HIV KNOWLEDGE, RISKY SEXUAL BEHAVIOR AND ORAL HEALTH AWARENESS AMONG LONG DISTANCE TRUCK DRIVERS IN SOUTH INDIA

Dr. Srinivas Pachava1, Dr. Nandyala Harsha Vardhan Reddy2, Dr. Sujeeth Pachava3

[1]Head of the department, Department of Public health dentistry, Sibar Institute of Dental Sciences,Takkellapadu, Guntur, Andhra Pradesh, India

[2]Post graduate student, Department of Public health dentistry, Sibar Institute of Dental Sciences, Takkellapadu, Guntur, Andhra Pradesh, India

[3]Post graduate Student Department of Ophthalmology Malla Reddy Institute of Medical Sciences Survey No. 138, Suraram Main Road, Quthbullapur Municipality, Hyderabad, Telangana, India

ABSTRACT

Background: India has approximately 3–3.5 million long-distance truck drivers (LDTDs), of whom more than one-third engages with commercial sex workers, contributing to a 1.48% HIV prevalence in this group. Their constant mobility, isolation, and limited access to healthcare make them key transmitters between high- and low-risk populations.

Aim: To assess risky sexual behaviour, knowledge, and perceptions related to HIV among highway truckers in India.

Methods: A cross-sectional survey was conducted among 150 male truckers using a pre-validated questionnaire (CVI = 0.89; Cronbach's alpha = 0.82). Data on demographics, sexual practices, HIV knowledge, condom use, and oral health awareness were collected and analysed using SPSS v25. Descriptive statistics and chi-square tests were applied, with $p < 0.05$ considered significant.

Results: The mean age of participants was 45.3 ± 8.8 years. About 72.7% reported extra relational sexual activity, predominantly with commercial sex workers (64.7%). Condom use was consistent among 68%, yet only 36% knew HIV was treatable, and a mere 2.7% were aware of oral manifestations. Age was significantly associated with risky sexual behaviour ($p = 0.044$) and willingness to socialize with HIV-positive persons ($p = 0.021$).

Conclusion: Despite high awareness of HIV/AIDS, misconceptions and risky sexual practices remain widespread among truckers. Targeted interventions integrating sexual and oral health education are essential to reduce transmission and stigma within this mobile occupational group.

Key words: HIV/AIDS; Truck drivers; Risky sexual behavior; Knowledge and perceptions; Condom use; Oral health awareness

INTRODUCTION

Human Immunodeficiency Virus (HIV) remains a major global public health issue, and India continues to bear a substantial burden despite steady progress in prevention. In 2023, approximately 3.14 million people in India were living with HIV, corresponding to an adult prevalence rate of 0.22%, down from 0.32% in 2010. This decline reflects a 37% reduction in new infections and a 66% drop in AIDS-related deaths since 2010[1]. However, specific high-risk occupational groups, such as long-distance truck drivers, continue to show elevated prevalence and behavioural vulnerabilities.

India has an estimated 5–6 million truck drivers and helpers in India[2], including 3–3.5 million long-distance truck drivers (LDTDs), who spend extended periods away from home. Around 36% of them reportedly engage in sexual contact with commercial sex workers[3]. Studies estimate HIV prevalence among truckers to exceed 1.4%, higher than the general adult population[4]. Factors such as mobility, occupational isolation, poor living conditions, and peer influence contribute to this elevated risk.

Truckers frequently engage in unsafe sexual practices, demonstrate inconsistent condom use, and have low self-perception of HIV risk. Their transient lifestyle limits access to healthcare and HIV intervention programmes[5]. Consequently, truckers may act as a bridge for HIV transmission from high-risk to low-risk populations, including spouses and partners at home[6]. Previous studies emphasize that interventions like community mobilization, behaviour change communication, and NGO-supported outreach have improved awareness but not fully mitigated behavioral risk[7].

Given these concerns, understanding the current patterns of risky sexual behaviour, knowledge, and perceptions among truckers remains essential for designing effective, targeted interventions. This study aims to assess these dimensions, including oral health awareness related to HIV, among highway truckers in India.

MATERIALS AND METHODS

Study Design and Population

A cross-sectional questionnaire-based study was conducted among long-distance highway truck drivers in India over six months. A total of 150 participants were recruited from truck halt centers located along an approx. 70 kilometer stretch of the Kolkata-Chennai National Highway (NH16) passing through Vijayawada, Guntur and Chilakaluripet.

