# Tobacco Use Among Middle-Aged Population in India: Prevalence, Patterns, and Health Implications –A Comprehensive Review

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***Abstract*—Tobacco use among the middle-aged population in India represents a significant public health challenge with increasing prevalence and severe health consequences. This systematic review synthesizes existing research on tobacco consumption patterns, prevalence rates, and associated health risks among middle-aged individuals in India and globally. A comprehensive search of multiple databases was conducted to identify relevant studies examining tobacco use patterns, cessation behaviors, and intervention effectiveness. The review included cross-sectional studies, community-based surveys, and intervention trials conducted across various Indian states and international settings. Results indicate alarming prevalence rates of tobacco use, with 37.2% of study populations reporting ever-tobacco use, including 32.9% current users and only 4.3% successful quitters. Smokeless tobacco forms, particularly Mawa-masala (63.7%) and Gutka (57.6%), dominate consumption patterns, with users typically consuming tobacco 6-8 times daily. The initiation age commonly falls between 15-30 years, with strong familial influences (63.8% family exposure). Despite moderate awareness of health hazards, cessation rates remain disappointingly low, with only 28.4% of current users expressing willingness to quit. Health complications serve as the primary motivation for cessation (72.2% of quitters). Educational interventions showed promising results, with structured teaching programs demonstrating significant knowledge improvement from 38.67% to 74.67%. The evidence strongly links tobacco use, especially smokeless forms, to serious health consequences including oral and throat cancers, with case-control studies showing 39-fold increased risk among users. These findings underscore the urgent need for comprehensive, multi-sectoral interventions targeting awareness, cessation support, and policy implementation to address this growing epidemic in India's middle-aged population.**

***Index Terms*—Tobacco consumption, middle-aged population, India, Smokeless tobacco, Health interventions, Framework convention on tobacco control (FCTC)**

## I. INTRODUCTION

Tobacco consumption represents one of the most significant preventable public health challenges facing India today, with particularly concerning trends among the middle-aged population. Introduced by the Portuguese in the 17th century via Goa, tobacco has evolved from a colonial import to a deeply entrenched public health crisis affecting millions across the Indian subcontinent [1]. The middle-aged demographic, typically defined as individuals aged 45-65 years, represents a critical population segment where tobacco-related health consequences become most apparent while intervention opportunities remain viable. According to the National Family Health Survey-III (NFHS-III), tobacco consumption in India demonstrates alarming gender-specific patterns, with 55.8% of Indian males and 10.8% of females aged 12-60 years consuming tobacco in various forms [2]. This prevalence encompasses both smoked and smokeless tobacco products, with the latter being particularly prevalent

in Indian consumption patterns. The addictive properties of nicotine serve as the primary driver of continued use, creating a cycle of dependence that contributes to substantial health burdens and economic consequences.

Globally, tobacco use stands as a major risk factor for oral cancer, ranking among the most common non-communicable diseases with an annual incidence of 354,864 new cases [3]. The disease represents the sixth most prevalent cancer worldwide, characterized by notably low 5-year survival rates, particularly in developing nations like India. This epidemiological profile underscores the critical importance of understanding regional variations in tobacco use patterns, as genetic, lifestyle, and cultural factors significantly influence both consumption behaviors and health outcomes.

The global burden of tobacco use extends beyond individual health consequences to encompass broader societal impacts. Smoking affects approximately 19.2% of adults worldwide, causing over 8 million deaths and 150 million disabilities annually [4]. Smokeless tobacco products, particularly prevalent in South-East Asian countries including India, contribute an additional 60,000 deaths and 1.7 million disability-adjusted life years (DALYs), with the region bearing over 85% of this burden. These statistics highlight the disproportionate impact of tobacco use on developing nations and emphasize the urgent need for targeted interventions addressing both smoked and smokeless tobacco consumption patterns prevalent in Indian populations.

