follow traffic rules only sometimes (blue) , 37.9% follow always (red) and 11.7% never followed (green).

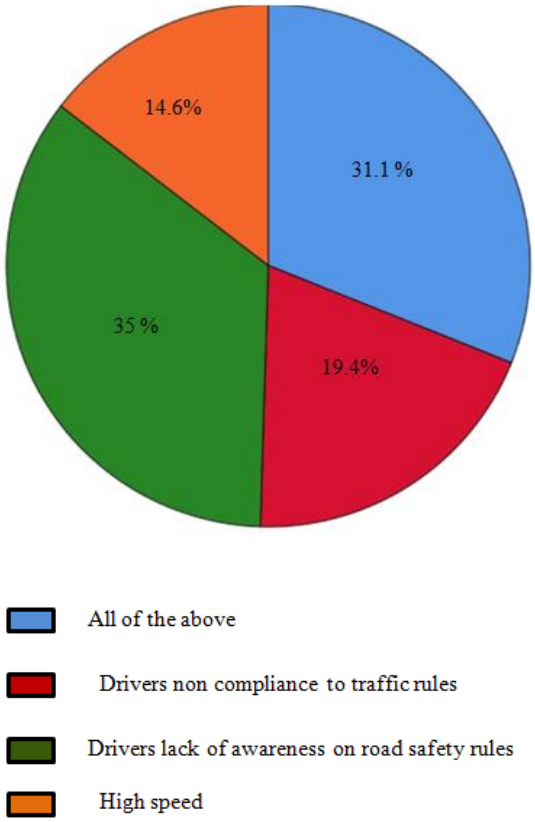


Figure 19 represents the awareness of college students on the reason for road accidents . 35% of the students replied as drivers lack awareness (green), 14.6% replied as high speed (orange) , 19.4% replied as drivers non compliance to traffic rules (red) and 31.1% replied as all the reasons (blue)

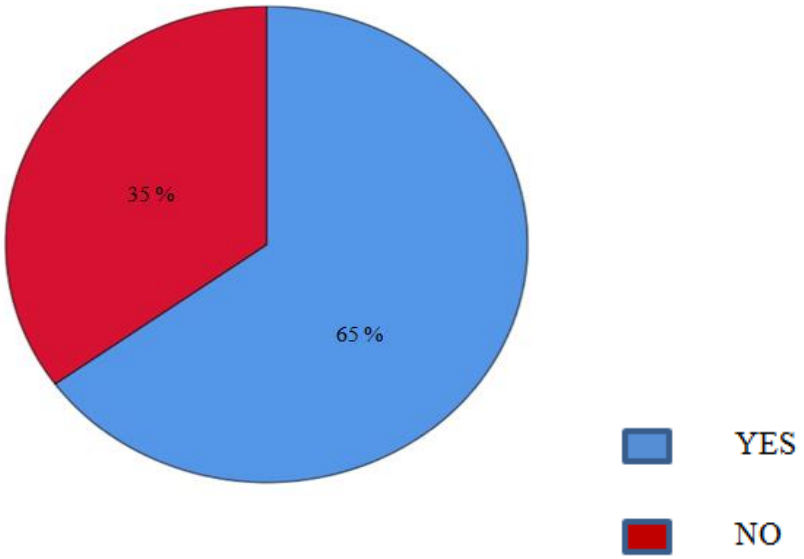


Figure 20 represents the percentage of college students who make others aware of road safety rules . 65% of the college students make others aware of road safety rules (yes) and 35% do not do so (red)

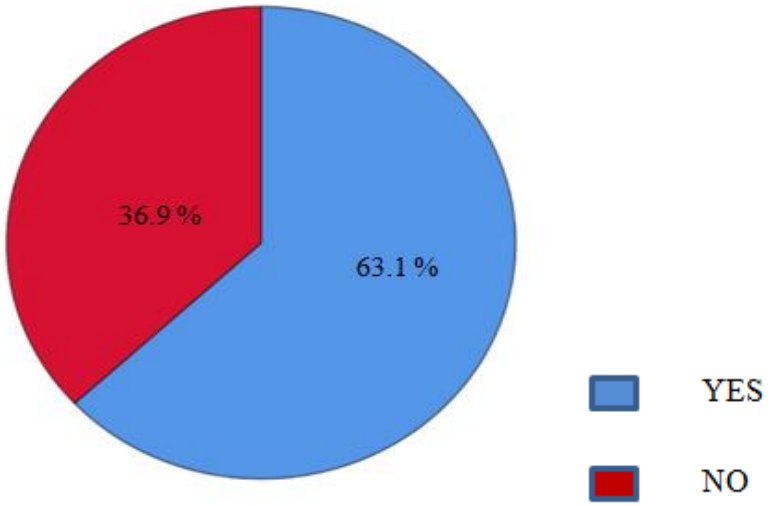


Figure 21 represents the percentage of college students who think awareness of traffic rules improve driving capacity . 63.1% of the college students responded that awareness of traffic rules improve driving capacity (blue) and 36.9% do not think so (red).

