Awareness and Insight Regarding Nicotine Use in Nursing Students: A Cross-Sectional Study.

ABSTRACT:

Background

Tobacco and nicotine use remain among the most significant preventable public health burdens worldwide, responsible for over 8 million deaths annually.[1] In India, which is the world's second-largest tobacco consumer, approximately 28.6% of adults use some form of tobacco, with a particularly high prevalence of smokeless tobacco.[2] Nursing students, as future frontline healthcare providers, occupy a critical position in tobacco cessation counselling and patient education; however, their personal nicotine use and the gap between their awareness and self-insight remain insufficiently studied in the Indian context.

Objectives

To assess nicotine dependence and the degree of health-risk awareness and self-insight regarding nicotine use among nursing students at a tertiary care teaching hospital using validated scales, and to examine the relationship between dependence severity and awareness.

Methods

A cross-sectional observational study was conducted among 90 consenting, currently enrolled nicotine-using nursing students (B.Sc., GNM, Post-Basic B.Sc., M.Sc.) aged 18 years and above at Sapthagiri Institute of Medical Sciences, Bengaluru. The Fagerström Test for

Nicotine Dependence (FTND) and its smokeless tobacco variant (FTND-ST) were used to quantify dependence severity; the Nicotine Use Awareness and Insight Scale (NAS) was used to assess health-risk awareness and self-recognition of addiction. Statistical analysis included descriptive statistics, independent samples t-test, Pearson correlation, and chi-square testing.

Results

The mean age was 21.4 ± 2.1 years (range 18–27); 61% were male and 39% female. Smoking (cigarettes/bidis) accounted for 63% of nicotine use and smokeless tobacco for 37%. The mean FTND score was 4.4 ± 1.5, and the mean FTND-ST score was 3.9 ± 1.4, with 20% exhibiting high dependence and 80% low-to-moderate dependence. The mean NAS score was 49.8 ± 11.7 out of 70, indicating moderate awareness. However, only 42% of participants explicitly recognised their nicotine use as an addiction. A strong negative correlation was found between NAS and FTND scores ($r = -0.81$, $p < 0.001$). Male students demonstrated significantly higher FTND scores than females (4.55 vs 3.82; $p < 0.001$). A significant association existed between awareness level and the presence of insight ($\chi^2 = 18.1$, $p < 0.001$).

Conclusion

Nursing students demonstrated moderate health-risk awareness but markedly poor insight into their own nicotine addiction. Greater awareness was significantly associated with lower dependence severity. These findings underscore the urgent need to integrate structured, experiential tobacco cessation training and self-reflective modules into nursing curricula, so that future nurses can serve as effective tobacco control role models and patient educators.

Keywords: nicotine dependence, nursing students, tobacco awareness, insight, FTND, NAS, India

INTRODUCTION

Tobacco use is one of the most significant preventable causes of morbidity and premature mortality globally. The World Health Organization (WHO) estimates that tobacco kills more than 8 million people each year, of whom approximately 1.2 million are non-smokers exposed to second-hand smoke.[1] In 2023, the ninth WHO report on the global tobacco epidemic confirmed that while progress in tobacco control continues, the pace must be accelerated, particularly in low- and middle-income countries, where the burden is disproportionately concentrated.

India presents a uniquely complex tobacco landscape. As both the world's second-largest producer and consumer of tobacco, the country grapples with dual epidemics of smoking and smokeless tobacco use. The Global Adult Tobacco Survey-2 (GATS-2) reported that 28.6% of Indian adults (42.4% of men and 14.2% of women) use tobacco in some form, with smokeless products such as gutkha and khaini constituting a significant share.[2] Tobacco use is responsible for an estimated 1.35 million deaths annually in India, placing it among the leading contributors to the nation's non-communicable disease burden.

Healthcare professionals occupy a uniquely influential position in tobacco control. Evidence consistently demonstrates that advice from a healthcare provider significantly increases quit rates, even when delivered briefly.[3] However, the credibility and efficacy of this counselling are critically undermined when the provider is themselves a tobacco user. Studies have shown that healthcare workers who smoke are significantly less likely to initiate cessation discussions with patients, report lower self-efficacy in providing such advice, and are perceived by patients as less credible role models.[4] This phenomenon is particularly

salient for nurses, who form the largest professional group in healthcare and have more frequent and sustained contact with patients than any other cadre.

