Complementary and Alternative Medicine/Therapy for Tobacco Cessation in India: A Secondary Analysis of GATS-1 and 2

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Abstract

Background: India has nearly 267 million adult tobacco users, with a slowly improving quitting rate. Among the many approaches to quitting the habit, such as counseling, nicotine replacement therapy, nicotine patch or gum, and prescribed allopathic medicines. Complementary and alternative medicine/therapy (CAM), a thousand-year-old practice in India, may also prove to be a potential method in tobacco cessation; however, there is scarce literature on the extent of use of CAM among tobacco users who attempt to quit the habit. Therefore, this study attempts to examine the potential of CAM as a strategy for tobacco control in India. **Material and Methods:** We undertook a secondary analysis of the data from both rounds of the Global Adult Tobacco Survey (GATS 2009 and 2016). The dependent variable included in the analysis was the use of traditional medicine as a method for quitting tobacco in three types of users—smokers, smokeless tobacco users, and dual users. The prevalence of CAM use was reported, and Chi-square test was applied to find the factors significantly associated with the use of CAM among tobacco users considering a *P* value of 0.05 to be statistically significant. **Results:** The overall prevalence of traditional medicine use for GATS-1 was observed to be more among dual users (4%), while for GATS-2, it was highest among smokers (3%). For both rounds of the GATS survey, the use of traditional medicine was found to be higher among males, rural residents, users with no education or less than primary education, and the eastern region. **Conclusions:** CAM has a promising potential for supporting tobacco cessation provided a concerted effort is undertaken to standardize pharmacopeia and establish robust clinical evidence. In addition, there is a need to create awareness, build the capacity of healthcare providers, and foster academic-industrial research in indigenous Ayurveda, Yoga, Naturopathy, Unani, Siddha, and Homeopathy (AYUSH) systems.

Keywords: Complementary and alternative medicine, India, tobacco cessation, traditional medicine GATS

BACKGROUND

On the global tobacco map, 40% of tobacco users are found in India and China.[1] And solely, India contributes as the second-largest consumer of tobacco products worldwide. Unfortunately, very few people in India quit tobacco use.[2] It is the addictive nature of nicotine that makes quitting challenging and relapse common.[3] The lack of awareness about the National Tobacco Control Program (NTCP) and cessation support further adds to the problem of continued tobacco use in India.[4,5]

With only 23 out of 194 countries having robust cessation support policies in place-complying with the WHO-Framework Convention on Tobacco Control (WHO-FCTC) obligations and best-practice adoption criteria—there is an increased demand

for support to quit tobacco use. Inarguably, efforts should be directed to make tobacco cessation support more accessible for common people to ultimately reduce the tobacco use burden.[6]

While nearly one-third of Indian adults (266.8 million) use tobacco in some form, more than half of them are planning or thinking of quitting (55.4% of current smokers and 49.6%

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of current smokeless tobacco users).[2] Therefore, it becomes imperative to understand and explore the acceptable, accessible, and desired modes of tobacco cessation interventions as part of the "individual specialist approaches."[6]

Globally, the most recognized and effective tobacco cessation measure is combining behavioral and pharmacological interventions,[6,7] with an increase in abstinence rates among smokeless tobacco (SLT) users with behavioral interventions as a single modality.[8,9] But the uptake of interventions also depends up on individual preferences, which are likely to vary across different social and cultural contexts.[2] Globally, several alternative treatments/therapies have been studied and proven effective for tobacco cessation including acupuncture,[10] rhythmic breathing (Sudarshan Kriya and Pranayam),[11] mind-body practices, such as yoga and mindfulness meditation-based therapies[12,13]; additionally use of natural products has also been explored, such as *Avena sativa*, lobeline, black pepper extract, Calamus and herbal tea preparation.[14-19] A survey conducted in Rochester, Minnesota, ascertaining the use and perceived efficacy interest reported high interest among patients in the future use of complementary and alternative medicine/therapy (CAM) therapies to quit tobacco: yoga, relaxation, meditation, and massage therapy were most commonly perceived to be efficacious.[20] The reported reasons for the preferred usage and popularity over nicotine replacement therapy among users are diversity, cost-effectiveness, and easier acceptance by the population.[10] Moreover, the characteristics and practice patterns of CAM practitioners make them better suited for a health/wellness promoter than any conventional practitioner.[21] Evaluation of cessation behaviors among current tobacco smokers (adults aged ≥15 years) using Global Adult Tobacco Survey (GATS) data from 31 countries (2008-2018) revealed that "traditional medication" use (here: any country-specific medication that was not considered an NRT or prescription medication) had a median of 1.6% (ranging from 0.1% in Bangladesh [2017] to 11.4% in Senegal [2015]).[22] Korea, on the other hand has explored the use of various techniques for smoking cessation treatment such as traditional Korean medicine (TKM), ear and manual acupuncture, herbal medicines, non-smoking doll and self-writing handbook under the umbrella of traditional and complementary medicines (T and CM) and incorporated it within their national health system.[23] While the national survey data from India (GATS-1 and -2) reveals a sizeable proportion of tobacco users who try methods other than the conventional methods, categorizing them under "traditional medicines," for example, Ayurvedic, Homeopathic, Unani.[2,24]