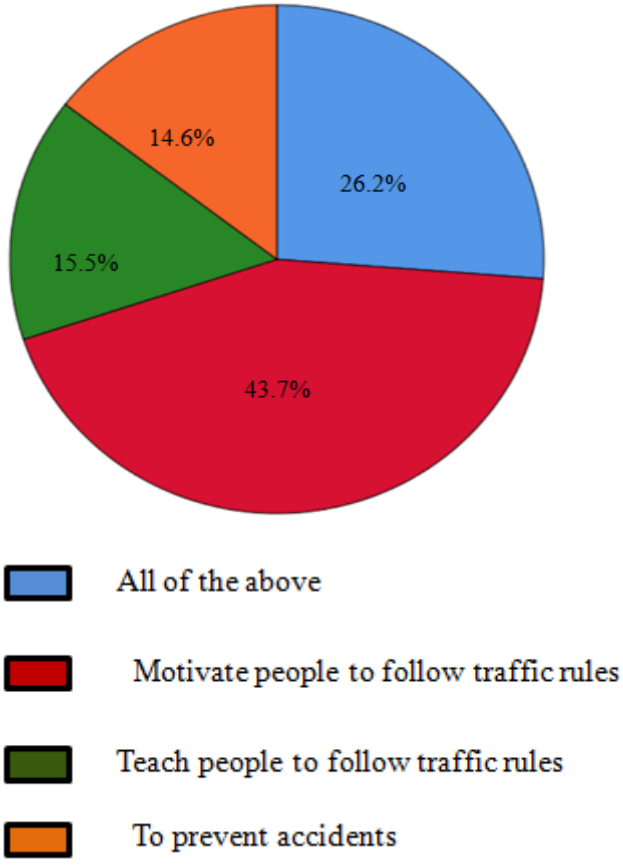


Figure 22 represents the knowledge of college students on the reason for awareness on road safety rules .43.7% of the students responded that awareness on road safety rules is done to motivate people to follow proper traffic rules (red), 15.5% said as to teach people proper safety rules (green), 14.6% said as to prevent accidents (orange) and 26.2% said as fo all these reasons awareness on road safety rules is required (blue).

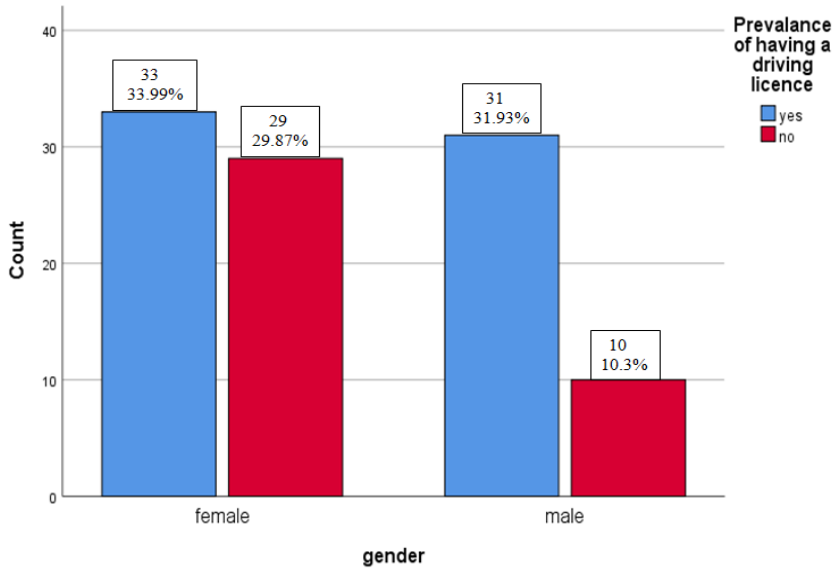


Figure 23 Representing the association between gender and prevalence of having driving licenses among college students. Blue represents that they have a driving license and red represents that they do not have a driving license. X axis represents the gender of the students and Y axis represents the number of students having driving licenses . The association between gender and prevalence of having driving licenses among college students was done using chi square test which was found to be statistically significant. Pearson chi square value = 0.022 hence statistically significant, proving more than males , females have driving licenses abiding the traffic rules.

