SOCIAL MARKETING AND PUBLIC AWARENESS CAMPAIGNS

Face-to-Face Road Safety Awareness Outreach in an Industrial Corridor of Raigad–Navi Mumbai, Maharashtra: A Student-Led Community Case Study

Pranay Dubey, Imran Ali Chaudhari, Bhojraj Y. Shewale Ayush Patro*, Rajat Gera

Amity Business School, Amity University Mumbai, Maharashtra, India

Published November 2026

Abstract

Background. Road traffic injuries are a major public health problem in India, and industrial corridors with mixed heavy and light traffic carry a particularly high exposure. Most road safety interventions are evaluated at the level of mass media or enforcement; documented evidence on small, community-level, face-to-face outreach is scarce.

Objective. To describe the need assessment, design, delivery and immediate response of a student-led, face-to-face road safety awareness outreach carried out along Sawala Apta Road in the Ashte, Ajivali and Somatane areas of the Raigad–Navi Mumbai region.

Methods. A descriptive, single-site case study with a four-stage design: secondary-data review and field need assessment, planning, roadside one-to-one awareness conversations supported by a pamphlet, and documentation. Twelve geo-tagged, time-stamped photographs from two field days (11 and 21 September 2026), field notes and structured observation were analysed thematically.

Results. The documented interactions were at three sites: a railway level crossing (n = 2), a heavy-vehicle corridor (n = 7) and a truck parking area (n = 3). They involved two-wheeler riders (n = 8), car or SUV drivers (n = 2) and truck drivers (n = 2). Five risk themes were identified: waiting behaviour at the level crossing, non-use of helmets, interaction of light vehicles with heavy vehicles, driver fatigue and vehicle visibility, and limited knowledge of emergency response. Road users were generally receptive when approached while stationary and when the conversation began with a question.

Conclusions. Stationary points in the journey (level-crossing queues, roadside stops, parking areas) offer practical entry points for low-cost awareness work. Student-led outreach can complement, but not replace, engineering and enforcement measures. A controlled, longer-term evaluation is needed to measure behavioural change.

Keywords: awareness campaign; community outreach; heavy vehicles; helmet use; India; Maharashtra; railway level crossing; road safety

1 Introduction

Road traffic injury is among the leading causes of premature death worldwide. The World Health Organization estimates that about 1.19 million people die on the world's roads every year, and that road traffic injuries are the leading cause of death among people aged 5–29 years [1]. Low- and middle-income countries carry a disproportionate share of this burden. India alone reported about 4.61 lakh road crashes and about 1.68 lakh deaths in 2022, which averages to more than 450 deaths a day [2]. Two-wheeler riders form the largest single category of victims, and over-speeding is the most common cause of fatal crashes [2].

The contemporary "Safe System" approach holds that crashes will occur because humans make mistakes, and that roads, vehicles, speeds and rules must therefore be designed so that mistakes do not result in death or serious injury [3]. Within this approach, road-user information and education are generally regarded as a supporting measure and not a stand-alone solution. Awareness work is nevertheless important in settings where engineering and enforcement are still developing, because it can improve the understanding of risk and the acceptance of rules among road users [4,5].

The Panvel–Taloja industrial belt of the Navi Mumbai–Raigad region provides a useful setting for studying small-scale outreach. Goods vehicles, tankers and containers share a narrow carriageway with scooters, motorcycles, autorickshaws and cars, a railway level crossing interrupts traffic, and new residential towers and construction sites add to vehicle movement. Daily commuters, industrial workers and professional drivers are exposed to risk in this setting, yet little published information exists on the nature of awareness needs there or on how road users respond to direct outreach.

1.1 Research gap and contribution

Published evaluations of road safety campaigns mostly concern mass-media or enforcement-linked programmes. Descriptions of how community needs were assessed and how direct, face-to-face outreach was designed and received at the roadside are comparatively rare, especially in the Indian industrial-corridor context. This paper contributes a transparent, replicable description of a student-led outreach, including its need assessment, message design, delivery and the immediate responses documented in the field.

1.2 Objectives

1. To assess the road safety needs of road users in the Ashte–Ajivali–Somatane area through observation and informal interviews.
2. To design and implement face-to-face awareness outreach targeted to the identified risk behaviours.
3. To document the reach, content and immediate response of the outreach using geo-tagged evidence.
4. To draw practical lessons for similar community-level and student-led campaigns.

