

Tobacco Use Among Rural Women in Tamil Nadu, India: Patterns, Perceptions, and Policy Implications for Cessation

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Abstract

Introduction: Smokeless tobacco (SLT) use among rural women in India is an under-recognized public health issue, deeply rooted in social norms, limited awareness, and structural inequities. Despite existing tobacco control policies, gendered dimensions of tobacco use and cessation remain poorly addressed, especially in underserved rural settings. This study aimed to examine the prevalence and patterns of tobacco use among rural women in Tamil Nadu, and to explore their knowledge, attitudes, and perceptions related to tobacco cessation. It also sought to identify key sociodemographic correlates influencing tobacco behaviour.

Methods: A community-based cross-sectional survey was conducted among 274 women aged 18 years and above, across four randomly selected villages in Theni district, Tamil Nadu. A structured questionnaire, adapted from the Global Adult Tobacco Survey (GATS) and translated into Tamil, was administered through face-to-face interviews. Descriptive statistics and chi-square tests were performed using Stata 14 to examine associations between tobacco use and sociodemographic characteristics.

Results: The prevalence of current tobacco use was 13.9%, with smokeless tobacco being more common (11.3%) than smoking (3.6%). Use was significantly higher among widowed, uneducated women and those in manual labour ($p < 0.001$). Peer and family influence played a major role in initiation. While 68.4% expressed willingness to quit if support were available, stress relief, low perceived harm, and social acceptance were common reasons for continued use. Although awareness of cancer risks was high, knowledge of reproductive and metabolic effects was limited. Only 15.3% had been screened by healthcare providers.

Conclusion: Tobacco use among rural women is shaped by intersecting structural and psychosocial factors. The findings highlight the need for gender-sensitive, community-based cessation interventions that include family engagement, peer support systems, and culturally relevant communication strategies. Integrating cessation services into primary healthcare and leveraging community health workers can enhance access, awareness, and sustained behaviour change among rural women.

Keywords: smokeless tobacco, rural women, cessation, health belief model, socio-ecological model

Introduction

Tobacco is consumed in both smoked and smokeless forms, each posing significant health risks [1]. Globally, tobacco use is currently ranked as the fourth leading contributor to years of life lost (YLL),

reflecting its substantial impact on premature mortality [2]. Tobacco usage represents a major global public health challenge, contributing to approximately 8 million preventable deaths annually, a toll that surpasses the combined mortality from HIV (Human-Immunodeficiency virus), tuberculosis, and malaria [3,4]. This figure includes an estimated 1.2 million deaths among non-smokers due to second-hand smoke exposure [4]. Approximately 80% of tobacco-related deaths occur in low- and middle-income countries (LMICs), where health systems often lack the capacity to address tobacco-related morbidity and mortality [5]. Smokeless tobacco (SLT) is particularly prevalent in South Asia, including India, Pakistan, Nepal, and Bangladesh, and among South Asian diaspora communities in countries like the United Kingdom [6]. The Global Adult Tobacco Survey (GATS-2) estimates that of the 248 million SLT users worldwide, approximately 232 million reside in India and Bangladesh alone, with India accounting for over 83% of the global burden [7]. SLT use is a well-established public health concern, linked to cancers of the oral cavity, oesophagus, and pancreas, as well as cardiovascular, metabolic, and reproductive health complications [8].

Tobacco use among women is influenced by a complex interplay of health, social, cultural, and economic factors [9]. While global smoking rates among men are declining, tobacco use among women in LMICs is either rising or stagnating [5]. In India, the National Family Health Survey (NFHS) and GATS-2 report a higher burden of SLT use among women than smoking, with rural, less-educated, and socioeconomically disadvantaged women disproportionately affected [10]. Women often initiate SLT use at a young age and continue through their reproductive years, influenced by social norms, peer bonding, stress relief, hunger suppression, and perceptions of SLT being less harmful than smoking [11]. The health consequences of tobacco use for women are extensive. SLT use has been linked to an increased risk of oral cancer, cardiovascular diseases, adverse pregnancy outcomes, menstrual irregularities, and hormonal imbalances [12]. Nicotine and other harmful compounds in SLT products can cross the placental barrier and may impair foetal development, contributing to neurodevelopmental and respiratory complications [13].