In the context of low- and middle-income countries, such as India, with a dismally low proportion of former users (<2% at the population level),[5] a relatively higher burden of SLT users (21.4%; 199.4 million),[2] along with a dedicated annual budgetary allocation of INR 0.2 million (district-level) for pharmacological treatment dependence under NTCP[25]; we discuss the potential of CAM as a strategy for Tobacco Control in India, using data from two rounds of the Global Adult Tobacco Survey (GATS 2009–17).

METHODS

The current study is a secondary data analysis of the first and second rounds of nationally representative Global Adult Tobacco Surveys: GATS-1 (2009–10) and GATS-2 (2016–17). The sample population of GATS included all non-institutionalized Indian residents above 15 years of age. In GATS-1 and -2, a total of 69,296 and 74,037 interviews, respectively, were taken from nationally representative rural and urban households. The details of the methodology are published elsewhere.[2]

Data were extracted for GATS-1 and -2, India, from a public, open-access repository, Global Tobacco Surveillance System (GTSS) data maintained by the Centers for Disease Control and Prevention.[26] Data were analyzed using SPSS (IBM SPSS Statistics for Windows, Version 21.0; Armonk, NY: IBM Corp., USA). Maps were generated using a digital AI tool—MapChart (https://www.mapchart.net/india.html) to represent the prevalence of CAM use in different states of India for two rounds of GATS. Tobacco users who were using both smoked and smokeless forms of tobacco in the past or at the time of the survey were categorized as dual users. The remaining smokers and SLT users were considered exclusive smokers and exclusive SLT users, respectively. The dependent variable in the analysis was the use of traditional medicine as a method of tobacco cessation. In the present analysis, the participants who responded to the questions "During the past 12 months, did you use any of the following to try to stop smoking tobacco—Traditional medicines, for example, Ayurvedic, Homeopathic, Unani?" and "During the past 12 months, did you use any of the following to try to stop using smokeless tobacco—Traditional medicines, for example, Ayurvedic, Homeopathic, Unani?" were used for data analysis.[2]

The outcome estimates were derived using weighted GATS data for sample estimates to closely approximate the Indian population during the years 2009–10 and 2016–17.[2,24] The Chi-square test was applied to determine the association between the use of traditional medicine and sociodemographic factors, such as age, gender, residence, educational status, occupation, and region keeping $P < 0.05$ as the statistical significance level. State-wise prevalence of the use of traditional medicine as a method of tobacco cessation was also analyzed.

RESULTS

The overall prevalence of tobacco users who attempted to quit the habit was found to be 33.3% and 31.5% for GATS-1 and GATS-2, respectively. Among these users, 3.4% (GATS-1) and 2.6% (GATS-2) users had either attempted or succeeded in quitting tobacco using traditional medicine (Ayurveda, Homeopathy, Unani, etc.) [Table 1]. Considering the type of tobacco used, the overall prevalence of traditional medicine use for GATS-1 was observed to be more among dual users (4%) followed by smokers (3.9%) and SLT users (2.8%) ($P < 0.001$). However, for GATS-2, it was the highest among smokers (3%),

followed by dual users (2.6%), and the lowest among SLT users (2.4%) (*P* < 0.001).

Among various categories of age groups, the use of traditional medicine as a cessation method was found to be the highest in users between 25 and 44 years of age for both GATS-1 (overall prevalence: 40.1%; 39.1% among exclusive smokers, 41.8% among exclusive SLT users, and 38.5% among dual users) and GATS-2 (overall prevalence: 51.7%; 39.1% among exclusive smokers, 60.6% among exclusive SLT users, and 48.9% among dual users) [Table 2].