2 Review of literature

2.1 Effectiveness of road safety campaigns

A meta-analysis of road safety campaigns reported that campaigns, on average, were associated with modest reductions in accidents, and that effects tended to be larger when campaigns were combined with enforcement or delivered through personal and community channels rather than through mass media alone [6]. European guidance on campaign design stresses a structured process: a needs analysis, clear definition of target groups, simple and specific messages, and evaluation built in from the beginning [7]. These principles guided the design of the present outreach.

2.2 Helmet use

Evidence from a systematic review shows that motorcycle helmets reduce the risk of death and the risk of head injury substantially among riders involved in crashes [8]. Helmet non-use therefore remains one of the most important and most preventable risk factors for two-wheeler riders. In India,

helmet use is legally required for riders under the Motor Vehicles Act, and the 2019 amendment increased penalties for non-compliance [9]. Compliance, however, depends on perceived risk and habit as well as enforcement, which is why awareness at the point of use remains relevant.

2.3 Speed and the mix of heavy and light vehicles

The relationship between speed and crash outcomes is well established. The "Power Model" indicates that a small increase in mean speed produces a considerably larger increase in the number of fatal crashes [10,11]. When fast-moving or heavy vehicles share space with unprotected road users such as scooter riders and pedestrians, the consequences of a collision fall mainly on the latter [3,12]. Safe-distance behaviour and knowledge of the blind spots of heavy vehicles are therefore practical messages for small-vehicle users in goods corridors.

2.4 Violations, errors and risk perception

Behavioural research has distinguished between driving errors (unintended failures of perception or judgement) and violations (deliberate deviations from safe practice) [13]. Many behaviours addressed by awareness outreach, such as not fastening a helmet strap, crossing before a barrier opens or riding with extra passengers, are violations influenced by hurry, habit and low perceived risk. Such behaviours are more likely to be changed by explanation and personal engagement than by information alone, which supports the use of conversational approaches.

2.5 Level crossings, fatigue and emergency response

Level crossings remain a point of conflict between road and rail even where legal safeguards and barriers exist, because the consequences of a collision with a train are severe and because impatience at a closed barrier is common. Fatigue and long working hours are well-recognised hazards for professional drivers, and the condition of the vehicle and the driver's field of view are further safety factors [12]. Early and appropriate help after a crash can reduce mortality and disability, which is why training on emergency numbers and legal protection for bystanders is part of global and national road safety guidance [1,5,9].

2.6 Student and community engagement

Training manuals and policy documents on road safety emphasise the role of civil society, educational institutions and local communities in raising awareness and supporting implementation [5,12]. Student-led work can combine low cost and local knowledge, but its value depends on clear objectives, ethical conduct and honest reporting of what such activities can and cannot achieve.

2.7 Summary and research questions

Taken together, the literature suggests that awareness outreach is most useful when it is based on a needs analysis, tailored to specific groups, delivered through personal contact and combined with other measures. It also suggests that helmet use, speed, interaction with heavy vehicles, fatigue and emergency response are priority areas. What is less clear is how such outreach is received at the roadside in an Indian industrial corridor and which practical features make it workable for a small volunteer team. The study therefore asked three questions: (RQ1) Which risk behaviours and conditions are most visible to a field team in this corridor? (RQ2) How can short, face-to-face outreach be organised safely and ethically at the roadside? (RQ3) How do road users respond to such outreach in the short term?

3 Study area and methods

3.1 Study design

A descriptive, single-site case study design was used. The work followed the four-stage framework shown in Figure 1. The study was carried out as a community outreach project in a higher-education programme, with the topic approved by a faculty mentor.