In response to declining tobacco consumption in high-income countries, the tobacco industry has aggressively targeted women in LMICs, including India, as an emerging market [4]. Although social stigma has traditionally curbed tobacco use among Indian women, recent data suggest rising trends, particularly in rural areas. GATS-2 reports that 14.2% of Indian women use tobacco, with SLT use higher among rural (32.5%) than urban (21.2%) women [5]. Studies have shown that SLT use is more prevalent among women with low literacy, limited economic opportunities, and in agricultural or informal occupations [14]. In a study conducted by Tiwari et al (2015) in Chhattisgarh, tobacco use was significantly higher among rural (54.4%) than urban (40%) women [15]. Despite the high burden, tobacco cessation efforts remain poorly targeted toward women, and gendered barriers persist. These include the perception that SLT is less harmful, social invisibility of female users, stigma around help-seeking, and under-recognition by healthcare workers. Existing resources such as quit lines and web-based tools are often inaccessible to rural women due to digital divides and low literacy [16].

There is growing recognition that tobacco cessation among women requires gender-sensitive and culturally responsive interventions [14]. While the health benefits of quitting are well established, studies have shown that quit attempts among Indian women are low and rarely supported through structured programs. Most women believe they can quit on their own, but personal, familial, and contextual barriers often impede sustained cessation. Frontline workers and public health programs seldom prioritize female tobacco users, compounding the invisibility of their needs. Despite India's

comprehensive policy landscape, including COTPA (Cigarettes and Other Tobacco Products Act, 2003) and the NTCP (National Tobacco Control Programme) rural women remain underserved in both research and intervention. This study addresses this critical gap by exploring the patterns of tobacco use, knowledge, attitudes, and perceptions related to cessation among rural women in Tamil Nadu. The findings aim to inform locally relevant, gender-inclusive, and equity-focused tobacco control strategies.

Theoretical Framework

This study draws upon two complementary theoretical models—the Socio-Ecological Model (SEM) and the Health Belief Model (HBM)—to examine the complex factors shaping tobacco use and cessation behaviours among rural women. The SEM provides a multi-layered lens through which tobacco use can be understood, emphasizing that individual behaviours are embedded within broader interpersonal, community, organizational, and policy contexts [17]. In rural Indian settings, tobacco use among women is not solely a personal choice but often reinforced by familial influence, cultural acceptability, limited health communication, and the easy accessibility of products. The SEM allows for a nuanced analysis of how factors such as low literacy, entrenched gender norms, and inadequate health infrastructure intersect to influence both the initiation and continuation of tobacco use [18]. In parallel, the Health Belief Model (HBM) focuses on individual-level cognitive and perceptual factors that predict health-related behaviours. The key constructs—perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy—are particularly relevant in understanding women’s tobacco use and their motivation to quit [19]. For instance, many rural women underestimate the risks of smokeless tobacco (low perceived severity), believe quitting will not yield tangible benefits, or face social stigma when seeking cessation support (high perceived barriers). Conversely, advice from healthcare providers or family encouragement can serve as powerful cues to action, triggering quit attempts [20]. Together, SEM and HBM offer an integrated framework for interpreting both external structural drivers and internal motivational factors related to tobacco use. As conceptualized in Figure 1 this dual-theoretical approach also provides a foundation for developing gender-sensitive, community-rooted, and culturally tailored cessation interventions that address the lived realities of rural women.