For both rounds of the GATS survey, the use of traditional medicine was found to be higher among males (77% for GATS-1 and 78.7% for GATS-2), rural areas of residence (76% for GATS-1 and 65.7% for GATS-2), and among users with no education or less than primary education (49.2% for GATS-1 and 46.9% for GATS-2) as compared to others within their respective categories. The only variation was found for employment status where the use of traditional medicine was found to be more prevalent among self-employed individuals for GATS-1 (35.6%) and among daily wage/casual laborers for GATS-2 (36.02%). Region-wise distribution of traditional medicine use as a cessation method was found to be the highest in the Eastern region for both rounds (57.9% for GATS-1 and 40.5% for GATS-2). Among the states, the use of CAM for quitting tobacco was found to be more prevalent in West Bengal (18.8%), followed by Sikkim (14.6%), Assam (14.1%), Odisha (13.6%), for GATS-1 [Figure 1]. For GATS-2, the prevalence was the highest in Goa (11.4%), followed by Jharkhand (7.4%), West Bengal (6.4%), and Odisha (5.9%) [Figure 1 and Table 3].

DISCUSSION

The Government of India has recognized the importance of tobacco cessation with increased budgetary outlays in successive five-year plans. There have been numerous research initiatives on various facets of tobacco cessation, and more and more evidence is emerging. There are several windows of opportunity for tobacco cessation by moving beyond the purview of tobacco cessation centers under the NTCP.[25]

This could be facilitated by integrating cessation support and interventions with each system of medicine (second to establishing their efficacy), that is easily accessible and available as an economical alternative. In this regard, the Indian System of Medicine could be a promising perspective.

Despite the Government of India's acknowledgment and ease of availability, CAM is still not included in the standard curricula in the majority of Indian medical institutions. As an outcome, medical graduates may be unaware of CAM. Even though CAM has been practiced in India for centuries, there is scant literature on the extent of use, attitude, and perspective of patient populations who are using CAM services for tobacco cessation, and none among Indian doctors.[27] However, this gap can be overcome by adequate capacity building and skill implementation of CAM practitioners in the country. A qualitative assessment conducted in Arizona, USA, among CAM practitioners trained in brief intervention for cessation, reported feeling more knowledgeable, motivated, and confident to address tobacco in everyday practice. Besides, their patients expressed receptivity to CAM practitioners asking them about their tobacco use.[28]

The findings from a practice-based trial conducted among CAM practitioners who were trained in brief behavioral intervention for cessation reported that they provide a significant but underutilized route for encouraging tobacco cessation and the use of evidence-based cessation aids.[29]

This study found out that nearly one-third of tobacco users attempted to quit the habit (33.29% and 30.84% for GATS-1 and GATS-2, respectively). This may be attributed to a lack of professional help to motivate them, difficulty to maintain long-term abstinence, higher nicotine dependence, withdrawal symptoms, failed previous quit attempts, lack of awareness about the availability of cessation support among users and poor access to cessation services, especially in rural areas, etc.[30,31] Among these users, 2.92% (GATS-1) and 2.31% (GATS-2) users had either attempted or succeeded in quitting tobacco using CAM/traditional medicine (Ayurveda, Homeopathy, Unani, etc.). In line with our findings, a detailed evaluation of quit methods among current smokers in 31 countries (median

Table 1: Tobacco use and its cessation trends for GATS-1 and -2 in India

Characteristics	GATS-1 (2009-10)	GATS-2 (2016-17)
Total exclusive smokers	75506915 (9.5%)	77171459 (8.3%)
Smokers who attempted to quit tobacco	22773368 (30.2%)	23398608 (30.3%)
Smokers who attempted to quit tobacco using CAM	883437 (3.9%)	692738 (3%)
Total SLT users	164565502 (20.7%)	165828306 (17.8%)
SLT users who attempted to quit tobacco	51496605 (31.3%)	48342560 (29.2%)
SLT users who attempted to quit tobacco using CAM	1459489 (2.8%)	1155068 (2.4%)
Total Dual Users	59061903 (7.4%)	52055494 (5.6%)
Dual users who attempted to quit tobacco	25423747 (43%)	21209546 (40.7%)
Dual users who attempted to quit tobacco using CAM	1027072 (4%)	545676 (2.6%)
Total tobacco users	299134321 (37.6%)	295055260 (31.6%)
Total tobacco users who attempted to quit tobacco	99693720 (33.3%)	92950714 (31.5%)
Total tobacco users who attempted to quit tobacco using CAM	3369998 (3.4%)	2393482 (2.6%)