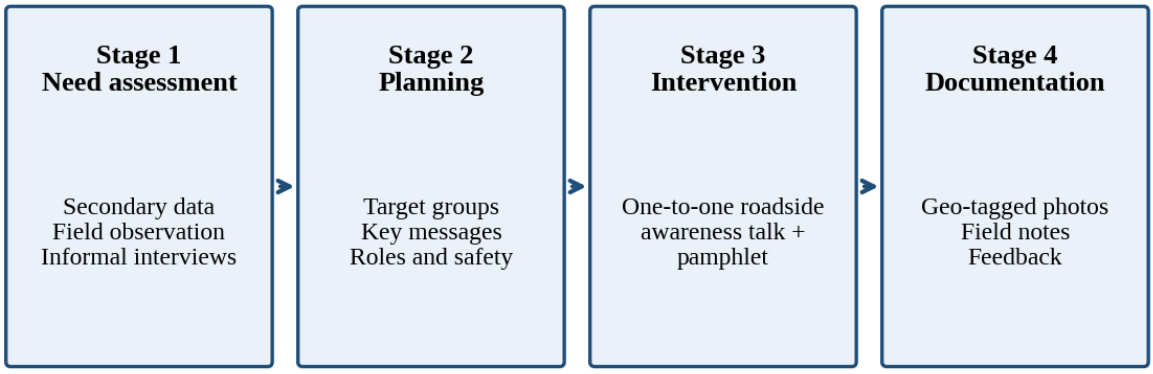


Figure 1. Four-stage framework followed in the outreach study.

3.2 Study area

The outreach took place along Sawala Apta Road in the Raigad–Navi Mumbai region at three sites (Table 1): the Somatane railway level crossing, the Ashte stretch of Sawala Apta Road, and a truck and tanker parking area at Ajivali. The sites were chosen because they combine heavy goods traffic, a railway level crossing, roadside commercial activity and a large daily population of two-wheeler commuters and professional drivers.

Table 1. Study sites and field-visit details (from geo-tag overlays).

Site	Coordinates (approx.)	Setting	Dates / time stamps
Somatane railway level crossing	18.9333° N, 73.1455° E	Manned crossing with queueing two-wheelers and passing train	11 Sep 2026; 2:56 PM
Sawala Apta Road, Ashte	18.9470–18.9481° N, 73.1497–73.1500° E	Mixed heavy and light traffic, roadside shops, construction hoardings, parked tankers	11 Sep 2026; 4:00–4:23 PM
Ajivali parking area	18.9561° N, 73.1630° E	Trucks and SUV parked near a fuel station on unpaved ground	21 Sep 2026; 1:44–1:46 PM

3.3 Need assessment

The need assessment combined three sources: (i) secondary data from national and international reports and the Motor Vehicles Act provisions; (ii) direct observation of traffic and road-user behaviour at each site, recorded in field notes; and (iii) short informal interviews with riders, drivers and local people about their experience of the road. A short anonymous questionnaire (helmet or seat-belt use, behaviour at the level crossing, rest breaks, emergency numbers) was used to

supplement these. Needs were ranked as high, medium or low priority on the basis of the severity of the possible consequence and the frequency with which the behaviour was observed.

3.4 Intervention

The intervention was a brief, one-to-one roadside conversation delivered by two or three student volunteers and supported by a short printed pamphlet. A five-step conversation plan was used as a guide: greet and introduce; ask one open question; explain one or two points with a reason; suggest one practical action; thank and hand over the pamphlet. Messages were tailored to the target group (Table 2). To keep the volunteers safe and avoid disturbing traffic, only stationary road users (at the barrier, in a parking area or by the roadside) were approached, and no attempt was made to stop moving vehicles.

Table 2. Target groups and core messages used in the outreach.

Target group	Core messages
Two-wheeler riders	Helmet with fastened strap for rider and pillion; no extra passengers or overloading; safe gap from trucks; no phone use; speed control
Commuters at level crossing	Wait until the barrier is fully open; never cross under a closed barrier; check for a second train; avoid crowding near the track
Car and SUV drivers	Seat belt for all occupants; no phone use; avoid driving when drowsy; give way to two-wheelers and pedestrians
Truck and tanker drivers	Blind spots; rest breaks; working lights, mirrors, reflectors and brakes; unobstructed view; do not park on the carriageway
All road users	Emergency numbers (112, 108, 139); help the injured; legal protection of Good Samaritans

3.5 Data collection and analysis

Data consisted of twelve geo-tagged, time-stamped photographs taken with a GPS camera application, field notes, observations during the conversations and responses to the questionnaire. The geo-tag overlay (place name, coordinates, date and time) was used to verify the site and sequence of each interaction. Photographs were reviewed independently by two team members, and each was coded for site, road-user group, vehicle type, helmet use (where visible) and topics discussed. Field notes were analysed thematically by grouping repeated observations into risk themes. Because the study is descriptive, only counts and percentages of documented interactions are reported, and no inferential statistics are used.