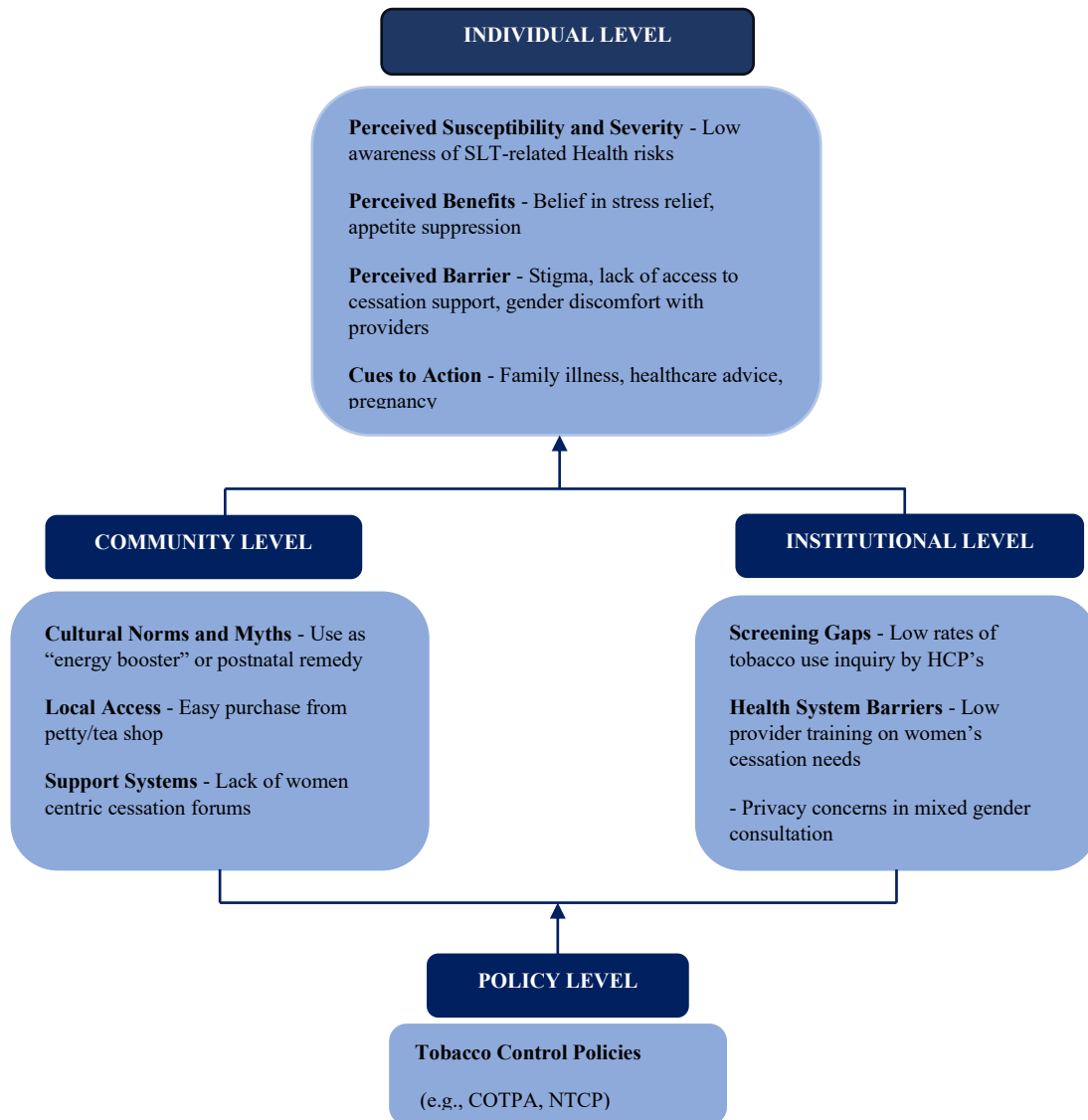


Figure 1 - Conceptual Framework Guiding the Study Integrated with Health Belief Model (HBM) and Socio-Ecological Model (SEM)

Aims and Objectives of the Study

This study aims to understand the patterns of tobacco use and perceptions related to cessation among women residing in rural communities of Tamil Nadu, India. Specifically, it seeks to: (i) Assess the prevalence of tobacco use among women in these rural settings; (ii) Identify the types of tobacco products used and the frequency of their use; (iii) Explore women's perceptions, beliefs, and attitudes regarding tobacco cessation; and (iv) Examine the influence of sociodemographic factors on both smoking and smokeless tobacco use patterns and cessation-related perceptions [7,21]. By addressing these objectives, the study aims to generate insights that can inform the development of culturally and gender-sensitive tobacco control strategies.

Methods

Study design, period, and participants

A community-based cross-sectional study was conducted from May to July 2023 in selected rural areas of Bodinayakanur block, Theni district, Tamil Nadu, India. Using a multistage sampling method to

enhance representativeness, four villages—Annaikaraipatty, Rasingapuram, Kamarajapuram, and Sillamarathupatty—were randomly selected through simple random sampling from a comprehensive list obtained from local administrative records. Equal samples were collected from each village to ensure geographic and demographic diversity.

Inclusion and exclusion criteria

Women aged 18 years and above, who were usual residents of the selected rural areas and willing to provide informed consent, were included. Women who were bedridden or diagnosed with terminal illness or cancer were excluded.

