ORIGINAL RESEARCH ARTICLE

Prevalence and Determinants of Smokeless Tobacco Use among Women in Urban Slums of Vidarbha, Maharashtra, India

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ABSTRACT

Background: Smokeless tobacco (SLT) use remains a major public health concern in India, particularly among women living in urban slum settings. Evidence on its prevalence and determinants in this population remains limited.

Methods: A community-based cross-sectional study was conducted among 300 women residing in urban slums of Vidarbha. Data on socio-demographic characteristics, SLT use, and behavioral factors were collected through face-to-face interviews. Statistics summarized participant characteristics and prevalence. Bivariate analysis using the Chi-square test estimated associations, while multivariate logistic regression was used to identify independent determinants.

Results: The prevalence of SLT use was 21.3%. In bivariate analysis, SLT use was associated with older age, low educational attainment, employment status, and family tobacco exposure. In the adjusted model, low educational attainment (AOR = 8.61; 95% CI: 4.17-19.2) and employment status (AOR = 2.64; 95% CI: 1.42-5.01) emerged as independent determinants. Khara was the most commonly consumed product. Peer pressure, indigestion-related reasons, and thrill-seeking behavior were the most frequently reported reasons for initiation.

Conclusion: SLT use is highly prevalent among women in urban slums, driven primarily by educational and occupational factors. Targeted, community-based interventions focusing on literacy and socio-behavioral change are essential to reduce SLT use and associated health risks.

Keywords: Smokeless tobacco, Prevalence, Women, Urban slums, Socio-demographic determinants, India

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INTRODUCTION

Smokeless tobacco (SLT) is used as a term to refer to tobacco products that have not been smoked or burned, and are usually consumed through either the mouth or nose.[1] Although there have been global campaigns to reduce tobacco consumption[2], the consumption of tobacco (particularly in South Asia) persists with a high number of users in India accounting a large percentage of the world population.[3,4]

Smokeless tobacco uses results in significant systemic exposure to nicotine and other toxicants, contributing to adverse circulatory and health effects.[5] Regionally prevalent products such as mishri, khaini, mawa, and gutka are commonly used in Vidarbha, Maharashtra, and studies suggest that women may be at a higher risk of adverse health effects associated with smokeless tobacco use.[6,7]

The health problems of SLT use are immense, such as oral and pharyngeal cancer, chronic lung and cardiovascular disease, and poor reproductive outcomes.[8] Women with less education and lower awareness tend to be more susceptible to using SLT,[9] also the nicotine exposure poses health risks.[10] Emerging evidence suggests that nicotine exposure, irrespective of the mode of delivery, is associated with adverse cardiometabolic and systemic health effects, particularly among women.[11] Although a lot of literature has been written about tobacco use, very little has been documented about the prevalence and socio-demographic factors that have determined the use of smokeless tobacco among women in Vidarbha, in urban slums.

These patterns need to be understood in order to be able to design a specific intervention aimed at decreasing the morbidity caused by SLT and improving the health of the population. Thus, the study objective was to approximate the rate of smokeless tobacco use in women in urban slum communities and determine the socio-demographic variables associated with it.

METHODOLOGY

Study Area and Population: This study was conducted in the catchment area of an Urban Health Training Centre (UHTC) affiliated with a tertiary care hospital in the Vidarbha region of Maharashtra. The target population included women aged 18 years and above residing in the selected urban slum communities.

Study Design and Duration: A community-based analytical cross-sectional design was employed. The study was carried out over a period of two months, aiming to capture a representative snapshot of smokeless tobacco use and associated socio-demographic factors among the target population.

Inclusion and Exclusion Criteria: Women aged 18 years and above who were permanent residents of the study area were included. Women who were critically ill or declined to provide informed consent were excluded.

Sample Size: The sample size was calculated based on an estimated prevalence of smokeless tobacco use of 22.3%, with a 5% allowable error.[12] Accounting for a 10% non-response rate and potential incomplete data, the final sample size was set at 300 participants.

Sampling Technique: Systematic random sampling was used to select households from the UHTC catchment area, which includes approximately 50,000 residents across 9,165 households. A sampling interval of every 31st household was applied. The first household was selected by lottery, followed by every 31st household thereafter. In cases where the selected house was locked, a second visit was made on a different day to include eligible participants.