3.6 Ethical considerations

The project was approved by the faculty mentor. Participation was voluntary, every person was approached politely and could end the conversation at any time, and no personal identifiers such as names, phone numbers or vehicle registration numbers were collected in the questionnaire. Photographs were taken for documentation.

3.7 Reflexivity and quality assurance

The authors were students who also acted as the field team, so their presence may have influenced how road users behaved and what they said. To limit this influence, the team used a polite, non-judgemental approach, avoided questions that could embarrass people and recorded observations

before giving advice wherever possible. Geo-tag overlays were used as an independent check on place, date and time. The team kept a simple log after each field day, and discrepancies between members' recollections were discussed and resolved by referring to the photographs. Claims in this paper are limited to what the documented evidence can support.

4 Results

4.1 Reach and distribution of documented interactions

Twelve interactions were documented with valid geo-tags across the two field days. Seven were recorded at Ashte, three at Ajivali and two at the Somatane level crossing (Figure 2a). Two-wheeler riders were the largest group (n = 8, 67%), followed by car or SUV drivers (n = 2, 17%) and truck drivers (n = 2, 17%) (Figure 2b; percentages are rounded). On Day 1 the documented conversations spanned about 87 minutes (2:56 PM to 4:23 PM; Figure 3), and on Day 2 the Ajivali conversations took place between 1:44 and 1:46 PM.

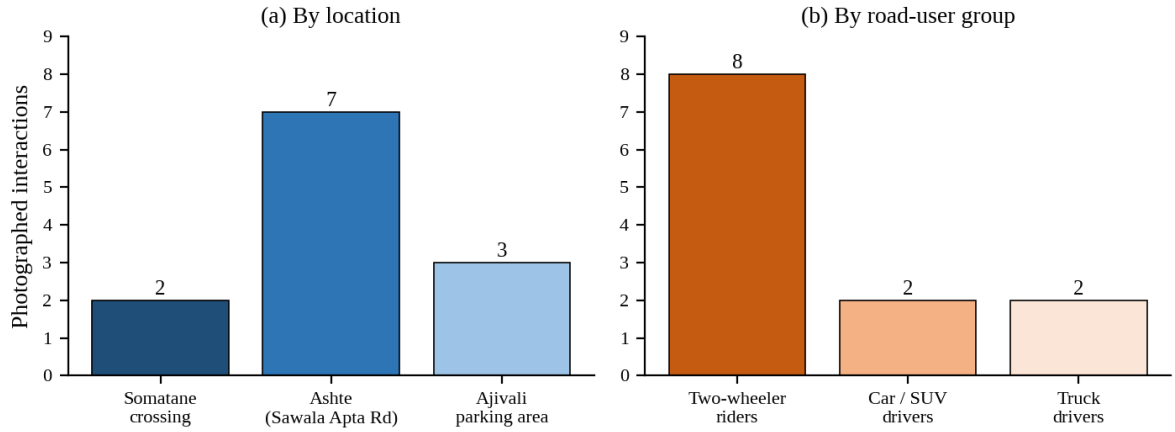


Figure 2. Documented (geo-tagged) interactions by (a) site and (b) road-user group (n = 12).

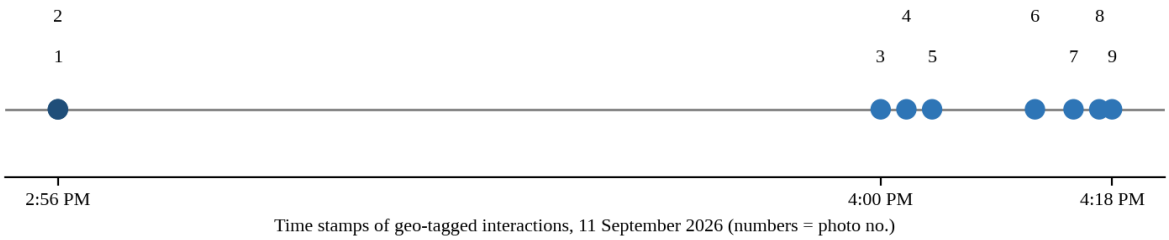


Figure 3. Time sequence of the nine documented interactions on 11 September 2026. Photographs 10–12 were taken at Ajivali on 21 September 2026.

