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Article

Road Safety Awareness and Attitudes Among Undergraduate Students in a City of Western India

Article History:

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Abstract: **Introduction**: Road traffic injuries (RTIs) are currently the eighth leading cause of death globally, with nearly 1.3 million people losing their lives each year due to road traffic collisions. **Aim**: To assess the level of road safety awareness, attitudes, and driving practices among university students in an urban Indian University. **Methodology**: This cross-sectional study was conducted at department of PSM (Community Medicine), Govt Medical College, Sawai Madhopur, attracting students from all states of India. The study population comprised undergraduate and postgraduate students from various faculties. **Result**: The study among 160 participants revealed high awareness of traffic signs and driving rule penalties, but very low knowledge of specific monetary fines. Unsafe driving behaviours such as speeding, sudden speed changes, carrying excess passengers, and mobile phone use were notably prevalent. These findings emphasize the need for targeted road safety interventions to address risky practices and improve fine-specific penalty awareness. **Conclusion**: The study highlights good overall road safety awareness but reveals critical gaps in understanding priority rules, fines, and risky driving behaviours. Targeted education and stricter enforcement are essential to improve compliance and reduce accidents.

Keywords Road traffic injuries, undergraduate students, attitude, awareness.

INTRODUCTION

Road traffic injuries (RTIs) have emerged as a significant global health challenge, currently ranking as the eighth leading cause of death worldwide. Each year, nearly 1.3 million people lose their lives in road traffic collisions, underscoring the magnitude of the problem.[1] Beyond these fatalities, millions more suffer non-fatal injuries, many of which lead to long-term disabilities that profoundly affect quality of life. Such injuries not only result in personal suffering but also exert a substantial burden on healthcare systems, social services, and national economies.[2] The economic consequences are staggering; the global burden of road traffic accidents (RTAs) is estimated to exceed 500 billion US dollars annually. Particularly in developing countries, the financial impact is disproportionately high—amounting to approximately twice the total aid they receive for national development projects—thereby straining already limited resources and impeding socio-economic progress.[3] India exemplifies the severity of this issue, bearing a disproportionately large share of the global RTA burden. It holds the grim distinction of being the only country where more than 14 fatalities and 53 injuries occur every single hour due to road crashes. The consequences extend beyond immediate loss of life and injury, as RTIs in India have been shown to significantly contribute to disability-adjusted life years (DALYs) lost[4], a measure that reflects both premature mortality and years lived with disability. In 2013, India ranked ninth globally for DALYs lost to RTIs, representing a 54% increase compared to earlier years, thus indicating a worsening trend. This rising incidence places enormous strain on the healthcare infrastructure and directly threatens the country's potential socio-economic gains from its so-called "demographic dividend," as young and economically active individuals are disproportionately affected. Among India's many urban centers, Pune emerges as a particularly critical focus for road safety research. The city's demographic profile includes a large student population, many of whom rely on two-wheelers for their daily commute[5]. This reliance significantly increases exposure to road traffic hazards, as two-wheeler riders are among the most vulnerable road users, often lacking the physical protection that larger vehicles

