Print ISSN: 2321-6379
Online ISSN: 2321-595X

Original Article

Evaluation of Awareness about Seat Belts and Airbags among Students in SMBT Campus for Road Safety: A Descriptive Survey

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Abstract

Introduction: Road traffic injuries are a major public health concern worldwide, particularly among young adults. It is the leading cause of morbidity and mortality, predominantly in developing countries. In India, the prevalence of road traffic accidents is high despite a comparatively smaller share of the global vehicle population. This study was conducted at SMBT campus, Nashik.

Materials and Methods: The study included students aged between 19-25. Data was collected using a validated, self-structured questionnaire comprising 15 multiple-choice questions on seat belt and airbag awareness, perceptions, and practices. Data was analysed using SPSS software.

Results: A total of 358 students were assessed. Out of total participants, 53% were males and 47% were females. Most participants reported consistent seat belt use while driving (66.2%), although usage was lower among passengers (39.1%). Discomfort (31.8%) was the most common reason for avoiding seat belts. Most participants recognised the effectiveness of airbags (86.9%), while (63.7%) were aware of the activation mechanism. Awareness did not differ significantly by gender, whereas attitude showed a significant gender difference (P = 0.024).

Conclusion: The present study highlights a generally satisfactory level of awareness and positive perception regarding the importance of seat belts and airbags among students. However, some important gaps were identified in consistent seat belt use, safety and airbag mechanisms. These findings highlight the importance of awareness programs to be incorporated in the institutional curriculum.

Key words: Airbags, Maxillofacial trauma, Road safety awareness, Road traffic accidents, Seat belts

INTRODUCTION

Road traffic injuries (RTIs) are any injury due to crashes originating from, terminating with or involving a vehicle partially or fully on a public road.[1] RTIs are the ninth leading cause of death worldwide. 1.24 million is the average number of deaths occurring on the world's roads. RTIs also result in 20–50 million non-fatal injuries yearly, followed by disability.[2] It is the leading cause of death among young people between 15 and 29 years globally.[3] In developing nations, road traffic accidents (RTAs) are the major cause of maxillofacial injuries.

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www.ijss-sn.com

Month of Submission : 07-2026
Month of Peer Review : 08-2026
Month of Acceptance : 09-2026
Month of Publishing : 09-2026

India leads the list of countries with the maximum number of road accidents and consequent deaths worldwide. According to the World Health Organization, RTIs are the sixth leading cause of death in India.[4] India contributes 1% to the global vehicle population but accounts for a disproportionately high 11% of road accident fatalities.[5] According to the 2022 report on road accidents in India, there were 4,61,312 road accident incidents, which claimed 1,68,491 lives and injured 4,43,366 persons.[6]

Accidents recorded in India.[6]

(Total number of accidents in 2022: 4,61,312)

Type of roads	Number of accidents	Percentage of accidents
National highway (NH), including Expressways	1,51,997	32.9
State highways	1,06,682	23.1

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Other roads	2,02,633	43.9

Fatalities recorded in India.[6]

(Total number of fatalities in 2022: 1,68,491)

Type of roads	Number of fatalities	Percentage of fatalities
National highway (NH), including Expressways	61,038	36.2
State highways	41,012	24.3
Other roads	66,441	39.4

In 2022, an increase was recorded in the following three indicators compared to the previous year:

I. The number of road accidents – 11.9%
II. The number of persons killed – 9.4%
III. The number of injuries – 15.3%.

Deaths from RTAs reached 180,000 in 2024. Prevalence of these injuries is higher in the male population in their third or fourth decade of life.[6]

Wearing a seat belt is recognized as one of the most effective ways to reduce fatalities in RTAs. In addition, airbags have been implemented as a supplementary safety feature to enhance protection during high-impact collisions; rear-end and angle collisions being the most common. Wearing a seatbelt can reduce the risk of death among vehicle occupants by up to 50%. The use of child restraints can lead to a 71% reduction in deaths among infants.[7] Many high- and middle-income countries require the use of approved child restraint systems for infants and children, meeting specific criteria for certain age or size groups.[7] Studies indicate that individuals not wearing seat belts are up to 10 times more likely to suffer fatal injuries, while proper seat belt use can lower the risk of death by approximately 45%.[8] Maximum injuries were seen in lower limbs (37.39%), followed by upper limbs (25.02%). Injury to the face was the third most common (13.14%).[9]

Several strategies like the use of seat belts and airbags as safety technology in motor vehicles have been implemented to reduce RTI. Safety measures need to be emphasized in the prevention of mortality, morbidity, and deaths due to RTA. This present study aims to assess the level of awareness regarding seat belts and airbags among the study participants while using motor vehicles.