Sociodemographic characteristics	GATS-1 (2009-10)				P	GATS-2 (2016-17)				P
	Exclusive Smokers	Exclusive SLT users	Dual Users	Total		Exclusive Smokers	Exclusive SLT users	Dual Users	Total	
Age groups*										
15-24 years	8.9	26.0	15.1	18.2	0.001	4.9	2.7	1.2	3.0	0.001
25-44 years	39.1	41.8	38.5	40.1		39.1	60.6	48.9	51.7	
45-64 years	33.4	26.1	35.5	30.9		39.9	23.7	29.2	29.6	
>65 years	18.5	6.1	10.9	10.8		16.0	13.0	20.8	15.7	
Gender*										
Male	81.2	65.5	89.7	77.0	0.001	80.6	71.6	91.3	78.7	0.001
Female	18.8	34.5	10.3	23.0		19.4	28.4	8.7	21.3	
Area of residence*										
Urban	34.6	24.4	24.0	27.0	0.001	36.9	31.0	38.1	34.3	0.001
Rural	65.4	75.6	76.0	73.0		63.1	69.0	61.9	65.7	
Level of education*										
No education or less than primary education	56.3	54.1	36.1	49.2	0.001	60.8	43.3	37.1	46.9	0.001
Primary school completed	14.8	15.8	11.1	14.1		11.9	9.8	20.7	12.9	
Less than secondary school completed	9.1	21.7	18.7	17.5		6.9	18.7	22.2	16.1	
Secondary school completed	6.5	3.8	20.1	9.5		16.6	7.0	7.2	9.8	
Higher secondary school completed	2.4	1.2	3.0	2.0		3.5	9.2	7.6	7.2	
Graduation and above	10.8	3.4	2.9	5.2		0.3	12	5.30	7.1	
Employment status*										
Government employee	4.5	1.9	5.9	3.8	0.001	0.9	5.1	0.0	2.7	0.001
Non-government employee	34.9	23.6	24.3	26.8		15.9	6.8	9.7	10.1	
Self-employed	28.7	41.6	33.0	35.6		23.3	36.7	36.2	32.7	
Homemaker, retired, student, or unemployed	31.8	32.9	36.8	33.8		15.0	16.3	15.7	15.8	
Daily wage/Casual laborer	-	-	-	-		44.9	32.0	38.4	37.2	
Region*										
North	2.9	0.9	1.8	1.7	0.001	6.5	1.1	7.8	4.2	0.001
Central	29.4	24.1	16.0	23.0		33.8	40.5	18.3	33.5	
East	33.2	24.8	57.9	37.1		31.6	38.0	57.0	40.5	
Northeast	9.5	5.3	12.9	8.7		0.5	3.1	4.3	2.6	
West	3.9	27.0	1.9	13.3		1.6	7.1	5.7	5.2	
South	21.0	17.9	9.5	16.1		26.0	10.2	6.9	14.0	

*For all sub-categories of correlates, the *P* value was found to be <0.001 for both GATS-1 and GATS-2

of 1.6% for "traditional medicine" use) highlighted a higher prevalence of CAM users (2.5%) in India [even more than use of quitline (0.4%) and NRT (1.7%)].[22]

In contrast, the results from a systematic review and network meta-analysis evaluating the efficacy of mindfulness meditation for smoking cessation reported that it did not differ significantly from comparator interventions (such as quitline counselling, interactive learning, or treatment as usual) in their effects on tobacco use.[12] Given the existing demand and preference among Indian tobacco users for CAM use, there is a window of opportunity that needs to be tapped both at the research and thereafter, at policy levels. Further, our analysis reports that the overall prevalence of CAM use was observed to be more among smokers than SLT users. This may be because of the prevailing misperceptions about less harm due to SLT use exclusively, false beliefs,[32] sociocultural presence, and social acceptability of SLT usage.[33] Furthermore, evidence suggests that both SLT users and healthcare providers have insufficient knowledge of the dangers

of SLT use and low demand for assistance to quit.[34] Given the fact that the SLT users in the Indian subcontinent is higher than the smokers, it makes our case stronger to target more users to motivate them to quit. Further, this could also facilitate the entry of CAM in healthcare system, increasing cessation outreach and thus bridging the treatment gap among users.[35]