provide.[3] Alarmingly, Pune has been reported to record the highest number of two-wheeler accidents in the country, a statistic that places its youth at considerable and persistent risk. Localized studies are essential in such high-risk settings, as national-level data may fail to capture context-specific patterns and contributing factors. The urgency of targeted research in Pune is further highlighted by unpublished data from insurance claims involving RTA victims at the researcher's own university, which indicate a notable number of accidents among the institution's community members[6]. Such evidence strongly suggests a pressing local need for preventive measures, improved traffic management, and greater public awareness. Despite the scale of the problem, there is a scarcity of comprehensive, evidence-based research on RTAs in Pune and similar urban environments, resulting in a gap that hinders effective policy formulation and resource allocation.[5,6] Filling this gap is essential for designing interventions that are both contextually relevant and impactful. Understanding the causes of road crashes requires a multi-faceted approach that considers the interaction between human factors,[7] environmental conditions, and vehicular elements. Among these, human behaviour plays a pivotal role, as risky practices such as speeding, drunk driving, helmet and seatbelt non-compliance, and mobile phone use while driving contribute to the majority of incidents. Enforcement of traffic regulations, while important, is often inadequate, and public awareness campaigns have yet to achieve consistent behavioural change. Furthermore, environmental factors such as road design, visibility, lighting, and traffic congestion can exacerbate the likelihood of crashes, particularly for inexperienced riders navigating complex traffic patterns. Vehicle-related issues, including poor maintenance or inadequate safety features, also play a contributory role, particularly in low- and middle-income settings where regulatory oversight may be insufficient.Given this multifactorial nature of RTAs, effective prevention strategies must integrate education, enforcement, engineering improvements, and emergency response enhancement. In a city like Pune, where young two-wheeler riders form a substantial proportion of road users, strategies could include stricter enforcement of helmet laws, targeted awareness campaigns at educational institutions, improved road infrastructure around campuses, and partnerships between universities, municipal authorities, and traffic police. These efforts must be guided by data-driven insights, making localized epidemiological research indispensable.

AIM

To assess the level of road safety awareness, attitudes, and driving practices among undergraduate students in an urban Indian University

METHODOLOGY

This cross-sectional study was conducted at department of PSM (Community Medicine), Govt Medical College, Sawai Madhopur, attracting students from all states of India. The study population comprised undergraduate and postgraduate students from various faculties. Data collection was carried out during the annual health check-up organized by the university health services. A pretested, structured, self-administered questionnaire was used to record responses. The questionnaire included sections on socio-demographic details, road safety awareness, driving practices, and perception towards safe driving behaviours. Participation was voluntary, and informed consent was obtained from all participants prior to data collection. Inclusion criteria were students who had valid driving licenses or operated any motorized two- or four-wheeler vehicle. Exclusion criteria included students unwilling to participate or those unable to complete the questionnaire. Data was coded and entered into Microsoft Excel, followed by statistical analysis using SPSS software. Descriptive statistics were applied to summarize findings, and associations were tested using appropriate statistical tests.

RESULT

Table 1: Student's characteristics

Gender	Number	Percentage
Boys	84	52.5%
Girls	76	47.5%

The study comprised 160 participants, including 84 boys (52.5%) and 76 girls (47.5%).

Table 2: Educational status

Education	Number	Percentage
Undergraduate	120	75%
Postgraduate	40	25%

In this study, 75% of participants were undergraduates, while 25% were postgraduates.

Table 3: Distribution of Participants by Type of Vehicle Driven and Possession of Driving License

Type of vehicle driven	Number	Percentage
Two-wheeler only	34	21%
Four-wheeler only	28	18%
Both	61	38%

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None	37	23%
Possession of driving license		
Yes	115	72%
No	45	28%

In the study, most participants reported driving both two- and four-wheelers (38%), followed by two-wheeler only (21%), none (23%), and four-wheeler only (18%), with 72% possessing a valid driving license.

Table 4: Awareness about traffic signs

Awareness about traffic signs		
Type of traffic sign	**Number**	**Aware (%)**
Red signal	158	**98.5**
Green signal	159	99.2
No entry	153	95.4
No overtaking	143	89.3
No U turn	158	98.9
No horn	159	99.6
Speed breaker ahead	149	93.1
Stop	140	87.2
Give way	43	26.8
Speed limit 50km/hr.	152	94.8

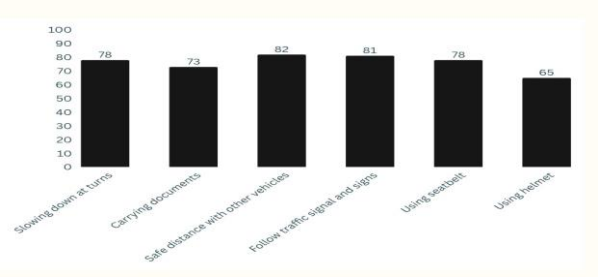
Most participants demonstrated a high level of awareness regarding common traffic signs, with over 85% recognizing most signs except "Give Way," which was identified by only 26.8% of respondents.