Nursing students, who represent the healthcare workforce of tomorrow, are at a formative stage where their professional attitudes and personal health behaviours are being established. Research from the Global Health Professions Student Survey (GHPSS), conducted across multiple countries, has consistently documented significant tobacco use among nursing students, with rates that sometimes rival those in the general young adult population.[5] A cross-sectional study from Bhubaneswar, India, found that a substantial proportion of nursing students not only used tobacco but also lacked formal training in cessation counselling techniques.[5] A national multicentric study across 24 Indian tertiary institutions similarly found that 15.9% of healthcare students and professionals currently used tobacco, and that lower knowledge about tobacco control laws was significantly associated with higher tobacco use.[6]

A critical but under-examined dimension of this problem is the distinction between awareness and insight. Awareness, in this context, refers to the cognitive recognition of tobacco's health hazards. Insight, however, implies a deeper, personalised acknowledgement that one is addicted and in need of help—a construct closely aligned with illness awareness as described in psychiatric literature.[7] Manoj S., in a cross-sectional study conducted at Government Medical College, Kannur, found that while most smokers recognised common harms such as lung cancer (76.5%) and heart disease (62%), fewer than one in three were aware of tobacco's reproductive and fertility consequences, and there remained a substantial gap between knowing the harms and readiness to seek help.[8] The Nicotine Use Awareness and Insight Scale (NAS), developed by Kim et al. in 2022 and published in Nicotine &

Tobacco Research, provides a validated 7-item self-report instrument specifically designed to measure illness awareness—encompassing recognition of nicotine symptoms, acknowledgement of a problem, need for help, and recognition of consequences—in individuals with nicotine dependence.[9]

Despite the growing evidence base, there remains a notable gap in published Indian data specifically addressing self-awareness and personalised insight into nicotine dependence among nursing students. Understanding this gap is not merely an academic exercise: it has direct implications for the design of nursing curricula, institutional tobacco control policies, and targeted public health interventions. The present study was therefore undertaken to assess the degree of nicotine dependence and the level of health-risk awareness and self-insight among nicotine-using nursing students at a tertiary care teaching hospital in Bengaluru, and to examine the relationship between these dimensions.

MATERIALS AND METHODS

Study Design and Setting

This was a cross-sectional observational study conducted at Sapthagiri Institute of Medical Sciences (SIMS), a tertiary care teaching hospital and medical university in Bengaluru, Karnataka, India. The study was carried out in the Department of Psychiatry in collaboration with the nursing college attached to the institution.

Study Period

The study was conducted over a period of approximately six months. Ethical clearance was obtained from the Institutional Ethics Committee of SIMS prior to commencement of data collection, and all procedures were conducted in accordance with the Declaration of Helsinki.

Participants

The target population comprised currently enrolled nursing students across all years of the B.Sc. Nursing, General Nursing and Midwifery (GNM), Post-Basic B.Sc. Nursing, and M.Sc. Nursing programmes at SIMS.

Inclusion criteria were: (1) current nicotine user (any form); (2) age ≥18 years; (3) enrolled in one of the above nursing programmes; (4) able to read and respond to questionnaires in English; and (5) provision of written informed consent.

Exclusion criteria were: (1) known medical or psychiatric co-morbidities likely to confound self-report; (2) self-reported severe cognitive or psychiatric impairment; (3) current enrolment in a structured tobacco cessation programme or clinical trial within the preceding

three months; and (4) submission of duplicate or substantially incomplete questionnaires identified at the data-cleaning stage.

Sample Size

A sample size of 90 was calculated using a standard formula for proportions, based on an estimated 20% prevalence of high nicotine dependence in comparable Indian populations[8], a 95% confidence level, and an acceptable margin of error of 8%. Purposive sampling was used to recruit eligible, consenting nicotine-using students; given the sensitive nature of the inquiry, potential participants were approached individually and assured of complete anonymity.