Inclusion and Exclusion Criteria

The sample comprised truck drivers operating along the Chennai Kolkata National Highway (NH16) passing through Andhra Pradesh were included. Individuals not meeting this criterion were excluded.

Sample Size Determination

The Sample size(n=150) was estimated using Israel's table assuming a 95 percent confidence level, 5 percent margin of error, 7% precision to ensure representativeness and adequate power to detect associations between sociodemographic factors and behavioral patterns[8].

Data Collection Tool

Data were collected using a structured, pre-validated questionnaire assessing demographic details, sexual behaviour, condom use, HIV knowledge, and oral health awareness. The questionnaire was translated into Telugu, back translated, and administered orally for participants with limited literacy to ensure comprehension.Interviewer bias was minimized through standardized training, and missing responses were cross verified before data entry.The questionnaire demonstrated good content validity (CVI = 0.89) and internal reliability (Cronbach's alpha = 0.82).

Ethical Considerations

Ethical approval for the study was obtained from the Institutional Ethics Committee of Sibar Institute of Dental Sciences (Protocol No 469/IEC/SIBAR/24, dated 2024).Informed consent was obtained from all participants. Confidentiality was maintained throughout the study, and participation was voluntary.

Statistical Analysis

Data were analysed using SPSS version 25. Descriptive statistics (frequencies, percentages, means, and standard deviations) described participant characteristics. Associations between variables were assessed using the chi-square test. Odds ratios (ORs) with 95 % confidence intervals (CIs) were computed using binary logistic regression to estimate the likelihood of engaging in extra-relational sex across sociodemographic groups.

RESULTS

Sociodemographic Characteristics

The mean age of the 150 male respondents was 45.3 ± 8.8 years. Over half (52.7%) resided in rural areas, and most (92%) were married. Nearly 89% earned below ₹30,000 per month, and 47% spent 6–8 months annually away from home. Tobacco use (48.7%) was the most common habit.

Risky Sexual Behaviour

A total of 72.7% of participants reported sexual activity outside marriage, mostly with female commercial sex workers (64.7%). The predominant reason was long absences from home (42.7%). Consistent condom use was reported by 68%, while 4.6% cited lack of availability as a barrier.

Knowledge and Perceptions about HIV

All participants had heard of HIV/AIDS; however, only 18.7% correctly distinguished HIV from AIDS, and 36% were aware that treatment exists. Awareness of oral manifestations was extremely low (2.7%). Two-thirds (67.3%) believed HIV-positive individuals could live healthy lives, but nearly all (99.3%) refused sexual contact with them.

TABLE 1: SOCIODEMOGRAPHIC CHARACTERISTICS OF THE STUDY POPULATION (N = 150)

VARIABLE	DISTRIBUTION
Age (years)	Mean ± SD = 45.3 ± 8.8
Residence	Urban 71 (47.3%) Rural 79 (52.7%)
Monthly Family Income	< ₹30,000 133 (88.7%) ₹31,000–₹60,000 17 (11.3%)
Marital Status	Married 138 (92.0%) Unmarried 4 (2.7%) Widowed 8 (5.3%)
Habits	Tobacco 73 (48.7%) Alcohol 29 (19.3%) Both 48 (32.0%)
Time Spent Away from Home per Year	1–3 months 24 (16.0%) 4–6 months 25 (16.7%) 6–8 months 71 (47.3%) >8 months 30 (20.0%)
Average Distance Travelled/Week	Mean ± SD = 1638.6 ± 589.6 km

Values are presented as mean ± standard deviation (SD) for continuous variables and as frequency (n) with percentage (%) for categorical variables.

TABLE 2: RISKY SEXUAL BEHAVIOUR AMONG TRUCK DRIVERS

VARIABLE	RESPONSE (N, %)
Extra relational sexual activity	Yes 109 (72.7%) No 41 (27.3%)
Type of sexual partner (among those reporting other partners, n = 109)	Female Commercial Sex Worker 97 (64.7%) Neighbour 9 (6.0%) Girlfriend 3 (2.0%)
Frequency of extra relational sexual activity	Seldom 25 (16.7%) Sometimes 61 (40.7%) Often 22 (14.7%) Very often 1 (0.7%)
Reasons for Involvement in extra relational sexual activity	Long stays away from home 64 (42.7%) Sexual urge 14 (9.3%) Peer influence 10 (6.7%) Easy availability 10 (6.7%) Beauty of partner 6 (4.0%) Other 5 (3.3%)
Condom Use Frequency	Every time 102 (68.0%) Most times 5 (3.3%) Sometimes 2 (1.3%)

Reason for Not Using Condom	Lack of availability 7 (4.6%)
Odds of Engaging in Risky Behaviour(OR)	OR = 2.66 (95 % CI 1.02–6.93) for age < 45 vs ≥ 45 years; indicates higher odds of engaging in extra-relational sex among younger drivers.