Forms of Tobacco

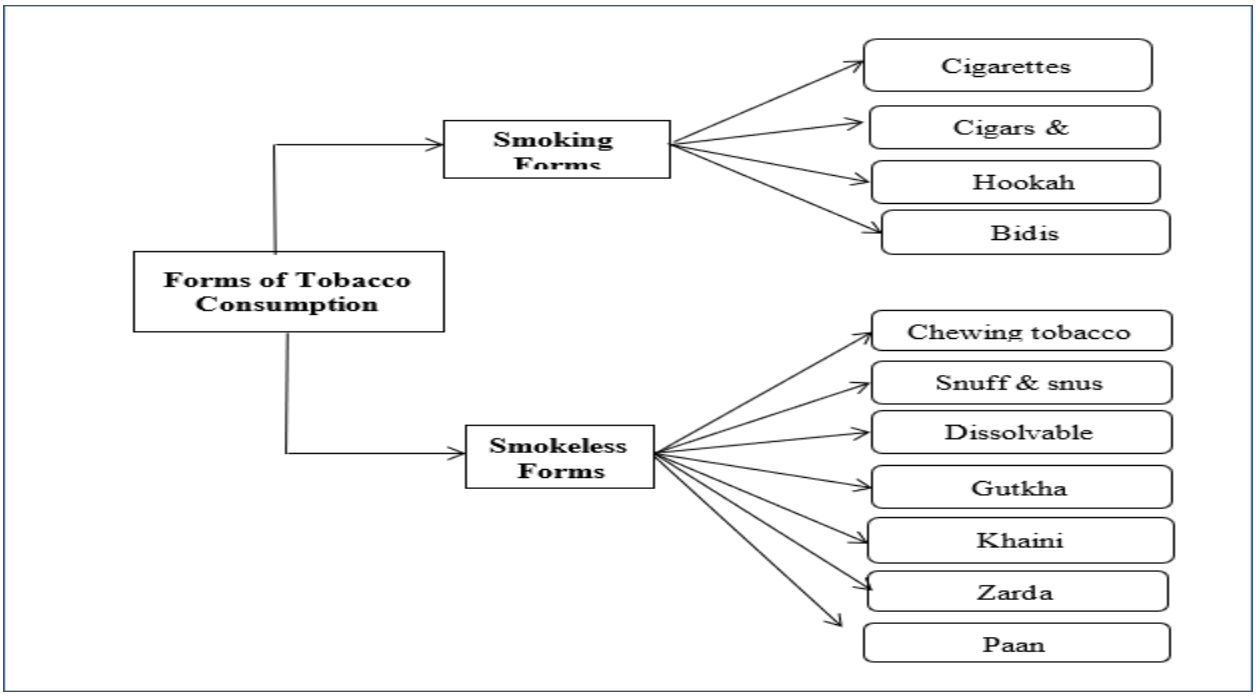


Fig:1 Forms of Tobacco Consumption

Prevalence and Patterns of Tobacco Use

Current Use Statistics

Contemporary research reveals concerning prevalence rates of tobacco use among middle-aged populations in India. Community-based studies demonstrate that approximately 37.2% of surveyed populations report lifetime tobacco use, with 32.9% classified as current users and only 4.3% having successfully quit [2]. This pattern indicates not only high initiation rates but also significant challenges in cessation efforts, highlighting the addictive nature of tobacco products and the need for comprehensive intervention strategies.

The demographic distribution of tobacco use shows significant gender disparities, with male consumption rates substantially exceeding female rates. In urban squatter settlements, tobacco use patterns demonstrate complex socioeconomic associations,

with smoking prevalence reaching 10.5% and smokeless tobacco use affecting 8.6% of surveyed populations [4]. These statistics reflect broader patterns of tobacco consumption that intersect with educational, occupational, and economic factors.


*Figure 2: shows smokeless forms of tobacco*

Forms of Tobacco Consumption

The landscape of tobacco consumption in India is characterized by diverse product types, with smokeless tobacco forms dominating usage patterns. Mawa-masala emerges as the most preferred form, used by 63.7% of tobacco consumers, followed closely by Gutka at 57.6% [2]. These products represent traditional Indian tobacco preparations that combine tobacco with various additives, creating products specifically adapted to local preferences and consumption behaviors. Usage frequency patterns reveal intensive consumption behaviors, with 57.5% of current tobacco chewers consuming products six to eight times daily [2]. This frequency indicates the development of significant nicotine dependence and suggests that intervention strategies must address both the physical addiction and behavioral components of tobacco use. The high frequency of use also amplifies health risks, as repeated exposure to carcinogenic compounds throughout the day increases the likelihood of developing tobacco-related diseases.