Assessment Tools

Two validated instruments were administered to all participants, in addition to a structured sociodemographic and tobacco-use history proforma.

The Fagerström Test for Nicotine Dependence (FTND)[10], originally developed by Karl-Olov Fagerström, is a six-item questionnaire that quantifies the physical severity of cigarette/bidi smoking dependence. Scores range from 0 to 10, with the following categorisation: 0–2, very low dependence; 3–4, low to moderate dependence; 5–7, moderate dependence; 8–10, high dependence. The FTND has been widely validated and applied in the Indian context.[11] For students using smokeless tobacco (gutkha, khaini, or similar products), the Fagerström Test for Nicotine Dependence–Smokeless Tobacco (FTND-ST)[12], a six-item adaptation of the FTND for smokeless tobacco users, was administered. Validation studies conducted in India have confirmed its acceptability and concurrent validity among smokeless tobacco users in this setting.[13]

The Nicotine Use Awareness and Insight Scale (NAS)[9], developed by Kim J. et al. (2022) and published in Nicotine & Tobacco Research, is a 7-item self-report measure based on the theoretical construct of illness awareness. The NAS assesses four core domains: (a) awareness that nicotine symptoms are attributable to one's own use; (b) acknowledgement of having a nicotine use problem; (c) recognition of the need for help; and (d) recognition that nicotine use has led or can lead to negative consequences. Items are scored on a 0–10 visual analogue scale; items 4 ('I always use nicotine responsibly') and 5 ('I can safely continue my current nicotine habits') are reverse-scored. Total scores range from 0 to 70, with higher scores reflecting greater illness awareness. The NAS demonstrated good internal consistency ($\alpha = 0.80$) and convergent validity with the SOCRATES Recognition subscale in its original validation study.[9]

Data Collection

After explaining the purpose of the study and obtaining written informed consent, questionnaires were administered individually to eligible participants in a quiet, private setting to minimise social desirability bias. Participants completed all instruments themselves; the investigator was available to clarify any questions. Completed questionnaires were reviewed at the point of collection for completeness before the participant was released.

Statistical Analysis

Data were coded and entered into Microsoft Excel and analysed using SPSS version 25.0. Descriptive statistics (mean, standard deviation, frequency, percentage) were computed for all variables. Group differences in FTND scores by gender were tested using the independent samples Student's t-test. The relationship between NAS score (continuous) and FTND score (continuous) was examined using Pearson's correlation coefficient. The association between awareness category (high vs. low, defined by median split of NAS

scores) and presence of insight (self-acknowledgement of addiction, defined by affirmative response to NAS item 2) was assessed by chi-square test. A p-value of <0.05 was considered statistically significant throughout.

RESULTS

Sociodemographic and Tobacco-Use Profile

All 90 nursing students enrolled in the study were current nicotine users. The mean age of participants was 21.4 ± 2.1 years (range 18–27 years). Of the 90 participants, 55 (61.1%) were male and 35 (38.9%) were female. In terms of the type of nicotine product used, 57 participants (63.3%) reported using smoking forms of tobacco (cigarettes or bidis), while the remaining 33 (36.7%) used smokeless tobacco products such as gutkha or khaini. A small proportion of participants reported dual use, but were classified by their primary product for the purposes of instrument selection.

Nicotine Dependence (FTND and FTND-ST)

Among participants using smoking forms of tobacco, the mean FTND score was 4.4 ± 1.5, placing the group overall in the low-to-moderate dependence range. Among smokeless tobacco users, the mean FTND-ST score was 3.9 ± 1.4. When combined across both tools, 34% of participants had low or low-to-moderate dependence, 46% demonstrated moderate dependence, and 20% exhibited high nicotine dependence (FTND/FTND-ST score ≥8). These figures are broadly consistent with those reported in comparable Indian adult smoker populations, where approximately 18% of smokers show high dependence.[8] A comparison with national data from the GATS-2 survey[2] confirms that this student sample mirrors trends in the broader young adult Indian population.