MATERIALS AND METHODS

This cross-sectional study was conducted at the SMBT campus, Nashik, with the aim of studying the awareness of students about seat belts and airbag safety. A total of 358 students aged 19–25 were assessed.

A self-structured and validated questionnaire, including demographics and questions regarding awareness about seat belt and airbag safety, was given to the study population. Respected professionals of SMBT IDSR validated the questionnaire. A total of 15 multiple-choice questions were included, with every question being necessary. The questionnaire was distributed among the study population through an online survey link.

Confidentiality of the participants was maintained; no information regarding the participants was misused.

Queries regarding the study were addressed in an appropriate manner.

After data collection, the responses were compiled into a Microsoft Excel spreadsheet and analyzed using SPSS software to obtain the results.

Study Population

Students of the SMBT campus.

RESULTS

A total of 358 students from the SMBT campus participated in the study.

Demographic Characteristics

The gender distribution was nearly equal, ensuring balanced representation across sexes. Out of the total participants, 53% were males and 47% were females.

Seat Belt Usage Patterns

- Most participants showed a positive attitude toward seat belt use. Two-thirds of the participants (66.2%) always wore a seat belt, 14.0% reported wearing it often, while 12.6% used it sometimes. A smaller proportion reported rarely (3.4%) or never (3.9%) wearing a seat belt
- Seat belt usage as a passenger was noticeably lower. Only 39.1% reported always wearing seat belts. About 21.2% wore them often, and 20.1% sometimes. However, 15.9% wore seat belts rarely, and 3.6% never used seat belts as passengers [Figure 3].

Reasons for Avoidance of Seat Belt Use

Discomfort emerged as the most common reason for not wearing a seat belt, reported by 31.8% of participants. It was followed by lack of awareness regarding its importance (23.7%), forgetfulness (18.7%), and short-distance travel

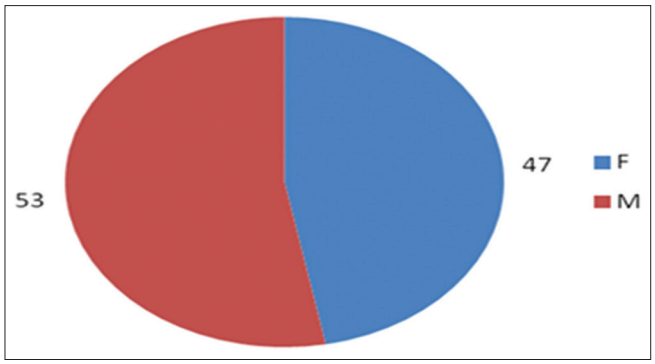

Figure 1: Distribution as per sex

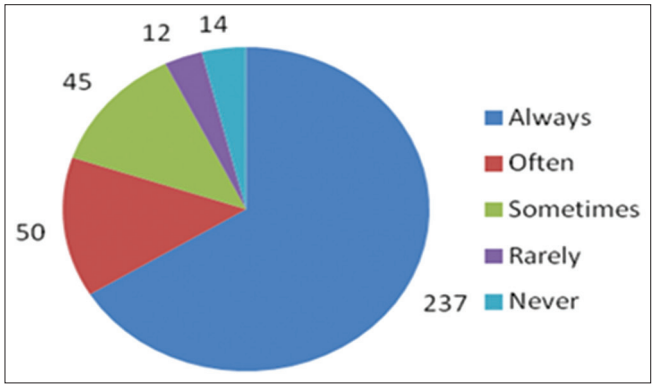

Figure 2: Distribution as per how often do you wear a seat belt while driving?