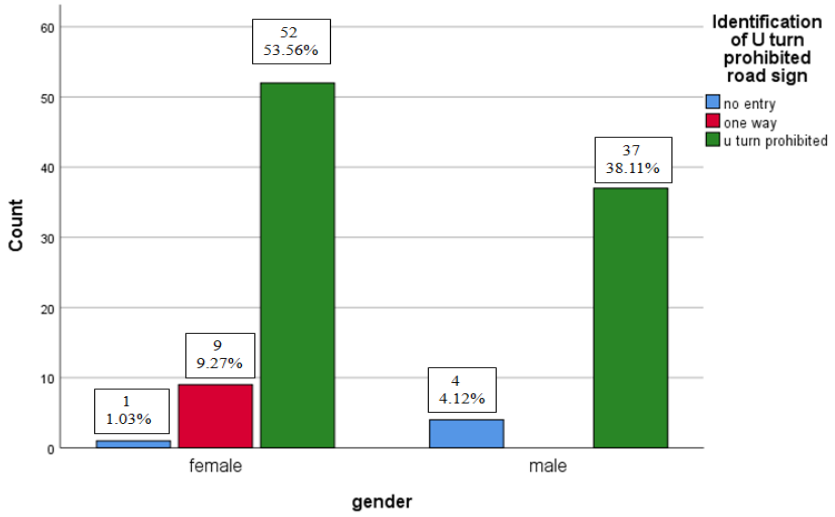


Figure 24 Representing the association between gender and identification of U turn prohibited sign by students . Blue represents no entry sign , red represents one way sign and green represents U turn prohibited sign. In the figure X axis represents the gender of the students and Y axis represents the number of students identified the sign . The association between gender and identification of U turn prohibited signs by students was done using chi square test which was statistically significant . Pearson chi square value = 0.009 hence statistically significant ,proving females were more aware about road signs than male

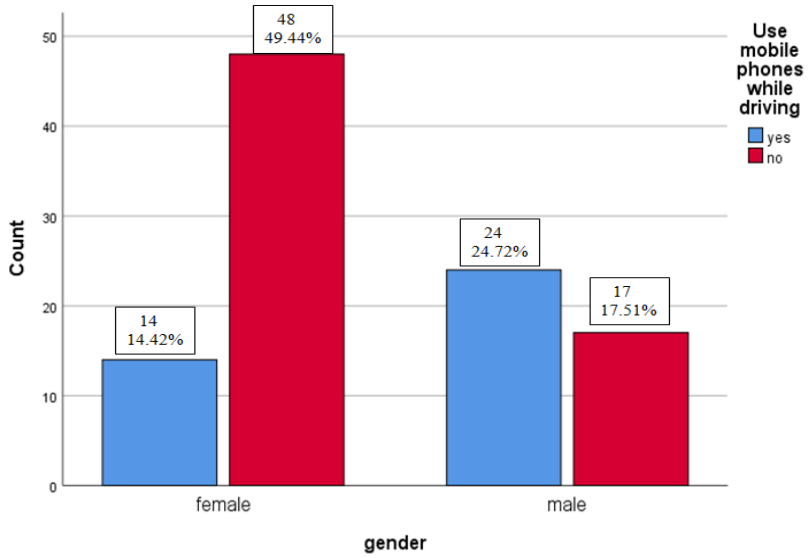


Figure 25 Representing the association between gender and usage of mobile phones while driving among college students .Blue represents they use mobile phones while driving and red represents that they do not use mobile phones while driving. X axis represents the gender of the students and Y axis represents the number of students responded. The association between gender and usage of mobile phones while driving among college students was done using chi square test which was statistically significant. Pearson chi square value = 0.00 hence statistically significant, proving females follow traffic rules properly more than males

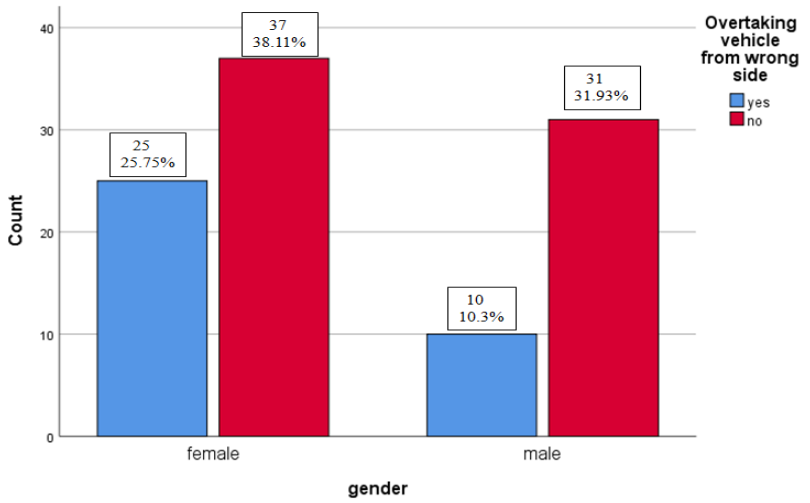


Figure 26 Representing the association between gender and the prevalence of overtaking vehicles from the wrong side among students. Blue denotes that they overtake vehicles and red denotes that they do not overtake vehicles from the wrong side. X axis represents the gender of the students and Y axis represents the number of students responded to overtaking vehicles on the wrong side. The association between gender and the prevalence of overtaking vehicles from the wrong side among students was done using chi square test which was statistically significant. Pearson chi square value = 0.045 hence statistically significant proving, females follow traffic rules in proper manner than males

CONCLUSION

Exposure to traffic related air pollution and noise pollution has adverse, respiratory and cardiovascular effects. Road traffic leads to increased impacts on mental wellbeing; mostly stress and aggression. There is also a need for understanding of the rules on road safety and the effect of traffic to reduce traffic congestion exposure. The current study concludes that the college going students are aware of road traffic rules and they have a good knowledge about it but when coming to following these rules they moderately adhere to the rules.

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