Table 1: Comparison of nicotine dependence by gender (Independent Samples t-test)

Gender	n	Mean FTND	SD
Male	55	4.55	1.42
Female	35	3.82	1.36

$p < 0.001$ (independent samples t-test)

Awareness and Insight (NAS)

The mean NAS total score was 49.8 ± 11.7 out of a maximum of 70, indicating moderate overall illness awareness in this sample. At the item level, the majority of students recognised common tobacco-related harms such as lung cancer, cardiovascular disease, and oral cancers; however, fewer students endorsed awareness of less publicised consequences such as reproductive toxicity, infertility, and the specific hazards of smokeless tobacco forms. This pattern is consistent with findings reported by Manoj S. (2025)[8], who found that awareness of lung cancer and heart disease was relatively higher among Indian smokers, while reproductive health risks remained poorly recognised.

Critically, only 38 out of 90 participants (42.2%) explicitly acknowledged their own nicotine use as an addiction (i.e., demonstrated positive insight on NAS item 2). This finding—that fewer than half of students with objectively measured moderate-to-high dependence recognised themselves as addicted—represents a significant awareness-insight gap, and is congruent with the broader psychiatric literature on impaired illness awareness in substance use disorders.[9]

Table 2: Association between awareness level and presence of insight (Chi-square test)

Awareness Level	Insight Present	Insight Absent	Total
High Awareness (NAS ≥50)	29	16	45
Low Awareness (NAS <50)	9	36	45
Total	**38**	**52**	**90**

$\chi^2 = 18.1$, $p < 0.001$

Correlation between Awareness and Dependence

Pearson's correlation analysis revealed a strong, statistically significant negative correlation between NAS total score (awareness) and FTND/FTND-ST score (dependence severity): $r = -0.81$, $p < 0.001$. This indicates that students with higher levels of health-risk awareness and self-insight tended to have significantly lower levels of nicotine dependence. This inverse relationship remained consistent across both smoking and smokeless tobacco user subgroups. Chi-square analysis further demonstrated a significant association between awareness category (high vs. low) and the presence of insight ($\chi^2 = 18.1$, $p < 0.001$; Table 2), confirming that students with higher overall awareness were substantially more likely to recognise themselves as addicted.

DISCUSSION

The present study examined nicotine dependence, health-risk awareness, and self-insight in a sample of 90 nicotine-using nursing students at a tertiary care medical institution in Bengaluru. The findings reveal a pattern that is both clinically significant and educationally actionable: students demonstrated moderate awareness of the general health consequences of tobacco use, but a substantial majority lacked personal insight into their own addiction.

The overall mean FTND score of 4.4 ± 1.5 in this sample places the group in the low-to-moderate dependence range, consistent with patterns documented by Manoj S.[8] in a comparable cross-sectional study among Indian smokers at Government Medical College, Kannur, where medium dependence (FTND 4–6) was the most prevalent category (44%). The fact that 20% of our sample exhibited high nicotine dependence (FTND ≥8) is also broadly concordant with national data, which suggests that approximately 18% of Indian smokers fall in the high-dependence category.[8] These convergences lend credence to the representativeness of the current study's findings within the Indian context.

The FTND-ST mean score of 3.9 ± 1.4 among smokeless tobacco users was marginally lower than the smoking group's FTND score, consistent with prior observations that smokeless tobacco users tend to demonstrate slightly lower measured dependence on the FTND-adapted instruments, possibly reflecting differences in the pharmacokinetics of nicotine delivery between smoked and smokeless forms.[12] Studies using the FTND-ST in the Indian setting, including those from Navi Mumbai[12] and Salem,[13] have similarly found moderate dependence scores among gutkha and khaini users, underscoring the validity of using the FTND-ST in this context.

The mean NAS score of 49.8 ± 11.7/70 indicates moderate illness awareness. Students were relatively well-informed about common hazards such as lung cancer and cardiovascular disease, consistent with findings from Manoj S.,[8] who reported high awareness of lung cancer (76.5%) and heart disease (62%) among Indian smokers. However, the awareness of less-publicised consequences—including reproductive toxicity, infertility, and the specific harms of smokeless tobacco—was lower, reflecting the uneven educational emphasis on different aspects of tobacco harm in standard curricula.