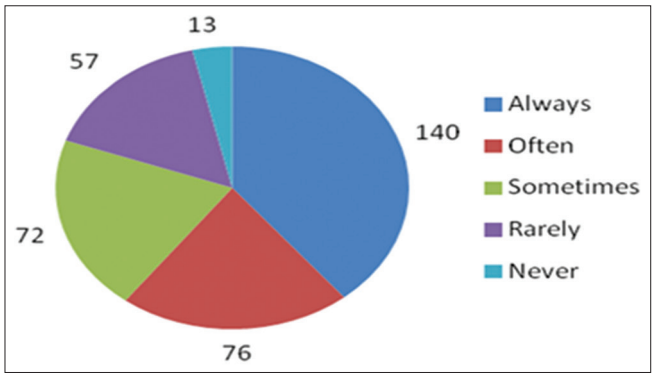

Figure 3: Distribution as per how often do you wear a seat belt as a passenger?

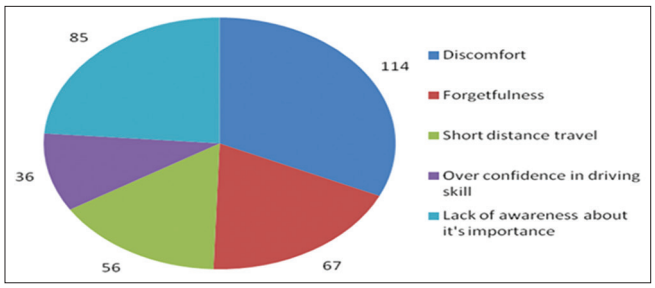

Figure 4: Distribution as per why do you think some people avoid wearing seat belts?

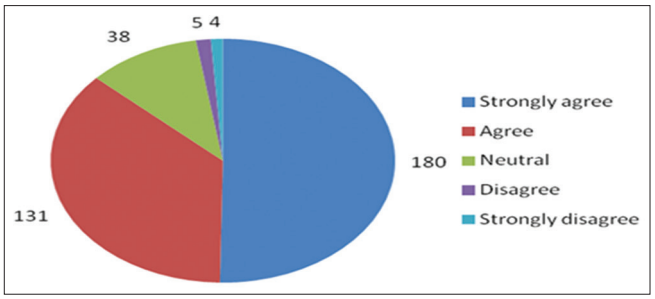

Figure 5: Distribution as per do you agree that airbags are effective in preventing serious injuries during accidents?

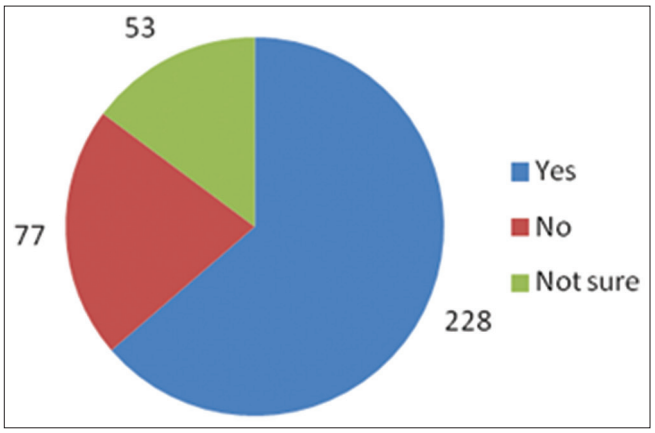

Figure 6: Distribution as per are you aware about how airbags are activated?

(15.6%). Overconfidence in driving skills was reported by 10.1% of participants [Figure 4].

Awareness and Perception of Airbags

- Most respondents showed a positive perception of airbags. 50.3% strongly agreed, and 36.6% agreed that airbags are effective in preventing serious injuries during accidents. Only a small proportion, 2.5% of participants, disagreed or strongly disagreed with the perception of airbags [Figure 5].
- Regarding awareness of airbag activation mechanisms, 63.7% reported being aware, while 21.5% were not aware and 14.8% were unsure [Figure 6].
- Over half of the participants (54.2%) correctly identified that airbags are commonly present in all major car locations, including the steering wheel, dashboard, side panels, and rear seats [Figure 7].