Age of Initiation and Familial Influences

The age of tobacco initiation represents a critical factor in understanding consumption patterns and developing prevention strategies. Research indicates that tobacco use typically begins between ages 15-30 years, with slight variations between current users and those who have successfully quit. Among individuals who have quit tobacco use, 84.2% initiated use between ages 20-30, while current consumers show a slightly younger initiation pattern, with 76.5% beginning use in the same age range [2]. Familial influence plays a substantial role in tobacco initiation and maintenance, with 63.8% of current tobacco chewers reporting family members who also consume tobacco [2]. This pattern suggests intergenerational transmission of tobacco use behaviors and highlights the importance of family-based intervention approaches. The high prevalence of family exposure indicates that tobacco use often occurs within social contexts that normalize and reinforce consumption behaviors, making cessation efforts more challenging.


*Figure 3: shows the smoking forms of tobacco*

Health Consequences and Disease Burden

Oral Cancer Risk

The relationship between tobacco uses and oral cancer represents one of the most well-established and severe health consequences of tobacco consumption. Meta-analytic evidence from case-control studies demonstrates that users of smokeless tobacco products face dramatically elevated cancer risks, with odds ratios reaching 38.74 (95% CI: 19.50-76.96) compared to non-users [3]. This represents approximately a 39-fold increase in oral cancer risk, establishing smokeless tobacco as a major carcinogenic exposure. The evidence linking tobacco use to oral and throat cancers is particularly strong for products commonly consumed in India. Research consistently demonstrates clear associations between chewing tobacco use and the development of oral cavity cancers, pharyngeal cancers, and other head and neck malignancies. These findings are particularly concerning given the high prevalence of smokeless tobacco use in Indian populations and the poor prognosis associated with these cancer types in resource-limited settings.

Broader Health Implications

Beyond oral cancer, tobacco use contributes to a comprehensive range of health problems affecting

multiple organ systems. The WHO Framework Convention on Tobacco Control (FCTC) recognizes tobacco as a risk factor for numerous conditions including periodontal disease, alveolar bone loss, tooth mobility, tooth loss, and dental implant failure [5]. These oral health consequences represent immediate and visible impacts of tobacco use that may serve as important motivators for cessation efforts. Tobacco consumption also significantly impacts health-related quality of life across multiple domains. Research demonstrates that cigarette smoking is associated with decreased physical functioning, general health, vitality, social functioning, and mental health [6]. Similarly, smokeless tobacco use correlates with increased bodily pain and reduced vitality. These quality-of-life impacts extend beyond specific disease outcomes to affect daily functioning and overall well-being, representing hidden costs of tobacco use that may not be immediately apparent to users.

Mortality and Disability Burden

The global mortality burden associated with tobacco use underscores the magnitude of this public health challenge. Tobacco-related deaths exceed 8 million annually worldwide, with smoking alone responsible for over 150 million disabilities [4]. In the South-East Asian region, which includes India, smokeless tobacco products contribute approximately 60,000 deaths and 1.7 million DALYs annually, representing over 85% of the global smokeless tobacco disease burden. These statistics reflect not only individual tragedies but also substantial economic and social costs for families and communities. The concentration of tobacco-related mortality and disability in developing countries like India creates additional challenges for healthcare systems already strained by infectious diseases and other health priorities.

Knowledge, Awareness, and Cessation Patterns

Knowledge Assessment Studies

Systematic assessment of tobacco-related knowledge reveals concerning gaps in understanding among various population segments. Studies among adolescents demonstrate that while awareness exists, comprehensive understanding of tobacco's health consequences remains limited. Among 100 adolescents surveyed, only 9% demonstrated adequate knowledge about tobacco's ill effects, while 87% showed moderate knowledge and 4% had inadequate knowledge [7]. Educational interventions show promising potential for improving knowledge and awareness. Structured teaching programs implemented among middle-aged populations demonstrate significant effectiveness, with knowledge scores improving from 38.67% to 74.67% following intervention [1]. These improvements represent a 35.94% increase in knowledge, with mean scores rising from 11.6±2.787 to 22.38±2.694. Such findings indicate that targeted educational approaches can substantially enhance understanding of tobacco-related health risks.