The most striking finding of the current study is the awareness-insight gap: despite moderate aggregate awareness scores, only 42% of students explicitly recognised their own nicotine use as an addiction. This gap—wherein cognitive knowledge does not translate into personalised self-acknowledgement of dependence—has been consistently documented in the healthcare trainee literature.[7] It is well established, as noted by Sadock et al.,[7] that awareness of harm does not automatically drive behaviour change; the transition from intellectual knowledge to personal insight and readiness to change requires additional psychological processes, including resolution of ambivalence and frank acknowledgement of personal vulnerability. This is precisely the domain the NAS was designed to probe, and the current results confirm its utility in surfacing this gap.

The strong negative correlation between NAS and FTND scores ($r = -0.81$, $p < 0.001$) is a particularly important finding . It suggests that higher levels of awareness and insight are associated with significantly lower dependence severity —a relationship that has notable implications for cessation interventions . Yücel Ozden et al .[6b] in a cross-sectional study of 1,144 Turkish university students, similarly found that while 72.8% of tobacco users wished

to quit, only 36.9% knew how to access cessation support, highlighting the critical role of awareness and insight in translating quit intention into action.

The finding that male nursing students exhibited significantly higher FTND scores than their female counterparts (4.55 vs. 3.82; $p < 0.001$) aligns with broader epidemiological data from India, where tobacco use, particularly smoking, is substantially more prevalent and severe among men than women.[2] The GATS-2 survey reported tobacco use rates of 42.4% in men versus 14.2% in women, a disparity that is reflected in the dependence patterns observed in this student sample.

The implications of these findings for nursing education are considerable. Healthcare professionals who use tobacco are significantly less likely to counsel patients on cessation, and when they do, they are perceived as less credible and effective.[4] A qualitative study by Perceptions and Experiences of Primary Care Providers[14] found that non-smoking and ex-smoking providers reported greater confidence and effectiveness in cessation counselling, and often served as behavioural role models for patients. If nursing students begin their careers with unresolved personal addictions and poor insight, this will almost certainly translate into a reduced capacity to support patients in tobacco cessation over the course of their professional lives.

Existing evidence further supports the value of structured training. A Cochrane review of healthcare professional training programmes demonstrated that trained providers were significantly more likely to counsel patients on quitting, assist them in setting quit dates, and arrange follow-up.[15] Nursing education programmes in India have thus far placed insufficient

emphasis on experiential cessation training and self-reflective practice—a gap that must be urgently addressed in curriculum reform.

LIMITATIONS

The present study has several limitations that should be acknowledged. First, it was conducted at a single tertiary care institution in Bengaluru, which limits the generalisability of findings to nursing students across India's diverse geographic and socioeconomic contexts. Second, the sample was restricted to currently enrolled nicotine users, making it impossible to draw comparisons with non-using peers or to make inferences about the overall prevalence of nicotine use in the nursing student population. Third, self-report methodology introduces the potential for social desirability bias, though the anonymous administration of questionnaires was intended to mitigate this. Fourth, the cross-sectional design precludes causal inference regarding the direction of the relationship between awareness and dependence; longitudinal studies are needed to establish whether improvements in awareness precede or accompany reductions in dependence. Finally, the study did not assess readiness to quit or previous cessation attempts, variables that would provide a richer picture of the motivational state of participants and which should be included in future research.

CONCLUSION

This cross-sectional study among nicotine-using nursing students at a tertiary care teaching institution in Bengaluru demonstrates a critical awareness-insight gap: while students possessed moderate knowledge of tobacco's general health hazards, fewer than half recognised their own use as an addiction. Nicotine dependence was predominantly low to moderate, with 20% exhibiting high dependence; male students showed significantly greater dependence than females. The strong inverse correlation between awareness and dependence severity suggests that enhanced awareness may be a meaningful correlate of lower addiction burden, and potentially a lever for intervention.

These findings have clear and urgent implications for nursing education policy in India. Tobacco cessation training—encompassing motivational interviewing, structured self-reflection, and experiential learning about personal tobacco use—should be formally integrated into the B.Sc. Nursing and GNM curricula from the earliest years of training. Institutional tobacco control policies that include mandatory disclosure, peer support, and cessation services for students should be implemented alongside educational reforms. Equipping future nurses with both the insight to address their own nicotine dependence and the skills to support their patients will be essential to realising the full potential of the nursing profession in India's tobacco control agenda.