Sample size and sampling method

The required sample size was calculated based on a 15.2% prevalence of tobacco use among rural women, as reported in a study [21]. With a 95% confidence level ($Z = 1.96$) and a 4.3% absolute precision, the minimum sample size was estimated to be 274. A convenience sampling technique was used to recruit participants based on their availability and willingness. Written informed consent was obtained from all participants. For illiterate women, consent forms were read aloud and documented via thumb impressions with a witness.

Data collection procedure

Data were collected using a structured questionnaire adapted from the Global Adult Tobacco Survey (GATS), administered via face-to-face interviews by the principal investigator [7]. The tool was translated into Tamil following the World Health Organization's standard methodology to ensure conceptual and linguistic validity [22]. Data were captured digitally using Kobo toolbox to enhance accuracy and reduce entry errors.

Study variables

Dependent Variable

- Tobacco use (both smoking and smokeless forms)

Independent Variables

- Sociodemographic variables: age, education, occupation, marital status [23].
- Knowledge [24]: Assessed through 10 items. Scoring: Yes = 2, Neutral = 1, No = 0; Total range: 0–20. Categorized as:
 - Satisfactory knowledge: ≥ 16
 - Unsatisfactory knowledge: < 16
- Attitude [24]: Measured via five items on a 3-point Likert scale. Total score range: 5–15. Categorized as:
 - Favourable attitude: ≥ 10
 - Unfavourable attitude: < 11
- Perception towards cessation [4]: Measured with five items on a 3-point scale (Agree = 3, Neutral = 2, Disagree = 1). Score range: 5–15. Categorized as:
 - Positive perception: ≥ 13
 - Neutral perception: 8–12
 - Negative perception: < 8

Only tobacco users were assessed for perception toward cessation. The questionnaire covered demographics, tobacco use patterns (including type, quantity, and frequency), procurement habits, cessation history, and knowledge/attitudes toward health risks and quitting.

Statistical analysis

Data were entered in Microsoft Excel 2019 and analysed using Stata version 14. Descriptive statistics (frequencies, percentages) were used to summarize categorical variables. Chi-square tests were performed to assess associations between sociodemographic variables and tobacco use. A p-value of <0.05 was considered statistically significant.

Results

Socio-demographic characteristics of study participants

A total of 274 individuals participated in the study. The majority of respondents were between the ages of 31 and 50 years (52.6%), followed by those aged 18–30 years (27.4%) and 51–70 years (20.1%). In terms of marital status, 69.3% of participants were married, while 17.9% were unmarried. Widowed individuals accounted for 10.2%, and 2.6% were divorced. Regarding educational attainment, nearly one-third (31.8%) of respondents had completed an undergraduate degree, and 26.6% had attained higher secondary education. A notable proportion (15.0%) were uneducated, while others reported secondary school education (11.7%), primary school education (4.7%), or had dropped out of the educational system (7.3%). Only 2.9% of respondents reported completing a postgraduate degree. Employment data revealed that 34.7% of participants were unemployed. Manual workers made up 24.8% of the sample, followed by individuals employed in the private sector (17.5%). Other respondents reported being self-employed (9.9%), working as government employees (4.4%), or being students (8.0%). A very small proportion were retired (0.7%).

Age-wise distribution of socio-demographic and tobacco use characteristics

The overall prevalence of tobacco use was similar across age groups: 14.7% among those aged 18–30 years, 13.2% in the 31–50 group, and 14.5% among those aged 51–70 years. This difference was not statistically significant ($p = 0.944$), suggesting that tobacco use was relatively consistent across the life course. Marital status, education, and employment showed significant variation by age group ($p < 0.001$). Marriage was predominant in the 31–50 age group (86.1%) and remained high (63.6%) in the 51–70 group. Widowed respondents were concentrated in the oldest group (36.4%), while none in the youngest group were widowed or divorced. More than half of respondents aged 18–30 had completed an undergraduate degree (52.0%), compared to 28.5% in the 31–50 group and just 12.7% in the 51–70 group. Uneducated individuals were most common in the oldest group (30.9%) and least common in the youngest (2.7%). Students (29.3%) were primarily in the youngest age group, while unemployment was most prevalent among the oldest group (61.8%).

Demographic correlates of tobacco use

Out of 274 respondents, 13.9% ($n = 38$) reported current use of tobacco products. Tobacco use was most prevalent among widowed individuals (28.9%) and unmarried participants (21.1%), compared to 9.5% among married respondents ($p < 0.001$). Higher prevalence was also observed among those with low education: 31.6% of uneducated women and 18.4% of those with only primary schooling used tobacco,

compared to only 5.7% with undergraduate and 2.6% with postgraduate education ($p < 0.001$). Manual labourers had the highest prevalence (60.5%), with no users reported among private sector or government employees ($p < 0.001$).