Data were summarized as frequency (n) and percentage (%). Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated using binary logistic regression to determine the likelihood of engaging in extra-relational sex across different sociodemographic and knowledge-related categories. A p-value < 0.05 was considered statistically significant.

TAB.LE 3: KNOWLEDGE AND PERCEPTIONS REGARDING HIV/AIDS

VARIABLE	RESPONSE (N, %)
Heard of HIV/AIDS	Yes 150 (100%)
Belief that HIV and AIDS Are the Same	Yes 28 (18.7%) No 44 (29.3%) Don't know 78 (52.0%)
Knowledge of HIV Treatment	No treatment available 73 (48.7%) Treatment exists but unaware 23 (15.3%) Aware of treatment 54 (36.0%)
Awareness of Oral Manifestations	Yes 4 (2.7%) No 17 (11.3%) Don't know 129 (86.0%)
Perception that HIV-positive Persons Can Live Healthy Lives	Yes 101 (67.3%) No 49 (32.7%)
Willingness to Have Sex with HIV-positive Person	Not at all 149 (99.3%) Not likely1 (0.7%)
Willingness to Socialize with HIV-positive Person	Yes 101 (67.3%) No 49 (32.7%)

Values are shown as frequency (n) and percentage (%). "Awareness" and "perceptions" are based on participant self-responses to structured questionnaire items.

TABLE 4: ASSOCIATION OF AGE WITH RISKY SEXUAL BEHAVIOUR AND HIV RELATED ATTITUDES AMONG TRUCK DRIVERS

VARIABLE	X^2 VALUE	p-VALUE
Engagement in risky sexual behaviour	4.08	0.044
Willingness to socialize with HIV-positive individuals	5.34	0.021

Chi-square test

*p value $\leq$0.05 is considered as statistically significant

DISCUSSION

The present study assessed risky sexual behaviour, HIV-related knowledge, and perceptions among long distance truck drivers operating along the Chennai–Kolkata National Highway. Although awareness of HIV/AIDS was universal, substantial misconceptions, unsafe practices, and limited oral health literacy persist, reflecting the complex psychosocial and occupational determinants that shape preventive behaviours in this mobile population.

Demographic and Behavioral Profile

The mean age of participants was 45.3 ± 8.8 years, representing a predominantly mid-career working population comparable to earlier studies that identified drivers aged 35 to 50 years as the backbone of India's transport sector. The predominance of rural residence (52.7%) and low monthly income (below ₹30,000 in 88.7%) highlights the socioeconomic vulnerability of this group. Nearly half of the drivers spent six to eight months away from home annually, and tobacco and alcohol use was common (80 percent combined), compounding their exposure to health risks. These patterns are consistent with national data showing that occupational isolation, fatigue, and substance use heighten psychosocial stress, which often manifests as compensatory sexual behaviour.[5,9]

A high proportion (**72.7** percent) of respondents reported sexual relationships outside marriage, primarily with female commercial sex workers (64.7 percent). The most frequent reason cited was long stays away from home (42.7 percent), echoing earlier reports that attributed such behaviour to occupational loneliness and the normalization of extra relational sex within trucker communities.[6-7] Although 68 Percent reported consistent condom use, slightly higher than rates reported in similar Indian studies (56 to 64 percent), a small but significant number reported irregular use or non-availability. This suggests that while awareness exists, behavioural consistency is hindered by logistic barriers and fluctuating motivation, reinforcing the need for continuous peer-led condom promotion and reliable supply.

Age and Risk Behavior

Age showed a statistically significant association with risky sexual behaviour ($p = 0.044$). Drivers aged below 45 years had 2.66 times higher odds of engaging in extra relational sexual activity compared with those aged 45 years or above. This indicates that younger drivers are more behaviourally vulnerable to high-risk encounters, possibly due to stronger sexual drive, peer influence, and lower perceived susceptibility to HIV infection. In contrast, older drivers may benefit from marital stability and greater personal responsibility, which moderate impulsive behaviours.

Comparable trends have been reported among truck drivers in Pune and Meerut, where younger cohorts exhibited higher engagement with commercial sex workers than older counterparts.[10-11] Behaviourally, this can be explained through the Health Belief Model and the Theory of Planned Behaviour: younger drivers may cognitively acknowledge HIV risk but underestimate their personal vulnerability, leading to inconsistent preventive practices[12-13]. The COM-B framework further clarifies that while knowledge or capability may be similar across ages, motivational and

opportunity factors differ.[14] Younger drivers often face prolonged isolation, peer reinforcement of risk taking, and limited access to counselling or support networks.