Table 5 : Awareness about driving rules

Driving Rule	Number of People	Penalty Awareness (%)	Number of People	Monetary Penalty Awareness (%)
Driving under influence of alcohol	154	96.5%	1	0.6%
Speaking on mobile phone while driving	151	94.3%	4	2.4%
Driving beyond permissible speed limit	150	93.9%	3	2.1%
Not wearing a helmet	152	94.7%	12	7.5%
Not wearing seat belt	152	95.1%	5	3.1%
Driving without carrying driving license	156	97.5%	2	1.1%

The majority of participants were aware that certain driving behaviours are prohibited, with the highest awareness for driving without a license (97.5%) and under the influence of alcohol (96.5%). Awareness was similarly high for not wearing a seatbelt (95.1%), not wearing a helmet (94.7%), speaking on a mobile phone while driving (94.3%), and overspeeding (93.9%). However, knowledge about the corresponding monetary penalties was very low, ranging from 0.6% for driving under the influence to 7.5% for not wearing a helmet. This highlights a significant gap between rule awareness and penalty awareness.

Figure 1:Driving practices:



The majority of participants reported practicing safe driving habits such as following traffic signals (82%), maintaining a safe distance (81%), slowing down at turns (78%), using seatbelts (78%), carrying documents (73%), and wearing helmets (65%).

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Table 6: Percent of students following safe driving practices/Students following safe driving practices

Unsafe Driving Practice	n=160	%
Exceeding speed limit	40	24.7
Sudden change in speed	33	20.8
Carrying excess persons	31	19.6
Overtaking from left side	29	17.9
Not using side indicators	23	14.1
Use of mobile phones	20	12.6
Drive after drinking	15	9.3%

The most common unsafe driving practice was exceeding the speed limit (24.7%), followed by sudden changes in speed (20.8%), carrying excess passengers (19.6%), overtaking from the left side (17.9%), not using side indicators (14.1%), and using mobile phones while driving (12.6%).

DISCUSSION

High usage of vehicle can be attributed to the rising student population and their affordability to use private vehicles considering their higher socio-economic status. In the present study, a total of 160 participants were included. Among them, 84 (52.5%) were boys and 76 (47.5%) were girls. This indicates a slightly higher representation of boys compared to girls. Our finding of having knowledgescore more in boys is similar to the observation in the study conducted by Raj et. Al.[8] Being a male was associated with more knowledge of traffic signs and penalties in case of default. Being exposed to driving at earlier ages than females, males are more exposed to traffic signs, media sources and day-to-day exposure to traffic in the city thus contributes to an increased 'driving experience' in males as compared to females.

In the present study, out of 160 participants, 120 (75%) were pursuing undergraduate education, while 40 (25%) were enrolled in postgraduate courses. The majority of the sample comprised undergraduate students, indicating a predominance of younger participants in the study. Postgraduate students formed a smaller but significant portion of the group. This educational distribution reflects a diverse academic background among participants. Such variation is important for capturing perspectives across different educational levels.

In the present study, 34 participants (21%) reported driving only two-wheelers, while 28 (18%) drove only four-wheelers. A larger proportion, 61 (38%), drove both types of vehicles, indicating versatility in vehicle operation. Additionally, 37 participants (23%) did not drive any vehicle. Regarding possession of a driving license, 115 participants (72%) had a valid license, while 45 (28%) did not. The high proportion of licensed drivers suggests that most participants were eligible to drive legally. This distribution provides insights into driving experience and legal compliance among the study population.