Patterns of tobacco use

Of the total sample, 13.9% reported current tobacco use. SLT use (11.3%) was more common than smoking (3.6%). Among SLT users, the most common product was betel quid with tobacco. The average number of products used was 2.1 (SD = 1.48). Most used 1–4 packets per week (83.9%). Among smokers ($n = 10$), cigarettes were most used (60%), followed by bidi (30%) and hookah (10%). 70% were daily smokers; 20% smoked less than daily; and 10% smoked occasionally. Most (60%) smoked 1–10 times weekly, while 28.6% of young smokers exceeded 10 episodes weekly.

Age-wise patterns of tobacco use

SLT use was most common in middle-aged and older adults (12.5% and 12.7%, respectively), though not statistically significant ($p = 0.568$). Mean number of SLT products was highest in the youngest group. Heavier use (≥ 5 packs/week) was observed only in older groups. Smoking was significantly associated with age ($p = 0.007$). Young adults (18–30) had the highest smoking prevalence (9.3%). Cigarette use was dominant among them, while bidi and hookah appeared only in older groups. All 31–50-year-old smokers smoked daily. Younger smokers showed varied patterns. Differences in smoking product use were significant ($p = 0.033$).

Initiation, influence, and social context of tobacco use

Most users initiated tobacco between 17–20 years (38.9%) or 21–25 years (30.6%), with 19.4% starting at 12–16 years. Peer influence (51.4%) was the most cited factor for initiation, followed by sibling (28.6%) and parental use (20%). Petty shops were the most common source (61.5%), followed by tea shops (20.5%) and grocery stores (15.4%). Weekly spending was under ₹100 for 70.3% of users, but some spent over ₹200 (10.8%), suggesting differing dependence levels. A concerning 78.4% of users admitted encouraging others to use tobacco, though 71.1% also advised others to quit—suggesting internal conflict or shifting attitudes.

Healthcare interaction and cessation intentions among tobacco users

58% of participants had visited an HCP in the past year. However, only 15.3% were asked about tobacco use. This rate was significantly higher among users (63.2%) vs non-users (7.6%) ($p < 0.001$). Over half (55.9%) of those asked were advised to quit. Only 29.7% of users had attempted to quit in the past year. While 45.7% said they would like to quit someday, only 8.6% intended to quit within the next year. Encouragingly, 68.4% of users expressed willingness to quit if support were available.

Knowledge of health risks associated with tobacco use

High knowledge existed for oral and lung cancer risks (95%+), but users were less aware than non-users (e.g., lung cancer: 86.8% vs 97.9%; $p = 0.001$). Gaps persisted for lesser-known risks:

- Infertility (28.9% of users vs 62.7% of non-users; $p < 0.001$)
- Stroke (44.7% vs 76.7%; $p < 0.001$)
- Diabetes (23.7% vs 48.3%; $p < 0.001$)

“Do not know” responses were more frequent among users across categories.