4.2 Findings from the need assessment

Field observation identified five recurring risk themes (Table 3).

Table 3. Risk themes identified through observation and informal interviews.

Theme	Observation	Site
T1. Waiting behaviour at the level crossing	Dense queue of two-wheelers with pillion passengers close to the closed barrier while a train passed; riders and pillions with and without helmets	Somatane
T2. Helmet non-use	Several riders and pillion passengers without helmets were seen on the Ashte stretch and at the level crossing	Somatane, Ashte
T3. Light vehicles beside heavy vehicles	Scooters and motorcycles moving or stopping close to trucks, tankers and containers on a road with uneven edges and potholes	Ashte
T4. Fatigue and visibility	Drivers waiting for long periods in parking areas; decorated cabs with hanging ornaments; parking on soft, muddy ground	Ajivali
T5. Limited emergency-response awareness	Informal interviews indicated limited awareness of emergency numbers and of legal protection for bystanders	All sites

4.3 Content and conduct of the outreach

At the level crossing, riders waiting in the queue were approached while a train passed. The conversation concentrated on waiting until the barrier was fully raised, not going under it and wearing helmets. On the Ashte stretch, the team spoke to scooter riders and motorcyclists about helmets, speed, indicators and distance from trucks and tankers, to a car driver about the seat belt and phone use, and to a group of riders on a motorcycle and a scooter about helmets for riders and pillion passengers. At Ajivali, the team spoke to an SUV driver about seat belts and speed near the fuel station, and to a truck driver about blind spots, rest breaks and vehicle visibility. Figure 4 shows representative interactions.