In this study, awareness of common traffic signs was generally high among participants. Nearly all respondents recognized the red signal (98.5%), green signal (99.2%), no horn (99.6%), and no U-turn (98.9%). Awareness was also strong for no entry (95.4%), speed limit 50 km/hr (94.8%), and speed breaker ahead (93.1%). Slightly lower but still substantial awareness was observed for no overtaking (89.3%) and stop signs (87.2%). However, awareness of the "give way" sign was markedly low at only 26.8%. These findings highlight good overall traffic sign recognition, with specific gaps in understanding priority-related signs.

Awareness regarding penalties for violating driving rules was notably high among participants. Most respondents knew that driving under the influence of alcohol (96.5%), not carrying a driving license (97.5%), not wearing a helmet (94.7%), and not wearing a seatbelt (95.1%) were punishable offenses. Similarly, high awareness was seen for speaking on a mobile phone while driving (94.3%) and driving beyond the permissible speed limit (93.9%). However, knowledge about the monetary penalty amounts for these offenses was extremely low, ranging from only 0.6% for alcohol-related offenses to 7.5% for helmet violations. This indicates that while general penalty awareness is strong, awareness of exact monetary fines remains poor. In a study conducted by Reang T et al in Tripura[9], more than 90 percent of study participants perceived that use of helmet and seat belts minimizes road traffic fatalities and subsequently used it while driving. Such behavior is alarming as there is evidence that use of helmet and seatbelt reduces morbidity and mortality associated with RTAs.[9] Among the participants, exceeding the speed limit was the most common unsafe driving practice, reported by 24.7%. Sudden changes in speed were noted in 20.8% of cases, while 19.6% admitted to carrying excess passengers.

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Overtaking from the left side was practiced by 17.9% of drivers, posing significant safety risks. Not using side indicators was reported by 14.1% of respondents, potentially increasing accident chances. Use of mobile phones while driving was seen in 12.6% of participants and 9.3% were driving after drinking, indicating distracted driving behavior. Overall, these findings reveal notable unsafe driving habits that require targeted interventions to improve road safety. In a study conducted by Lalitha et al[10], around 48 percent of the participants reported exceeding speed above lawful limit and S. B. Salve et al reported around 32 percent of the participants speaking on mobile phone while driving. Drunken driving is responsible for increased morbidity and mortality associated with RTAs.[11] In recent study, three percent of the participants. reported drunken driving, in contrast to 25 (Kulkarni V. etal.).[12]

CONCLUSION

The present study assessed knowledge, awareness, and practices related to road safety among 160 participants, revealing significant insights into traffic sign recognition, rule compliance, and unsafe driving behaviors. The sample consisted of a slightly higher proportion of males (52.5%) than females (47.5%), with the majority being undergraduate students (75%), suggesting a younger participant base. Most participants (72%) possessed a valid driving license, and many reported driving both two-wheelers and four-wheelers, indicating diverse driving experience.Awareness of common traffic signs was generally high, with over 90% recognizing critical signals such as red, green, no horn, and no U-turn signs. However, knowledge of the "give way" sign was notably low (26.8%), pointing to a gap in understanding priority-related rules. Similarly, while penalty awareness for major violations such as drunken driving, speeding, and helmet non-use exceeded 93%, knowledge of corresponding monetary fines was very poor, highlighting an area for targeted education.Unsafe driving practices were evident, with exceeding the speed limit (24.7%) and sudden speed changes (20.8%) being the most reported risky behaviors. Other concerns included carrying excess passengers, overtaking from the left, not using indicators, mobile phone use while driving, and a small proportion engaging in drunken driving. Such practices are consistent with previous research linking these behaviors to increased accident risk and road traffic injuries.Overall, the findings emphasize the need for enhanced road safety education focusing not only on general awareness but also on specific gaps such as priority rules, monetary penalties, and the dangers of risky driving habits. Strengthening enforcement and awareness campaigns, particularly among young drivers, could contribute to reducing road traffic accidents and improving public safety.

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