Knowledge, Misconceptions, and Oral Health Awareness

While all participants had heard of HIV/AIDS, only 18.7 percent correctly distinguished between HIV and AIDS, and 36 percent were aware that treatment exists. This superficial awareness mirrors findings from Halder et al. (2024)[15] and Bhalla et al. (2005)[16], who reported persistent misconceptions even after decades of public health campaigns. Alarmingly, only 2.7 percent recognized oral manifestations of HIV, such as candidiasis or hairy leukoplakia, which often precede systemic symptoms. This mirrors earlier reports of superficial awareness despite years of public campaigns. The low level of oral health knowledge highlights the need to integrate oral health education into HIV prevention programmes to enable early detection and promote holistic care-seeking behaviour.

Attitudes and Stigma

A majority (67.3 percent) of drivers expressed willingness to socialize with HIV-positive individuals, reflecting a gradual reduction of overt stigma. However, almost all (99.3 percent) refused sexual contact with HIV-positive persons. This response may represent rational caution rather than prejudice, as participants sought to avoid perceived risk of transmission. It also reflects limited awareness of biomedical evidence, including the "Undetectable equals Untransmittable (U = U)" principle, which establishes that individuals on effective antiretroviral therapy (ART) with undetectable viral load cannot transmit HIV through sexual contact.[17] Thus, this behaviour suggests a blend of informed discretion and partial biomedical understanding rather than ignorance or discrimination. Educational efforts should therefore respect personal choice while simultaneously enhancing scientific literacy about HIV transmission and treatment efficacy.

A statistically significant association was also observed between age and willingness to socialize with HIV-positive individuals ($p = 0.021$). Younger drivers were generally more accepting and showed reduced stigma, likely reflecting greater exposure to contemporary HIV education and changing social norms. Older drivers, however, displayed more cautious attitudes, possibly influenced by long-held beliefs shaped by earlier public health messaging. These findings highlight the need for age-sensitive stigma reduction strategies that integrate empathy with accurate biomedical information.

Behavioral Determinants and Cognitive Factors

The findings underscore that awareness alone does not guarantee behavioural change. According to the Health Belief Model and the Theory of Planned Behaviour, truckers often show low perceived susceptibility and limited behavioural control. Occupational loneliness, peer norms, and the availability of commercial sex collectively weaken self-regulation and normalize casual sexual encounters. The COM-B model reinforces that while capability or knowledge exists, opportunity and motivation are constrained by occupational and emotional contexts.

The tendency toward optimism bias, a cognitive distortion in which individuals underestimate personal risk after repeated unprotected encounters without adverse outcomes, may explain inconsistent condom use. Incorporating cognitive-behavioural counselling, reflective risk appraisal, and peer-led education could help recalibrate risk perception and sustain preventive practices.[18]

Behavioral Change and Policy Implications

Applying the COM-B framework to promote sustainable change involves strengthening:

- Capability – enhancing truckers' understanding of HIV, oral health, and prevention through culturally adapted and pictorial education
- Opportunity – ensuring access to condoms, counselling, and voluntary testing at truck halts and depots
- Motivation – cultivating peer reinforcement, positive role modelling, and recognition of safe practices

From a policy perspective, the relaxation of educational requirements for heavy vehicle drivers (Rule 8, Central Motor Vehicles Rules, 2019)[19] enhances workforce inclusivity but also demands tailored health communication for non-literate groups. Visual, vernacular, and participatory learning modules should therefore be integrated into highway-based health promotion.

s

As a cross-sectional study relying on self-reported data, causal inferences are limited, and responses may have been influenced by recall or social desirability bias. Nonetheless, rigorous linguistic standardization, interviewer-assisted administration, and integration of behavioural theory enhanced both internal validity and cultural relevance. Despite the sensitivity of the subject matter, the study provides one of the few comprehensive analyses linking sociodemographic, psychological, and oral health dimensions of HIV-related risk among Indian truckers.

CONCLUSION

Taken together, the data reveal a paradox of high awareness but low behavioural compliance. Persistent misconceptions, limited oral health literacy, and psychosocial vulnerabilities continue to undermine HIV prevention among highway truckers. The findings of this study underscore the urgent need for Context-specific, behaviourally informed, and culturally sensitive interventions particularly those using peer educators and visual aids are vital for bridging the gap between knowledge and action. Strengthening community-based, multilingual outreach that combines sexual and oral health promotion can accelerate progress toward national HIV control goals.