Cessation Willingness and Barriers

Despite awareness of health risks, cessation rates remain disappointingly low across studied populations. Among current tobacco users, only 28.4% express willingness to quit, indicating significant barriers to cessation beyond simple awareness of health consequences [2]. This finding suggests that knowledge alone is insufficient to motivate cessation and that comprehensive intervention strategies must address multiple factors influencing tobacco use behavior. Health problems serve as the primary catalyst for successful cessation, with 72.2% of individuals who quit tobacco reporting health issues as their primary motivation [2]. This pattern indicates that many individuals continue tobacco use until serious health consequences develop, representing missed opportunities for prevention and early intervention. The reactive rather than proactive nature of most cessation attempts highlights the need for intervention strategies that motivate cessation before health problems become apparent.

Factors Influencing Cessation Success

Analysis of successful quitters reveals important patterns that may inform intervention development. Among individuals who successfully quit tobacco use, 58.3% had not consumed tobacco for more than five years, while 55.5% of those showing willingness to quit already knew about health hazards before cessation [2]. These findings suggest that successful cessation often requires extended periods of sustained motivation and that knowledge alone, while necessary, is not sufficient for cessation success. The duration of tobacco use appears to influence cessation patterns, with individuals having shorter usage periods showing greater likelihood of successful cessation. This finding emphasizes the importance of

early intervention and suggests that prevention efforts targeting young adults may be particularly effective in reducing long-term tobacco use prevalence.

Intervention Strategies and Educational Programs

Structured Teaching Programs

Systematic evaluation of educational interventions demonstrates significant potential for improving tobacco-related knowledge and awareness. Pre-experimental studies using one-group pre-test and post-test designs show substantial knowledge improvements following structured teaching programs. In rural Hisar populations, educational interventions produced dramatic improvements in knowledge scores, with post-test scores reaching 74.67% compared to pre-test scores of 38.67% [1]. The effectiveness of structured teaching programs appears to be influenced by demographic characteristics including age, education level, and occupation. Chi-square analysis reveals significant associations between knowledge improvement and these demographic variables, suggesting that intervention strategies may need to be tailored to specific population characteristics to maximize effectiveness. This finding indicates the importance of culturally and educationally appropriate intervention design.

Media and Communication Strategies

Mass media emerges as a significant source of tobacco-related information, with 56.7% of middle-aged populations reporting media as their primary information source [1]. Health personnel represent the second most common information source at 40%, while peer networks contribute only 3.3% of information exposure. These patterns suggest that media-based interventions may reach large population segments effectively, while also highlighting the important role of healthcare providers in tobacco education. Exposure to health warnings demonstrates significant protective effects against tobacco initiation and continued use. Research indicates that exposure to anti-tobacco media messages significantly reduces smoking likelihood, with adjusted odds ratios of 0.02 for smoking behavior [4]. This finding supports the implementation of comprehensive media campaigns as part of broader tobacco control strategies.

Healthcare Provider Interventions

Healthcare providers play crucial roles in tobacco cessation efforts, serving as trusted sources of health information and motivation for behavior change. The effectiveness of provider-delivered interventions may be enhanced by training programs that improve providers' knowledge and skills in tobacco cessation counseling. Given that health problems serve as the primary motivation for cessation, healthcare encounters represent critical opportunities for intervention. The integration of tobacco cessation counseling into routine healthcare visits may increase intervention reach and effectiveness. Systematic approaches to identifying tobacco users and providing brief counseling interventions have demonstrated effectiveness in other settings and may be particularly valuable in Indian healthcare contexts where tobacco use prevalence is high.

Demographic and Socioeconomic Factors

Age Distribution Patterns

The demographic profile of tobacco users reveals important patterns that inform intervention targeting. Among middle-aged populations, the highest representation occurs in the 45-50 years age group (28.3%), followed by 61-65 years (26.7%) and 51-55 years (25%), with the lowest representation in the 55-60 years group (20%) [1]. This distribution suggests that tobacco use remains prevalent throughout the middle-aged years, with slight variations that may reflect cohort effects or age-related cessation patterns. Age-specific tobacco uses patterns demonstrate that smokeless tobacco use is more common among individuals aged 50-59 years, while smoking shows higher prevalence among those aged 30-39 years [4]. These age-related differences in tobacco product preferences suggest that intervention strategies may need to address different products and use patterns across age groups.