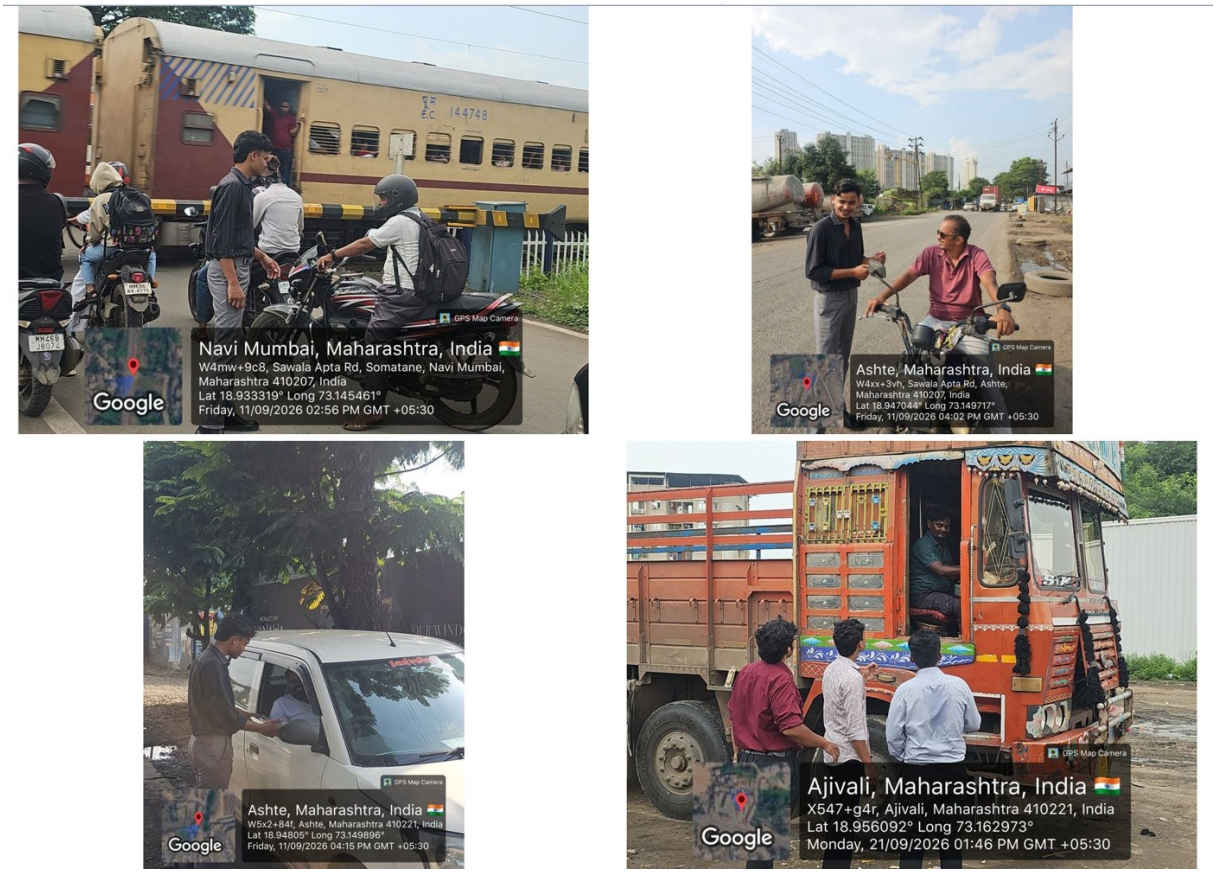


Figure 4. Representative geo-tagged interactions: (top left) riders at the Somatane level crossing, 11 Sep 2026, 2:56 PM; (top right) rider on the Ashte stretch, 4:02 PM; (bottom left) car driver, 4:15 PM; (bottom right) truck driver at Ajivali, 21 Sep 2026, 1:46 PM.

4.4 Immediate response of road users

The field notes show that most road users were willing to listen for one to two minutes. The responses recorded by the team members, in their own words and not as verbatim quotes, fell into four patterns: (i) acknowledgement of the risk, for example riders agreeing that they sometimes skip the helmet strap on short trips; (ii) explanation of the circumstances, such as potholes and heavy vehicles making the road difficult and truck drivers describing long working hours and tight delivery schedules; (iii) appreciation that someone had come to talk instead of fining them; and (iv) brief, polite acceptance without further comment. No hostile response was recorded.

4.5 Questionnaire findings

The questionnaire responses are summarised in Table 4.

Table 4. Questionnaire responses.

Item	Yes, n (%)	No, n (%)	Sometimes, n (%)
Always wears helmet / seat belt			
Waits for the barrier to open fully			
Takes rest breaks on long drives			
Knows emergency numbers 112 / 108			
Knows Good Samaritan protection			

4.6 Cross-site comparison

Table 5 compares the three sites. The sites differed in the nature of the risk, the type of road user reached and the time available for conversation. At the level crossing, the risk was acute and time-limited (the waiting period of a passing train); on the Ashte stretch it was chronic and related to mixed traffic; and at Ajivali it was linked to the working conditions of professional drivers.

Table 5. Cross-site comparison of risk, reach and response.

Feature	Somatane level crossing	Ashte (Sawala Apta Road)	Ajivali parking area
Documented interactions	2	7	3
Main road users	Two-wheeler riders and pillion passengers	Scooter and motorcycle riders, car driver	SUV driver, truck drivers
Dominant risk	Crossing behaviour; head injury	Heavy–light vehicle conflict; helmet non-use	Fatigue; visibility; blind spots
Time available for talk	Short (train passage)	Short to moderate (roadside stop)	Moderate (driver waiting)
Principal messages	Wait for the barrier; helmets	Helmets; speed; safe distance	Rest; blind spots; vehicle checks
Observed response	Attentive; shared own experience	Receptive; commented on potholes and traffic	Warm; spoke about long hours

5 Discussion

5.1 Stationary points as entry points for outreach

A practical finding of the study is that conversations were possible and productive at points where road users were already stationary: the level-crossing queue, the roadside stop and the parking area. At such points, people have a short period of idle time, are not in motion and are less likely to feel that their trip is being obstructed. This echoes campaign-design guidance that the setting and timing of a message should match the situation of the target audience [7]. It also supports the safety of the volunteers, as no traffic had to be stopped.

5.2 Linking messages to observed risks

The messages were built around the risk themes identified during the need assessment and were delivered in the place where the risk occurs. For example, the level-crossing message was delivered at the crossing during a train passage, and the heavy-vehicle message beside the tanker line. Such place-based messaging may increase the salience of the message, although this study did not test the proposition. The tailoring of messages for different road-user groups also meant that truck drivers, who face different risks from scooter riders, were addressed with fatigue and visibility messages and not helmet messages.