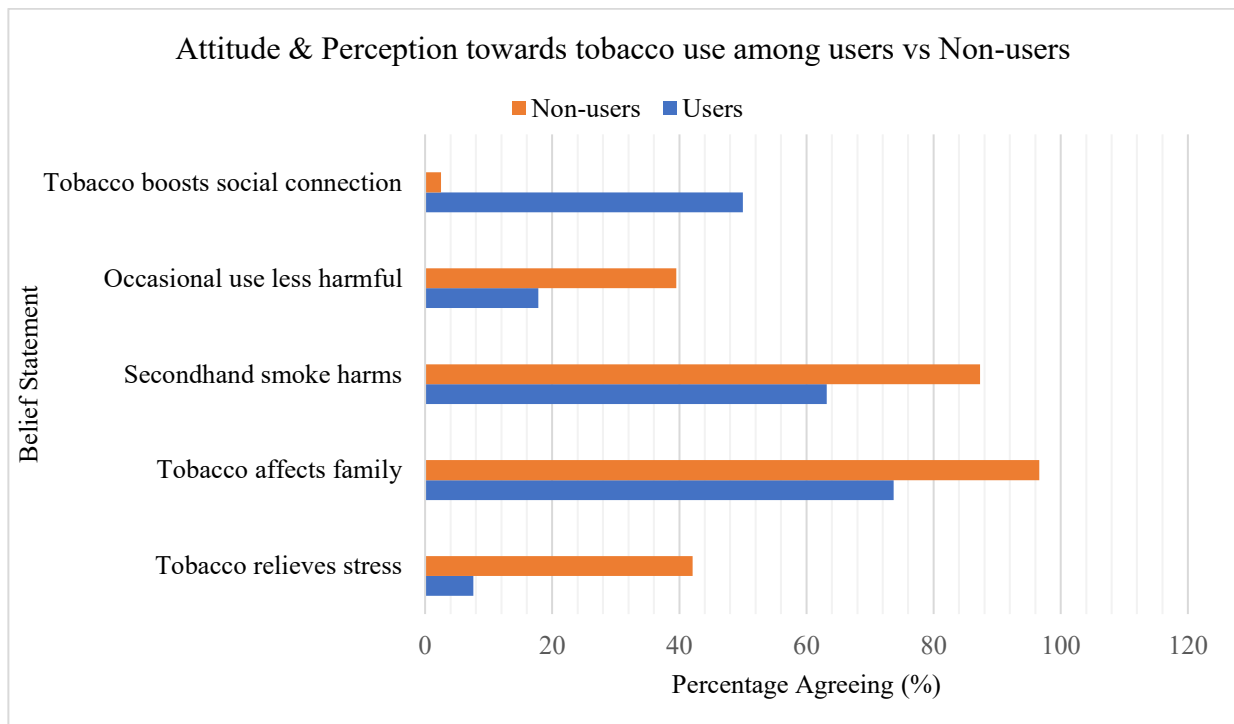


Figure 2 - Attitudes and perceptions toward tobacco use among users vs non-users

Attitudes and Perceptions Toward Tobacco Use

As described in Figure 2, users were more likely to agree that tobacco relieves stress (42.1% vs 7.6%), enhances social connection (50.0% vs 2.5%), and that occasional use is less harmful (39.5% vs 17.8%) (all $p < 0.01$). Users were less likely to agree that tobacco harms families (73.7% vs 96.6%) or second-hand smoke is harmful (63.2% vs 87.3%) ($p < 0.001$). Tobacco users are more likely to perceive social and emotional benefits from use and less likely to recognize associated harms.

Gender Barrier in Communication

Only 47% of users were comfortable speaking to providers of the opposite gender about tobacco, while 29% expressed discomfort. Cultural taboos may hinder open discussions about cessation.

Discussion

Socioeconomic status significantly influences smokeless tobacco (SLT) use among rural women. Those from lower socioeconomic backgrounds often exhibit higher rates of SLT consumption, driven by factors such as limited educational attainment, poverty, and inadequate awareness of tobacco-related health risks [14]. According to findings from the GATS-2, the prevalence of SLT use is nearly double in rural populations compared to their urban counterparts. Furthermore, it is significantly higher among individuals without formal education—approximately twice as high among men and up to eight times higher among women—compared to those with secondary education or above [7].

This study highlights the intricate socio-cultural and economic factors influencing SLT use among women in rural Theni, Tamil Nadu. A key outcome reveals a disproportionately higher prevalence of SLT use among women from lower socioeconomic strata, consistent with findings from GATS-2, which

reported significantly elevated SLT use in rural areas, especially among those with little or no formal education. These women are not only economically disadvantaged but also nutritionally vulnerable, compounding the harmful effects of tobacco and increasing their risk of tobacco-related cancers [25]. Moreover, women belonging to the lowest wealth quintiles, scheduled tribes, or other marginalized communities are disproportionately affected, placing them at heightened risk of tobacco dependence [16,26].

Sociodemographic characteristics strongly influenced cessation perceptions. For instance, women with limited education or working in informal labour reported lower awareness of cessation options and greater emotional dependence on tobacco. Widowed participants—who had the highest tobacco use—often lacked familial or peer support for quitting. These findings underscore the need to tailor cessation messaging and delivery methods based on the intersecting effects of age, education, and marital status.

Cultural and social norms play a pivotal role in shaping tobacco use behaviours among rural women. In several rural settings, the use of tobacco is socially normalized and often integrated into daily routines [6]. For many women, tobacco serves as a culturally accepted means of coping with stress, managing emotional distress, or addressing traditional health beliefs—such as its perceived utility in postnatal care [16]. Family members and peers significantly influence tobacco use behaviours among rural women. Research suggests that interpersonal relationships, particularly within the household, play a pivotal role in either reinforcing or discouraging tobacco use [27]. Notably, some studies have observed a growing trend where husbands and other family members encourage women to quit tobacco use during pregnancy, indicating a gradual and positive shift in societal perceptions toward tobacco cessation [7].