Data Collection Procedure: The objectives and confidentiality measures were explained to each participant, and informed consent was obtained. Data were collected through face-to-face interviews using a predesigned and pre-tested questionnaire in the local language. The questionnaire captured socio-demographic characteristics, types of smokeless tobacco used, and behavioral and social factors influencing consumption. A pilot study was conducted in a nearby community to ensure the validity and clarity of the questionnaire.

Operational Definitions

Smokeless tobacco user: A woman aged 18 years or above who had been consuming SLT for at least the past six months.

Khara/Mawa/Gutka: A mixture of tobacco, areca nut, and slaked lime that is chewed.

Mishri: Burned tobacco traditionally used for teeth cleaning.

Khaini: Roasted tobacco flakes mixed with slaked lime, applied to the palm, and placed in the buccal sulcus.

Statistical Analysis: Descriptive statistics were used to summarize background characteristics and prevalence of smokeless tobacco use. The Chi-square test was applied to evaluate associations between tobacco use and socio-demographic factors. Odds ratios (OR) with 95% confidence intervals (CI) were calculated to quantify the strength of associations. Bivariate analysis was conducted to assess crude associations between smokeless tobacco use and selected socio-demographic variables. Variables with a p-value <0.20 in bivariate analysis, as well as variables of known public health importance, were entered into a multivariate logistic regression model to identify independent determinants of smokeless tobacco use. Adjusted odds ratios (AORs) with corresponding 95% confidence intervals were reported. All analyses

were performed using R statistical software (RStudio v.4.5.2)[13], and statistical significance was set at p <0.05. Findings were presented in tables and graphs for clarity.

Ethics Statement: The research was conducted in line with the ethical requirements specified in the Declaration of Helsinki. The research had to get the ethical approval of the Institutional Ethics Committee prior to its initiation (NKPSIMS & RC and LMH/21/2024). All participants had a written informed consent, which had undergone a detailed explanation of the objectives and procedures of the study and the protection of their anonymity. The involvement was on a voluntary basis and the participants were free to quit at any point without facing any negative effects.

RESULTS

Participant Description and Sample Characteristics: A total of 300 women aged 18 years and above were included in the final analysis. The socio-demographic characteristics of the study population are summarized in Table 1.

Among the participants, 67.7% were aged ≥40 years, while 32.3% were below 40 years of age. Nearly 44.3% of the women had low educational attainment (illiterate or primary level), and 57.7% were unemployed. The majority of participants were married (86.15%). The mean household size was 4.5 ± 1.77 members. Exposure to tobacco use among family members or close contacts was reported by 67.18% of the participants.

Prevalence of smokeless tobacco use: Out of the 300 women included in the study, 64 participants reported current use of smokeless tobacco, resulting in an overall prevalence of 21.3%. The prevalence of smokeless tobacco use was 21.3% (64/300), with a 95% confidence interval of 16.8% to 26.0%, indicating a considerable burden of smokeless tobacco consumption in the study population.

Profile of smokeless tobacco users: A descriptive profile of participants who reported smokeless tobacco use is presented in Table 1. Among the 64 women who reported current use of smokeless tobacco, the majority were aged ≥40 years (79.7%). Most users had low educational attainment (illiterate or primary level) (81.2%), and 60.9% were employed.

With regard to product preference, khara was the most commonly consumed smokeless tobacco product (57.8%), followed by gutka (25.0%), mishri (12.5%), and khaini (4.7%).

Table 1: Socio-demographic characteristics of the study population

Variable	Particip[ants (%)	SLT Users (64)
Age group (years)		
<40	97 (32.3)	13
≥40	203 (67.7)	51
Education level		
Primary	133 (44.3)	52
Secondary & above	167 (55.7)	12
Occupation		
Employed	127 (42.3)	39
Unemployed	173 (57.7)	25
Marital status		
Married	282 (94.0)	56
Unmarried	16 (5.3)	6
Divorced	2 (0.7)	2
Household size (Mean ± SD)	4.5 ± 1.77	-
Family tobacco use		
Yes	128 (44.4)	43
No	160 (55.6)	21

Table 2: Bivariate analysis of factors associated with smokeless tobacco use

Risk Factor	Category	Smokeless Tobacco Users	OR	95% (CI)	p-value*
Age	≥40 yrs	51	2.16	1.13-4.34	0.01
Occupation	Employed	39	2.61	1.48-4.65	0.001
Marital Status	Unmarried	2	0.44	0.06-1.74	0.29
Number of Family Members	<4	42	1.42	0.80-2.57	0.22
Education	Illiterate/up to primary	52	8.23	4.23-16.9	0.001
Family Tobacco Use	Yes	33	1.86	1.06-3.27	0.03