5.3 Helmets, speed and heavy vehicles

Helmet non-use among riders and pillion passengers was visible at more than one site. In view of the strong evidence on the protective effect of helmets [8] and the large share of two-wheeler riders in road deaths [2], helmet use should remain the first priority message in such corridors. The coexist-

ence of light and heavy vehicles on a road with uneven edges illustrates the "mixed traffic" problem described in the Safe System literature [3,12]. Awareness can help riders to keep distance and avoid blind spots, but the underlying hazard can only be reduced through engineering and traffic management, such as separate parking bays for goods vehicles, repair of road edges and speed management [10,11].

5.4 Professional drivers and fatigue

Conversations with truck drivers suggested that long hours and delivery pressure shape their ability to rest. This indicates that awareness messages directed at individual drivers should be complemented by action at the level of transport operators and regulators, such as adherence to rest-hour norms and vehicle maintenance. Educational outreach alone does not remove the structural pressures that lead to risky behaviour [6,12].

5.5 Value and limits of student-led outreach

Student-led outreach has clear advantages: it is low in cost, local, friendly in approach and educational for the students, who learn to observe, communicate and document responsibly. However, it cannot, by itself, change crash outcomes. The meta-analytic evidence suggests that campaigns achieve more when linked to enforcement and community channels [6], so the most realistic role of such outreach is as one component in a wider local programme in cooperation with traffic police, road-owning agencies, transport operators and schools or colleges.

5.6 Practical recommendations

- Use stationary points (level-crossing queues, parking areas, roadside stops) for short conversations, with one speaker and one observer.
- Start with a question, give one or two reasons-based points, and end with one practical action.
- Tailor messages to the road-user group; use local languages and a short pamphlet.
- Coordinate with traffic police, railway and road authorities, so that awareness and enforcement or engineering measures are mutually reinforcing.
- Build evaluation into the plan from the start: a pre-test and post-test questionnaire, observation counts of helmet use before and after, and follow-up visits.
- Display emergency numbers and basic safety messages at parking areas and the level crossing.

5.7 Implications for policy and practice

For road-owning agencies and local authorities, the observations point to several low-cost measures that would support awareness work: clear warning signs and reflective markings near the level crossing, designated bays for tanker and truck parking away from the carriageway, repair of road edges and potholes, and display of emergency numbers at parking areas and shops. For transport operators, the discussion with drivers highlights the importance of rest-hour compliance and vehicle maintenance. For educational institutions, structured community outreach projects can be designed so that the need assessment, the ethical safeguards and the evaluation plan are as important as the activity itself. These suggestions arise from the observations of a single case and should be tested in other settings.

6 Limitations

The study has several limitations. It is a descriptive case study from one corridor and two field days and cannot be generalised. The documented sample consists of geo-tagged interactions and not a random sample of road users. Observations of helmet use and traffic behaviour were visual and not systematically counted over fixed periods. The response of road users was recorded by the team members themselves, which could introduce observer bias and a tendency towards socially desirable answers. No pre- and post-intervention measurement was made, so no claim of behaviour change or of reduction in crashes can be made. Fixed-site observations of helmet use before and after, controlled comparison sites and follow-up interviews would be needed for a proper evaluation. The study period was also short and may not reflect seasonal conditions such as the monsoon, when road surfaces and visibility change.

6.1 Directions for future research

Future studies could extend the work in three directions. First, a pre–post design with fixed-point counts of helmet use at the same sites before and after outreach, with comparison sites, would allow the effect of outreach to be estimated. Second, interviews or short surveys with professional drivers and transport operators could examine the structural causes of fatigue and delivery pressure. Third, combining outreach with simple engineering or parking-management measures and with enforcement, in collaboration with the responsible agencies, could test whether awareness and structural measures reinforce one another in an Indian industrial corridor.

7 Conclusion

This case study describes how a small student team assessed local road safety needs and delivered face-to-face awareness outreach in an industrial corridor of the Raigad–Navi Mumbai region. The need assessment identified five risk themes: behaviour at the level crossing, helmet non-use, the mix of light and heavy vehicles, fatigue and vehicle visibility among professional drivers, and limited knowledge of emergency response. Road users who were approached while stationary were generally receptive to short, tailored conversations. The approach is low in cost, replicable and educational for the students, but its effect on behaviour and on crashes remains untested. Future work should include a measurable pre–post design and partnership with enforcement and engineering agencies, so that awareness and structural measures complement one another.