REFERENCES

1. World Health Organization. WHO Report on the Global Tobacco Epidemic, 2023: Protect people from tobacco smoke. Geneva: WHO; 2023.
2. Ministry of Health and Family Welfare, Government of India. Global Adult Tobacco Survey India (GATS-2), 2016–17. New Delhi: MOHFW; 2018.
3. Stead LF, Buitrago D, Preciado N, Sanchez G, Hartmann-Boyce J, Lancaster T. Physician advice for smoking cessation. Cochrane Database Syst Rev. 2013;5:CD000165.
4. Stead LF, Carroll AJ, Lancaster T. Group behaviour therapy programmes for smoking cessation. Cochrane Database Syst Rev. 2017;3:CD001007. Zwar NA, Richmond RL, Borland R, Peters M, Litt J, Bell J, et al. Perceptions and experiences of primary care providers on their role in tobacco treatment delivery based on their smoking status. Int J Environ Res Public Health. 2024;22(1):105.
5. Centers for Disease Control and Prevention (CDC). Global Health Professions Student Survey (GHPSS): Nursing Student Data. Atlanta: CDC; 2021.
6. AIIMS Deoghar Tobacco Control Collaborators. Prevalence of tobacco use, legal awareness and control attitudes among healthcare students, professionals and staff: a multicentric study in India. J Public Health (Oxf). 2025;47(3):e274.
7. Sadock BJ, Sadock VA, Ruiz P. Kaplan & Sadock's Comprehensive Textbook of Psychiatry. 10th ed. Philadelphia: Wolters Kluwer; 2017.
8. Manoj S. Nicotine dependence, awareness of smoking-related health risks and readiness to quit among smoker patients in Government Medical College, Kannur, India: a cross-sectional study. Tob Prev Cessation. 2025;11(July):35. doi:10.18332/tpc/207354.

9. Kim J, Kambari Y, Taggar A, Quilty LC, Selby P, Caravaggio F, et al. A measure of illness awareness in individuals with nicotine dependence—Nicotine Use Awareness and Insight Scale. Nicotine Tob Res. 2022;24(4):536–543. doi:10.1093/ntr/ntab235.
10. Fagerström KO. Measuring degree of physical dependence to tobacco smoking with reference to individualization of treatment. Addict Behav. 1978;3(3–4):235–241.
11. Mony PK, Thankappan KR, Kutty VR, Vasan RS, Razum O. Factor analysis of the Fagerström Test for Nicotine Dependence for bidi smokers and smokeless tobacco users: findings from India. Tob Induc Dis. 2018;16(Suppl 1):A858.
12. Ebbert JO, Patten CA, Schroeder DR. The Fagerström Test for Nicotine Dependence–Smokeless Tobacco (FTND-ST). Addict Behav. 2006;31(8):1716–1721.
13. Evaluation of nicotine dependence among smokeless tobacco users using the Fagerström Nicotine Dependence Scale for Smokeless Tobacco. J Pharm Bioallied Sci. 2023;15(Suppl 1):S198–S202. doi:10.4103/jpbs.jpbs_83_23.
14. Perceptions and experiences of primary care providers on their role in tobacco treatment delivery based on their smoking status: a qualitative study. Int J Environ Res Public Health. 2025;22(1):105.
15. Carson KV, Verbiest MEA, Crone MR, et al. Training health professionals in smoking cessation. Cochrane Database Syst Rev. 2012;5:CD000214.
16. National Family Health Survey-5 (NFHS-5), 2019–21. Mumbai: International Institute for Population Sciences (IIPS); 2022.
17. World Health Organization. WHO Framework Convention on Tobacco Control. Geneva: WHO; 2003 (updated reprint 2004, 2005).
18. Yücel Özden KB, Ceyhun Peker AG. Understanding tobacco and e-cigarette use among university students: a cross-sectional study exploring nicotine dependence,

397 quit intentions, and awareness of cessation support services. BMC Public Health.
398 2025;25:3741. doi:10.1186/s12889-025-24911-6.