*p-value <0.05 is significant; CI- Confidence Interval; OR – Odds Ratio

Table 3: Multivariate logistic regression analysis identifying independent determinants of smokeless tobacco use

Variable	Category	AOR	95% CI	p-value
Age group (years)	≥40	0.95	0.42-2.15	0.89
Education level	Illiterate / Primary	8.61	4.17-19.2	0.001
Occupation	Employed	2.64	1.42-5.01	0.002
Family tobacco use	Yes	1.41	0.75-2.66	0.29

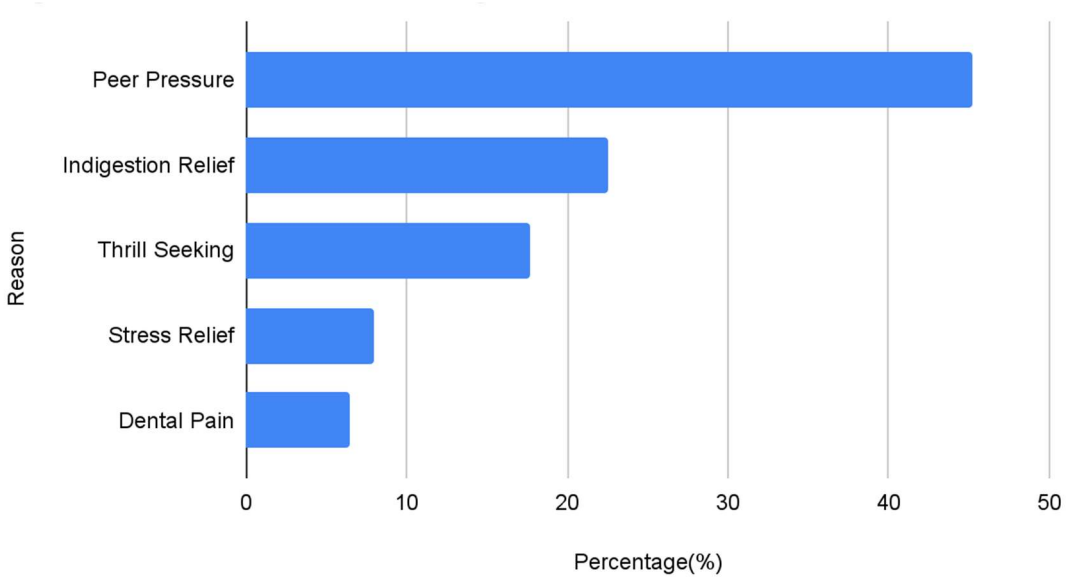

Figure 1: Reasons for Initiating SLT use

Bivariate Analysis: Bivariate analysis was performed to assess the association between smokeless tobacco use and selected socio-demographic variables. Crude odds ratios (ORs) with 95% confidence intervals and p-values are presented in Table 2.

Smokeless tobacco use was significantly associated with age ≥40 years (OR = 2.16; 95% CI: 1.13-4.34; p = 0.01), low educational attainment (OR = 8.23; 95% CI: 4.23-16.9; p < 0.001), employment status (OR = 2.61; 95% CI: 1.48-4.65; p = 0.001), and family tobacco use (OR = 1.86; 95% CI: 1.06-3.27; p = 0.03).

Selection of variables for multivariate analysis: Variables demonstrating a p-value < 0.20 in bivariate analysis, along with variables of established public health relevance, were considered for inclusion in the multivariate logistic regression model. Based on these criteria, age group, education level, occupation, and family tobacco use were included in the adjusted analysis to identify independent determinants of smokeless tobacco use.

Multivariate (Adjusted) Analysis: Multivariate logistic regression analysis was performed to identify independent determinants of smokeless tobacco use. Adjusted odds ratios (AORs) with 95% confidence intervals and p-values are presented in Table 3.

After adjustment, low educational attainment remained strongly associated with smokeless tobacco use (AOR = 8.61; 95% CI: 4.17-19.2; p <0.001). Employment status was also independently associated with increased odds of smokeless tobacco use (AOR = 2.64; 95% CI: 1.42-5.01; p = 0.002). The multivariate model demonstrated acceptable goodness of fit.