Gender Disparities

Gender represents a significant factor influencing tobacco use patterns, with substantial disparities observed across different populations and geographic regions. In urban squatter settlements, smoking demonstrates strong male predominance, with unemployed males showing particularly high risk (AOR=6.6) [4]. These patterns reflect broader cultural and social factors that influence tobacco use behaviors and suggest the need for gender-specific intervention approaches. Female tobacco use patterns may be influenced by different social and cultural factors compared to male use, potentially requiring distinct intervention strategies. Understanding

gender-specific motivations, barriers, and facilitators for tobacco use and cessation is essential for developing effective intervention programs that address the unique needs of both male and female tobacco users.

Educational and Occupational Influences

Educational attainment shows strong associations with tobacco use patterns, with lower educational levels associated with higher tobacco use prevalence. Among studied populations, 50% were illiterate, 26.7% had primary education, 20% had secondary education, and only 3.3% were graduates or postgraduates [1]. This educational distribution suggests that literacy and educational interventions may play important roles in tobacco prevention and cessation efforts. Occupational patterns reveal that certain work environments and employment statuses are associated with higher tobacco use risks. Unemployment emerges as a significant risk factor for both smoking (AOR=6.6) and smokeless tobacco use (AOR=3.6) [4]. These associations may reflect stress-related tobacco use, social factors associated with unemployment, or reduced access to healthcare and intervention services among unemployed populations.

Socioeconomic Status

Socioeconomic factors significantly influence tobacco use patterns and intervention effectiveness. The majority of studied populations belong to middle (65%) and lower (30%) socioeconomic classes, with only 5% from upper socioeconomic strata [1]. This distribution indicates that tobacco use disproportionately affects populations with limited economic resources, potentially creating additional barriers to cessation due to cost concerns, stress, and reduced access to healthcare services. The relationship between socioeconomic status and tobacco use is complex and bidirectional. While lower socioeconomic status may increase tobacco use risk due to stress and social factors, tobacco use also contributes to economic hardship through direct costs and health-related expenses. Understanding these relationships is crucial for developing intervention strategies that address both tobacco use and underlying socioeconomic factors.

Regional Variations and Cultural Factors: (Urban vs. Rural Patterns)

Geographic variations in tobacco use patterns reflect different cultural, economic, and social factors that influence consumption behaviors. Urban settings may present different risk profiles compared to rural areas, with variations in product availability, social norms, and access to cessation resources. Understanding these geographic variations is essential for developing appropriately targeted intervention strategies. Rural populations may face unique challenges in accessing tobacco cessation resources, including limited healthcare infrastructure and reduced availability of specialized services. However, rural communities may also possess cultural and social resources that could be leveraged for intervention purposes, including traditional healing practices and strong community networks.

Cultural and Religious Influences

Cultural factors play significant roles in shaping tobacco use patterns and cessation behaviors. Religious affiliation may influence tobacco use through doctrinal teachings, social norms, and community practices. Among studied populations, 100% followed Hindu religion [1], limiting the ability to assess religious variations but suggesting the importance of understanding how religious beliefs and practices influence tobacco-related behaviors. Traditional cultural practices may either facilitate or inhibit tobacco use, depending on specific customs and social norms. Understanding these cultural factors is essential for developing culturally appropriate intervention strategies that work within existing belief systems and social structures rather than challenging them directly.

Family and Social Network Influences

Social factors, particularly family influences, demonstrate strong associations with tobacco use patterns. The high prevalence of family tobacco use among current users (63.8%) indicates that social learning and modeling play important roles in tobacco initiation and maintenance [2]. These patterns suggest that family-based interventions may be particularly effective for both prevention and cessation efforts. Social network influences extend beyond immediate family to include peer groups, work colleagues, and community members. Understanding these broader social influences is important for developing intervention strategies that address social and environmental factors contributing to tobacco use. Community-based approaches that engage multiple levels of social influence may be

particularly effective in settings where tobacco use is socially normative.