Knowledge of Airbag Quantity and Safety Impact

- When asked about the minimum recommended number of airbags for optimal safety, 59.2% reported four airbags, followed by 24.3% who selected six airbags. Smaller proportions selected two (12.0%) or eight airbags (4.5%) [Figure 8]

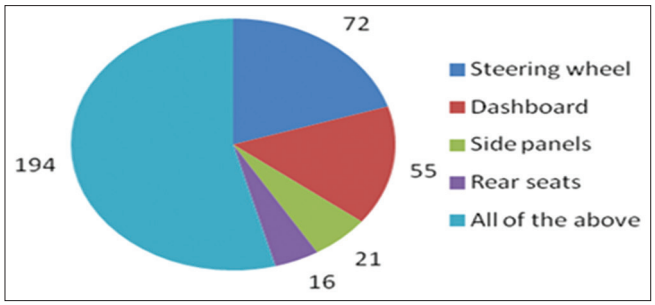

Figure 7: Distribution as per which of the following parts of a car commonly have airbags?

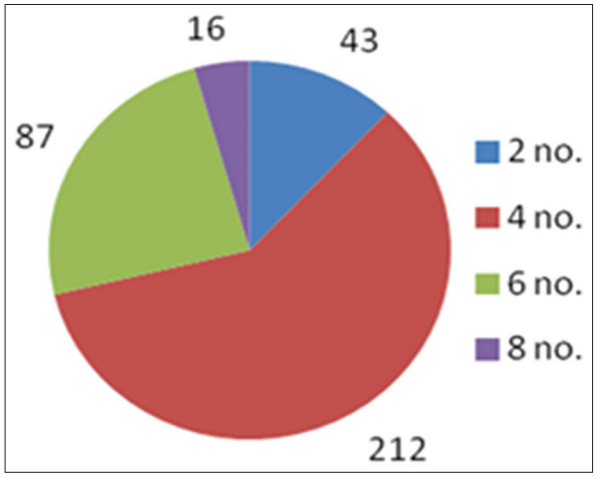

Figure 8: Distribution as per what is the minimum number of airbags recommended for optimal safety in car?

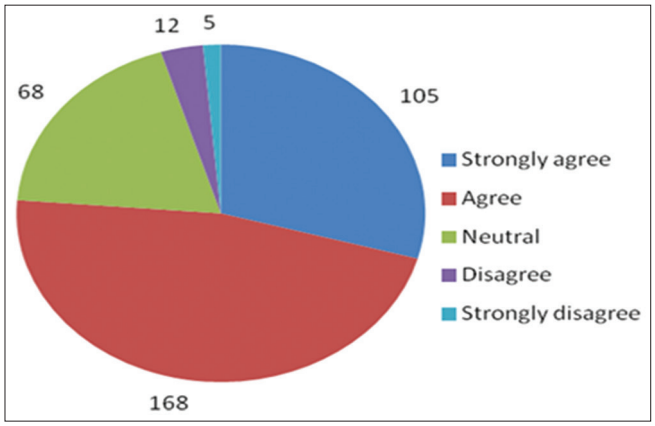

Figure 9: Distribution as per does the number of airbags in car impact overall passenger safety?

- A substantial majority perceived that the number of airbags impacts passenger safety, with 46.9% agreeing and 29.3% strongly agreeing. Only 4.8% disagreed or strongly disagreed [Figure 9].

Perceived Benefits and Risks of Airbags

- Most participants (80.4%) recognized all listed advantages of airbags – crash impact reduction, driver protection, and passenger protection [Figure 10]
- With respect to potential dangers, 38.0% identified small children seated in the front seat, and 35.8% identified passengers not wearing seat belts as high-risk situations. Fewer participants recognized risks related to sitting too close to the dashboard (16.5%) or steering wheel (9.8%) [Figure 11].

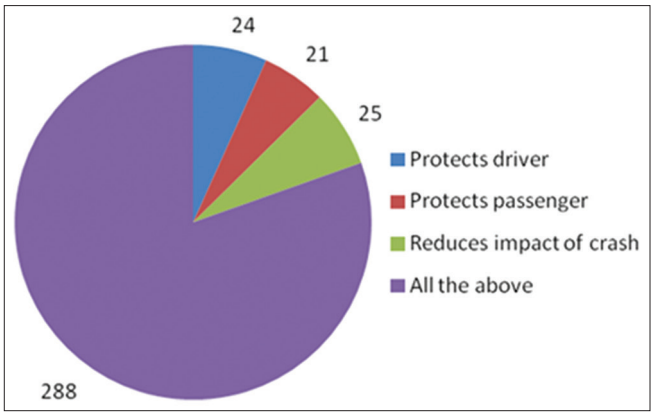

Figure 10: Distribution as per what do you think is the important benefit of airbags?