No external funding and no conflicts of interest.

REFERENCES

1. National AIDS Control Organization (NACO). HIV Facts & Figures [Internet]. New Delhi: Ministry of Health and Family Welfare, Government of India; [cited 2025 Jul 30]. Available from: https://naco.gov.in/surveillance-epidemiology-0

2. National AIDS Control Organisation (NACO). Targeted Interventions Under NACP III. Operational Guidelines. New Delhi: NACO, Ministry of Health & Family Welfare, Government of India; 2007. Available from: http://www.naco.gov.in/upload/Publication/NGOs%20and%20targetted%20Intervations/NACP-III.pdf.

3. National AIDS Control Organisation (NACO). Annual HIV Sentinel Surveillance Country Report 2006. New Delhi: National Institute of Health &Famliy Welfare, NACO, Ministry of Health & Family Welfare; 2007. Available from: http://naco.gov.in/upload/NACO%20PDF/HIV%20Sentinel%20Surveillance%202006_India%20Country%20Report.pdf.

4. National AIDS Control Organisation (NACO). Annual HIV Sentinel Surveillance: Country Report 2008–09. New Delhi: National Institute of Health &Famliy Welfare, NACO, Ministry of Health & Family Welfare; 2011. Available from: http://naco.gov.in/upload/Surveillance/Reports%20&%20Publication/HIV%20Sentinel%20Surveillance%20India%20Country%20Report,%202008-09.pdf.

5. Varun Sharma, NiranjanSaggurti&Shalini Bharat (2015) Health care coverage among long-distance truckers in India: an evaluation based on the Tanahashi model, HIV/AIDS - Research and Palliative Care, , 83-94, DOI: 10.2147/HIV.S76416

6. Chandrasekaran P, Dallabetta G, Loo V, Rao S, Gayle H, Alexander A. Containing HIV/AIDS in India: the unfinished agenda. The Lancet infectious diseases. 2006 Aug 1;6(8):508-21.

7. Pandey A, Mishra RM, Sahu D, et al. Heading towards the Safer Highways: an assessment of the Avahan prevention programme among long distance truck drivers in India. BMC Public Health. 2011;11(Suppl 6):S15.

8. Israel, Glenn D. 1992. Sampling the Evidence of Extension Program Impact. Program Evaluation and Organizational Development, IFAS, University of Florida. PEOD-5. October.

9. Rao VT, Mahapatra B, Juneja S, Singh IR. Evaluating the McDonald's business model for HIV prevention among truckers to improve program coverage and service utilization in India, 2004–2010. HIV AIDS (Auckl). 2013;5:51–60.

10. Gupta H, Singh J, Awasthi P, et al. High-risk behaviour among truck drivers in Pune. *J PopulTherClinPharmacol*. 2023;30(2):e5568.

11. Pundhir A, Shukla A, Goel AD, et al. Unsafe sexual practices among truck drivers in Meerut. *Afr Health Sci*. 2021;21(2):211701.

12. Abraham, Charles &Sheeran, Paschal. (2015). The Health Belief Model.

13. Ajzen I. The theory of planned behavior. Organizational behavior and human decision processes. 1991 Dec 1;50(2):179-211.

14. Michie S, Van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. Implementation science. 2011 Apr 23;6(1):42.

15. Halder T, Pal J, Debnath P, Ghosh M. Knowledge and practices regarding HIV among truck drivers in West Bengal. *Int J Community Med Public Health*. 2024;11(3):13026.

16. Bhalla S, Chandwani H, Singh D, Somasundaram C, Rasania SK, Singh S. Knowledge about HIV/AIDS among senior secondary school students in Jamnagar, Gujarat. Health PopulPerspect Issues. 2005;28: 178–188.

17. Joint United Nations Programme on HIV/AIDS (UNAIDS). Undetectable = Untransmittable (U=U): Public health and human rights imperatives. Geneva: UNAIDS; 2018

18. Albarracín D, Gillette JC, Earl AN, Glasman LR, Durantini MR, Ho MH. A test of major assumptions about behavior change: a comprehensive look at the effects of passive and active HIV-prevention interventions since the beginning of the epidemic. Psychological bulletin. 2005 Nov;131(6):856.

19. Ministry of Road Transport and Highways (MoRTH). Central Motor Vehicles (Amendment) Rules, 2019. Rule 8. New Delhi: Government of India; 2019.