A significant barrier to tobacco cessation among rural women is the lack of awareness regarding its harmful effects. Many women in these settings perceive tobacco use as harmless or even beneficial, often due to longstanding misconceptions [16,28]. This is further exacerbated by limited access to health education and inadequate exposure to tobacco control initiatives. Interventions led by community health workers (CHWs) and targeted awareness campaigns have demonstrated potential in enhancing knowledge and motivating women to consider quitting [29]. Delegating tobacco cessation responsibilities to CHWs has emerged as a practical and effective strategy in rural India. Given their existing roles within maternal and child health programs, CHWs are well-positioned to deliver brief interventions, conduct screenings, and offer cessation support to pregnant women and other community members. Both CHWs and beneficiaries, including pregnant women, have shown a willingness to engage with this approach. However, concerns such as added workload and the need for adequate training and support remain important considerations [25].

The study findings substantiate the potential effectiveness of culturally sensitive and community-integrated tobacco cessation strategies. A considerable proportion of women reported misconceptions regarding the health impacts of SLT, with many perceiving its use as a stress reliever. This reinforces the need for culturally tailored awareness campaigns—such as folk performances, posters, and visual media in local dialects—that directly address these beliefs. Moreover, the data revealed that family dynamics significantly influenced tobacco behaviours. Findings from the GATS-2 survey indicated that some women were encouraged by family to reduce or stop tobacco use during pregnancy, highlighting the promise of family-based interventions in motivating cessation. Additionally, while several participants showed a readiness to quit, they lacked access to peer support systems or structured guidance, underscoring the importance of integrating group-based support and mental health services within existing rural primary healthcare setups [30].

Community-based support initiatives, such as peer support groups and mental health screening, can offer vital resources and motivation for women attempting to quit tobacco. To be effective, these programs must be culturally appropriate and specifically designed to address the unique challenges faced by rural women, including low literacy levels, unemployment, and socioeconomic inequalities [31]. Although various cessation strategies are available, multiple barriers continue to impede women's efforts to quit tobacco use. These include insufficient awareness of cessation options, restricted access to healthcare services, and the social stigma surrounding tobacco use among women. To be effective, interventions must focus on overcoming these challenges by integrating accessible, affordable, and stigma-sensitive cessation support within the primary healthcare framework [32].

A unique strength of the study is its community-based, culturally informed design, which allowed for nuanced understanding of attitudes and perceptions toward tobacco cessation among rural women—an area often underrepresented in tobacco control literature. Nevertheless, limitations include the self-reported nature of the data, potential recall bias, and the geographic constraint which may affect generalizability.

Conclusion and Recommendations

Tobacco remains a uniquely harmful substance legal yet lethal even when used as intended [33]. Among rural women in India, tobacco use is shaped by a confluence of low education, gendered social norms, occupational stress, and deeply embedded cultural beliefs. Despite a demonstrated willingness to quit, many women face systemic barriers to cessation, including limited access to support services, low health literacy, and discomfort in discussing tobacco use with healthcare providers particularly of the opposite gender.

These findings underscore the urgent need for gender-sensitive and culturally contextualized cessation programs that are embedded within communities. Interventions should include:

- Task-shifting to community health workers (CHWs) such as Women Health Volunteers (WHV) from Makkalai Thedi Marutthuvam (MTM) under the National Health Mission, Government of Tamil Nadu for routine screening and brief counselling
- Peer-led support groups to address stigma and emotional dependence in the community level for increased support and making the interventions interwoven inside the community
- Locally adapted media campaigns using folk arts and visual tools in regional languages to challenge misconceptions.

Health systems must also integrate tobacco cessation into routine care by offering brief advice, pharmacological support for nicotine dependence, and structured follow-ups. Importantly, addressing the broader social determinants such as poverty, unemployment, and educational disadvantage is vital for achieving sustained impact. A comprehensive, multisectoral approach anchored in empathy, empowerment, and equity is essential to support rural women in quitting tobacco and advancing community health.

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and interpretation of results were developed by the authors. The final manuscript has been reviewed and approved by all contributing authors to ensure accuracy and accountability.

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