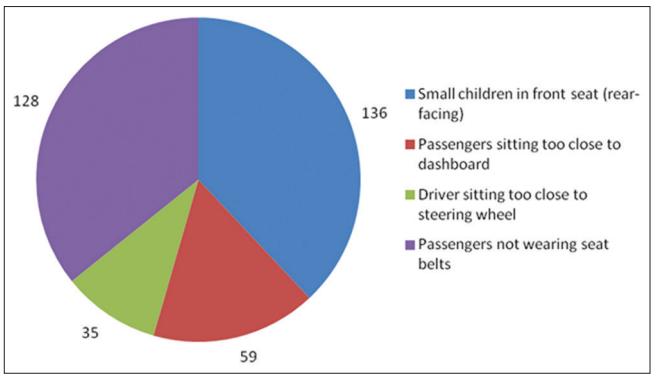

Figure 11: Distribution as per perception of the potential risks of airbags

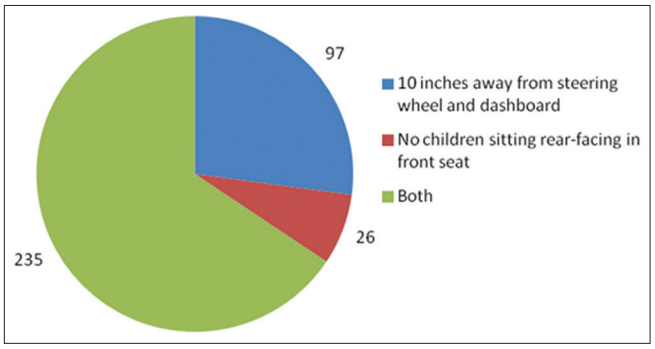

Figure 12: Distribution as per do you know proper seating position to maximize the effectiveness of airbag?

Knowledge of Proper Seating Position

Knowledge regarding correct seating position to maximize airbag effectiveness was relatively high.

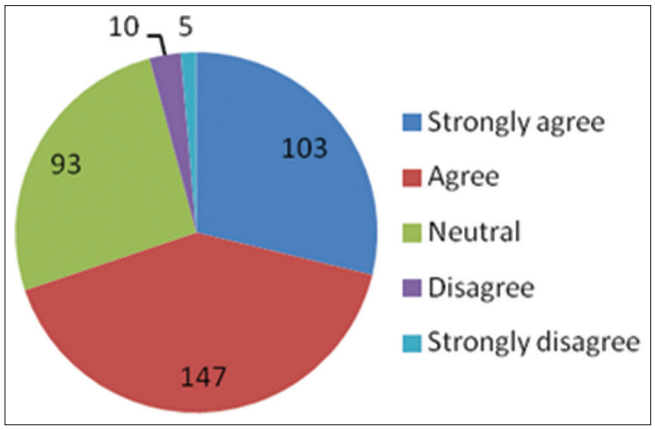

Figure 13: Distribution as per does the addition of more airbags significantly influence the decision to purchase a car?

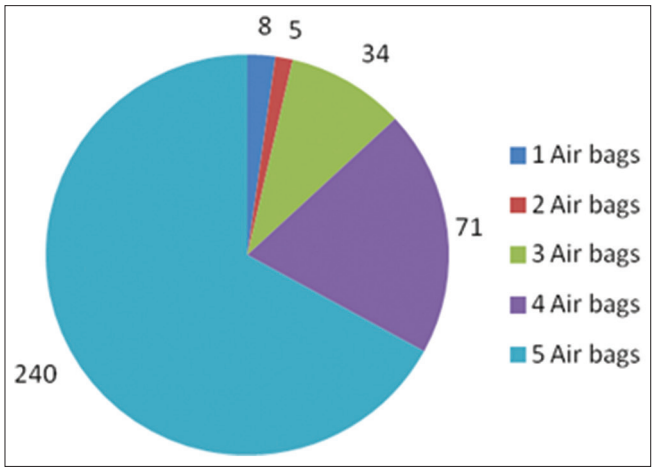

Figure 14: Distribution as per how important are the following factors when choosing a vehicle? Rate from 1 (not important) to 5 (very important): Airbags

65.6% correctly identified both maintaining a minimum distance from the steering wheel/dashboard and avoiding rear-facing children in the front seat, while 27.1% selected distance maintenance alone [Table 12 and Figure 12].