## II. STUDY METHODOLOGY SUMMARY

| Study | Design | Sample Size | Population | Methods | Key Measures |
|---|---|---|---|---|---|
| Rural Hisar Study [1] | Pre-experimental, pre-post design | 60 | Middle-aged rural population | Structured teaching program evaluation | Knowledge scores, demographic variables |
| Jamnagar Cross-sectional [2] | Cross-sectional survey | 2,513 | Urban population | Cluster sampling, structured questionnaire | Prevalence, quitting patterns, tobacco types |
| Meta-analysis [3] | Systematic review/meta-analysis | 6 studies | Various populations | Newcastle-Ottawa Scale quality assessment | Oral cancer odds ratios |
| Lahore Community Survey [4] | Cross-sectional community survey | 607 | Urban squatter settlement | WHO Stepwise approach, multivariable regression | Tobacco use prevalence, associated factors |
| WHO Eastern Mediterranean Review [5] | Scoping review | 322 publications | 22 countries | Database search, FCTC article mapping | Publication characteristics, FCTC compliance |
| Swedish Population Study [6] | Cross-sectional | 1,279 | Adult population 18-65 | SF-36 health survey, multivariable regression | Health-related quality of life |
| Adolescent Knowledge Study [7] | Non-experimental descriptive | 100 | Adolescents | Structured knowledge questionnaire | Knowledge levels, demographic associations |
| Shillong Community Study [8] | Cross-sectional community-based | 330 | Population ≥15 years | Chi-square and t-test analyses | Prevalence, associated factors |
| Adult Smoking Intervention [9] | Pre-experimental | 100 | Adults | Convenience sampling, knowledge questionnaire | Pre-post knowledge scores |
| Medical Student Study [10] | Cross-sectional | 372 | Undergraduate medical students | Self-administered questionnaire, SPSS analysis | Prevalence, associated variables |

The research synthesized in this review employed diverse methodological approaches reflecting the complexity of tobacco use research and the need for multiple types of evidence to understand this public health challenge comprehensively. This methodological diversity strengthens the overall evidence base by providing multiple perspectives on tobacco use patterns, intervention effectiveness, and

associated factors. The combination of cross-sectional prevalence studies, intervention trials, and systematic reviews creates a comprehensive foundation for understanding tobacco use among middle-aged populations and developing evidence-based intervention strategies.

## III. SUMMARY AND CONCLUSION

This comprehensive review reveals the alarming prevalence and complex patterns of tobacco use among middle-aged populations in India, with current use rates reaching 32.9% and successful cessation rates remaining disappointingly low at only 4.3%. The dominance of smokeless tobacco products, particularly Mawa-masala and Gutka, consumed 6-8 times daily, reflects culturally specific consumption patterns that require targeted intervention approaches. Strong familial influences, with 63.8% of users having family members who also consume tobacco, highlight the intergenerational nature of this public health challenge. The evidence demonstrates substantial health consequences, with smokeless tobacco users facing 39-fold increased oral cancer risk compared to non-users. Despite moderate awareness levels, cessation remains challenging, with health problems serving as the primary motivation for only 28.4% of users expressing willingness to quit. Educational interventions show promise, with structured teaching programs improving knowledge scores from 38.67% to 74.67%, indicating that targeted educational approaches can enhance understanding and potentially motivate behavior change. The findings underscore the urgent need for comprehensive, multi-sectoral interventions that address not only individual knowledge and behavior but also family dynamics, cultural factors, and socioeconomic determinants of tobacco use. Successful tobacco control strategies must integrate healthcare provider training, media campaigns, policy enforcement, and community-based approaches to create supportive environments for both prevention and cessation efforts among India's middle-aged population.

## IV. TAKE HOME MESSAGE

Tobacco uses among middle-aged Indians represents a critical public health emergency requiring immediate, comprehensive intervention. With one-third of middle-aged adults currently using tobacco and facing 39-fold increased cancer risk, the time for action is now. While education improves awareness, successful cessation requires addressing family influences, cultural norms, and socioeconomic factors through coordinated healthcare, media, and community-based approaches. The evidence is clear: intensive, multi-level interventions targeting prevention, cessation support, and policy enforcement are essential to prevent a generation of preventable tobacco-related deaths and disabilities in India's growing middle-aged population.

Conflict of interest

The authors declare that there is no conflict of interest.

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