Behavioral and contextual factors related to smokeless tobacco use: Among the 64 women who reported smokeless tobacco use, the most commonly cited reason for initiation was peer pressure (45.2%). Other reported reasons included indigestion-related causes (22.6%), thrill-seeking behavior (17.7%), dental pain (6.5%), and stress-related reasons (8.0%). (Figure 1).

Discussion

The prevalence of smokeless tobacco (SLT) in the slum women populations of the Vidarbha urban city was established to be, at 21.3%. It is a similar rate to that of other urban locations in India with a prevalence of between 13.44 to 25.81%.[12,14,15] This variation is probably an indicator of disparity in the socioeconomic status, cultural values and the domestically marketed products in SLT.

Although higher SLT use was observed among women aged 40 years and above, age did not remain independently associated with SLT use after adjustment for socio-demographic factors. The trend is similar to other South Asian researches in which women of higher age are more likely to use them-possibly because of long-term exposure, well-established social practices, and disability to understand health-related information.[3,12] By contrast, younger women normally record lower use, which could be attributed to an improved education level and exposure to anti-tobacco campaigns.

The protective effect of education was great. Little or no formal education gave women a higher chance of using SLT, which strengthens the argument that education is a very important factor in determining health awareness and risk perception.[17,18] Broader evidence suggests that education plays a crucial role in shaping health awareness and risk perception across populations.[16] This relationship was found to be even stronger in this study than in certain national surveys, which might be due to the higher rate of concentration of socioeconomically disadvantaged women in the urban slums.

Employment status emerged as an independent de-

terminant of SLT use, with employed women showing higher adjusted odds of consumption, possibly reflecting occupational stressors, social exposure, or accessibility.[19,20] Family tobacco use showed a significant association in bivariate analysis; however, this association did not persist in multivariate analysis, suggesting a contextual rather than independent influence, this implied that the homestay norms and behaviors had a strong influencing influence on the habits of the individual, which was observed in both villages and urban areas in India.[21]

In terms of preferences of products, the most popular type of SLT was khara, then came the next preference, which was the gutka, then the mishri, and finally, the khaini. This tendency is also consistent with the tendencies in the region and increases the necessity of culturally sensitive intervention strategies.[3,7,22] Most of the reasons why SLT was initiated were peer influence, stress relief and perceived health benefits- similar reasons have been highlighted in other community-based studies that have underscored the social and behavioral factors underlying tobacco use.[23-25]

In general, these results demonstrate that any attempt to diminish the use of SLT among women should consider the factors of age, education, socioeconomic status, and family impact. Relative to national and regional statistics, it seems plausible that these urban slum neighborhoods are in need of interventions that are context-specific; which is to say that community education and household-based initiatives as well as culturally sensitive health promotion campaigns can be effective in helping these communities to ensure their health improves.

Limitations

There are a number of limitations to this research. To begin, the cross-sectional version does not allow concluding on the causal relationships between socio-demographic factors and SLT use. Second, the self-reported nature of the data in terms of tobacco use creates the risk of recall bias or under-reporting, especially among the socially sensitive subpopulations. Third, the research was limited to one area of a city slum in Vidarbha, which can also limit the extrapolation of the results to other geographical regions or even to rural communities. Notwithstanding these limitations, the study is informative in terms of patterns and determinants of smokeless tobacco use among the women in the marginalised urban settings.

Conclusion

Smokeless tobacco use remains a significant public health concern among women living in urban slums of Vidarbha, with a prevalence of 21.3%. Low educational attainment and employment status were identified as independent determinants of smokeless tobacco use, while peer pressure emerged as a prominent behavioral factor associated with initiation. These findings highlight the influence of educational, occupational, and social determinants on smokeless tobacco consumption among women in marginalized urban settings. Addressing these underlying factors through context-specific public health strategies may contribute to reducing the burden of smokeless tobacco use and its associated health risks in this vulnerable population.

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Individual Authors' Contributions: AS designed and supervised the study. **MG** and **KK** drafted the original manuscript. **MG** conducted data collection and refined the same. **PS** performed the statistical analysis, with analytical assistance and interpretation support from **KK**. All authors contributed to revising the manuscript critically for important intellectual content and approved the final version for publication.

Availability of Data: The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Declaration of Non-use of Generative AI Tools: This article was prepared without the use of generative AI tools for content creation, analysis, or data generation. All findings and interpretations are based solely on the authors' independent work and expertise.

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