Influence on Vehicle Purchase Decisions

The addition of airbags was reported to influence vehicle purchasing decisions by many respondents. 41.1% agreed, and 28.8% strongly agreed that a higher number of airbags significantly affects their choice, while 26.0% remained neutral [Table 13 and Figure 13].

Importance of Safety Features during Vehicle Selection

Airbags were rated as very important by 67.0% of participants and important by 19.8%. Similarly, seat belts were rated as very important by 79.0% and important by 12.6% of respondents, indicating a high perceived importance of passive safety features during vehicle selection [Figures 14 and 15].

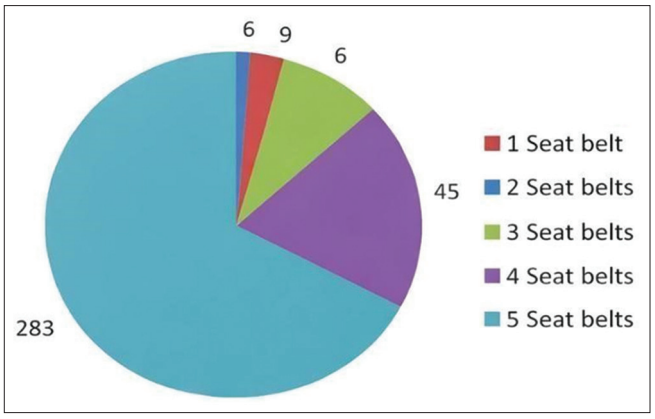

Figure 15: Distribution as per how important are the following factors when choosing a vehicle? Rate from 1 (Not important) to 5 (Very important): Seat belts

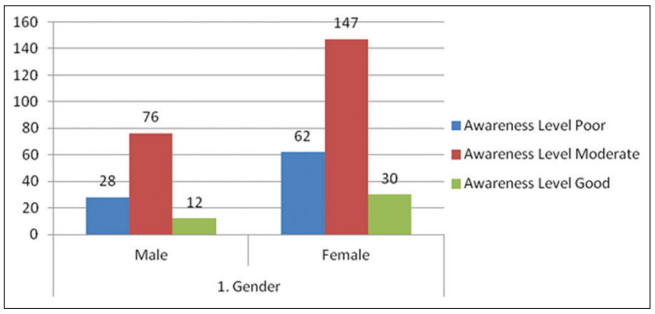

Figure 16: Gender * Awareness level cross tabulation

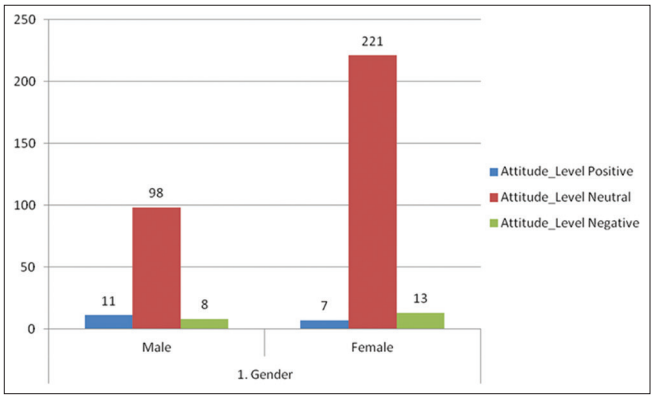

Figure 17: Gender * Attitude_level cross tabulation

Table 1: Gender-based comparison of awareness levels

	Awareness level			Total
	Poor	Moderate	Good	
Gender				
Male	28	76	12	116
Female	62	147	30	239
Total	90	223	42	355

Gender-Based Comparison of Awareness and Attitude Levels

Intergroup comparison revealed no statistically significant difference in awareness levels between males and females

Table 2: Gender-based comparison of attitude levels

	Attitude level			Total
	Positive	Neutral	Negative	
Gender				
Male	11	98	8	117
Female	7	221	13	241
Total	18	319	21	358

($\chi^2 = 0.622$, $P > 0.05$) [Table 1 and Figure 16].