Declarations

Consent: Verbal consent was taken from road users before conversations; no personal identifiers were collected.

Conflict of interest: The authors declare no conflict of interest.

Funding: No external funding was received.

Data availability: The geo-tagged photographs, field notes and questionnaire sheets are available from the corresponding author on reasonable request.

Acknowledgements: The authors thank the road users of Ashte, Ajivali and Somatane who shared their time and experience, and the faculty mentor and the institution for their support.

Appendix A. Five-step conversation guide used by the field team

Table A1. Conversation guide.

Step	Action	Example wording
1. Greet and introduce	Greet, introduce as a student team, ask for one minute	"We are students doing a road safety awareness project. May we speak with you for a minute?"
2. Ask	One open question to invite the person's own experience	"Do you usually wait till the barrier opens fully?"
3. Explain	One or two points with a reason	"A train cannot stop quickly, so even a few seconds on the track is dangerous."
4. Suggest	One practical action from today	"Please fasten the helmet strap on every trip, even short ones."
5. Thank and hand over	Thank, give the pamphlet, ask for brief feedback	"Thank you for your time. Please drive safely."

Appendix B. Questionnaire items

1. Type of vehicle used most often (two-wheeler / car or SUV / truck or tanker / bus or autorickshaw / on foot).
2. Frequency of travel on this road (daily / weekly / occasionally).
3. Always wears helmet (rider and pillion) or seat belt (yes / no / sometimes).
4. Waits for the railway barrier to open fully (yes / no / sometimes).
5. Has seen or experienced a road crash on this road (yes / no).
6. Biggest road safety problem in the area (speed / heavy vehicles / potholes / no helmets / parking on the road / other).
7. Hours driven in a day and rest breaks (for drivers).
8. Knows emergency numbers 112 and 108 (yes / no).
9. Knows that a person who helps a crash victim is legally protected (yes / no).
10. Suggestions to make the road safer (open response).

References

[1] World Health Organization. *Global status report on road safety 2023*. Geneva: World Health Organization; 2023.

[2] Ministry of Road Transport and Highways, Government of India. *Road accidents in India 2022*. New Delhi: Transport Research Wing, Ministry of Road Transport and Highways; 2023.

[3] Wegman F. The future of road safety: a worldwide perspective. *IATSS Research*. 2017;40(2):66–71. https://doi.org/10.1016/j.iatssr.2016.05.003

[4] Peden M, Scurfield R, Sleet D, Mohan D, Hyder AA, Jarawan E, et al., editors. *World report on road traffic injury prevention*. Geneva: World Health Organization; 2004.

[5] Mohan D, Tiwari G, Khayesi M, Nafukho FM. *Road traffic injury prevention training manual*. Geneva: World Health Organization; 2006.

[6] Phillips RO, Ulleberg P, Vaa T. Meta-analysis of the effect of road safety campaigns on accidents. *Accident Analysis & Prevention*. 2011;43(3):1204–1218. https://doi.org/10.1016/j.aap.2011.01.002

[7] Delhomme P, De Dobbeleer W, Forward S, Simões A. *Manual for designing, implementing, and evaluating road safety communication campaigns*. Brussels: Belgian Road Safety Institute; 2009.

[8] Liu BC, Ivers R, Norton R, Boufous S, Blows S, Lo SK. Helmets for preventing injury in motorcycle riders. *Cochrane Database of Systematic Reviews*. 2008;(1):CD004333. https://doi.org/10.1002/14651858.CD004333.pub3

[9] Government of India. *The Motor Vehicles (Amendment) Act, 2019*. New Delhi: Ministry of Law and Justice; 2019.

[10] Nilsson G. *Traffic safety dimensions and the Power Model to describe the effect of speed on safety*. Bulletin 221. Lund: Lund Institute of Technology; 2004.

[11] Elvik R. *The Power Model of the relationship between speed and road safety: update and new analyses*. TØI Report 1034/2009. Oslo: Institute of Transport Economics; 2009.

[12] Elvik R, Vaa T. *The handbook of road safety measures*. Amsterdam: Elsevier; 2004.

[13] Reason J, Manstead A, Stradling S, Baxter J, Campbell K. Errors and violations on the roads: a real distinction?. *Ergonomics* 1990;33(10–11):1315–1332. https://doi.org/10.1080/00140139008925335