A statistically significant difference was observed in attitude levels across gender ($\chi^2 = 7.45$, $P = 0.024$). Females demonstrated a higher frequency of neutral attitude toward seat belt and airbag safety compared to males [Table 1 and Figure 17].

DISCUSSION

RTIs represent a major public health issue globally. Seat belts and airbags are essential safety features that help reduce both morbidity and mortality. This study evaluated awareness and attitude related to seat belt and airbag use among students at the SMBT campus. It provided an understanding of the current safety consciousness within the young and educated population.

Seat Belt Usage Patterns

In this study, 66.2% of the participants reported always wearing seat belts while driving. However, consistent seat belt use among passengers was notably lower, at 39.1%. A study from the United States stated that 59% of students always used seatbelts when driving, but only 42% always used seatbelts as passengers.[10] Comparatively lower rates of awareness are observed in India, which may be due to inconsistent law enforcement or a lack of awareness that underestimates risk during short- distance travel.

Reasons for Non-Compliance with Seat Belt Use

Discomfort emerged as the most common reason for avoiding seatbelt use (31.8%), followed by lack of awareness (23.7%) and forgetfulness (18.7%).

Awareness and Perception of Airbags

Most participants showed positive perceptions regarding the effectiveness of airbags, with 86% agreeing or strongly agreeing that airbags prevent serious injuries. Awareness regarding airbag activation mechanisms and proper deployment conditions was comparatively lower, with one-third of participants unaware.

Knowledge of Airbag Locations, Quantity, and Benefits

54.2% of participants correctly identified all common airbag locations, and 80.4% identified important benefits of airbags, including protection of both drivers and passengers and reduction of crash impact. Studies show that frontal collisions result in nearly a 22% lower fatality rate, along with a reduction in serious injuries among belted drivers.[11] Most participants indicated four airbags as the minimum recommended number, suggesting only partial awareness.

Perceived Risks Associated with Airbags

Participants displayed a moderate understanding of the risk of airbags, particularly to children in the front seat and passengers not wearing seat belts.

Attitude toward Safety Features and Purchase Decisions

Most respondents rated airbags and seat belts as very important factors when choosing a vehicle, and a significant proportion indicated that the number of airbags influences purchasing decisions. These findings are consistent with recent studies, reflecting a shift in consumer preference prioritizing safety in vehicles.[12]

Gender-Based Differences

The present study found no significant gender difference in awareness level. It contradicts a study in which the prevalence of seat belt use was significantly higher in female drivers (51.47%) compared to male drivers (38.27%).[13]

Implications

This study was conducted in a single medical college; hence, it is recommended to conduct similar studies in a large population to generalize the study findings. Further research in this area needs to be conducted to assess the existing situation regarding road safety and determinants of morbidity and mortality of RTAs.

Overall, the findings suggest that general awareness and positive attitudes toward seat belts and airbags are present, but gaps still remain in consistent practice, knowledge, and risk perception.

CONCLUSION

The present study highlights a generally satisfactory level of awareness and positive perception regarding the importance of seat belts and airbags among students. Most participants acknowledged the effectiveness of airbags in preventing serious injuries and recognized seat belts and airbags as essential safety features while choosing a vehicle. However, some important gaps were identified in consistent seat belt use, particularly among passengers, and many participants did not have a clear understanding and knowledge of airbag activation mechanisms. There was limited awareness regarding correct seating positions and potential risks associated with airbag deployment. Although overall awareness levels

were significantly similar between genders, attitude levels showed statistical variation between the two groups. Even among educated populations, there is a need to promote general awareness and positive attitudes toward seat belts and airbags. These findings highlight the importance of awareness programs to be incorporated in the institutional curriculum.

ETHICAL CONSIDERATION

The Institutional Review Board and the Institutional Ethical Committee of SMBT IDSR, Nashik, approved this study.

PATIENT CONSENT

Not required.

ACKNOWLEDGMENT

This study was supported by the SMBT campus, Nashik.

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How to cite this article: Jadhav P, Bezalwar A, Ghorpade T. Evaluation of Awareness about Seat Belts and Airbags among Students in SMBT Campus for Road Safety: A Descriptive Survey. Int J Sci Stud 2026;14(6):8-14.

Source of Support: Nil, **Conflicts of Interest:** None declared.