The use of CAM as a cessation method was found to be the highest in users aged 25–44 years (GATS-1 and -2). This appears to be a promising sign, as the benefits of tobacco cessation could be harvested during the early years through a targeted focus. Further, this paper urges the Government of India to sincerely explore the potential of CAM use as a cessation strategy, thereby creating policy windows for including it under the thrust areas of NTCP.[25] As per the National Commission for Indian System of Medicine (statutory and regulatory body formed by the Government of India), there are 495 Ayurvedic (government and non-government), 57 Unani, 15 Siddha colleges across India (as on June 2023).[36]
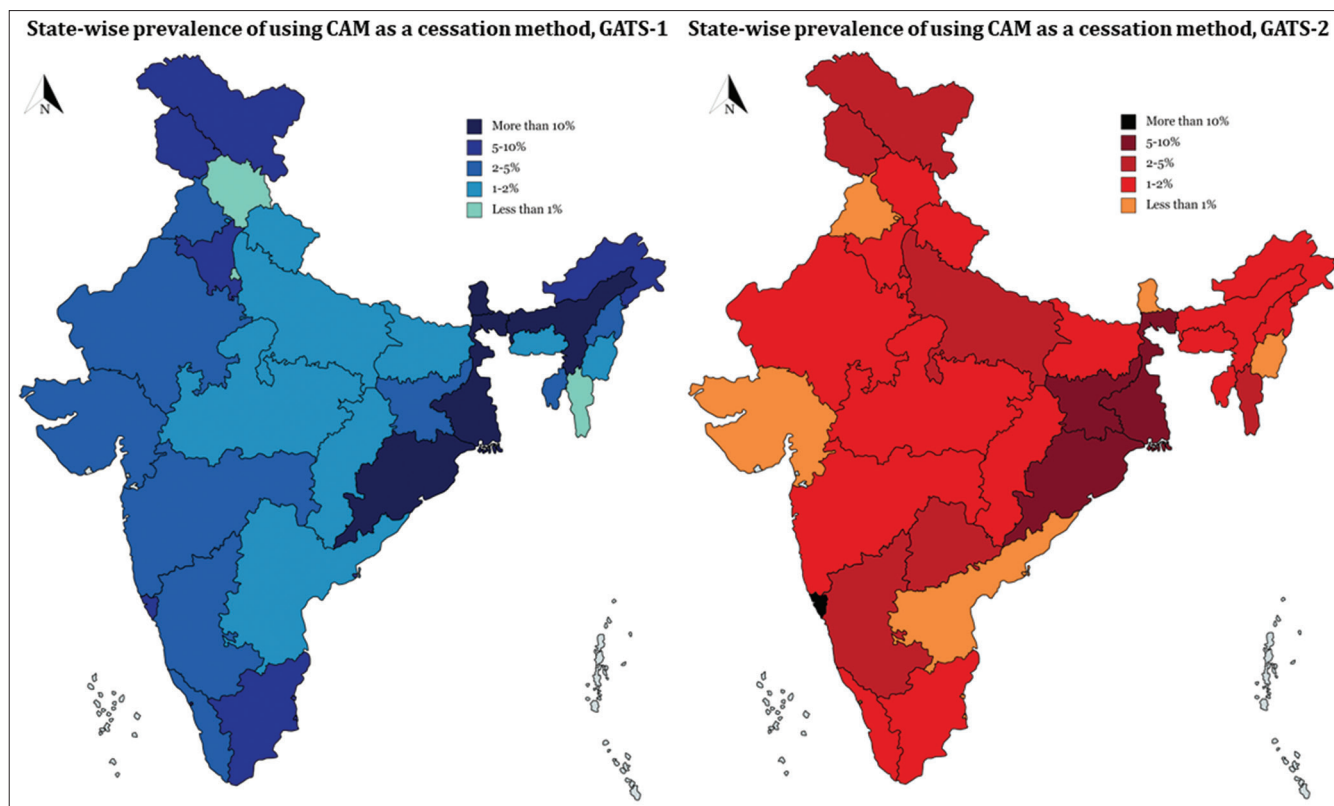
Figure 1: Prevalence of using traditional medicine for tobacco cessation (Global Adult Tobacco Survey-1 and -2)

These institutions could be utilized to generate awareness among users about the harms of tobacco use and provide cessation support in their settings. Moreover, 11 national-level institutions under AYUSH provide medical facilities and education in the AYUSH system of medicine.[37] As a next step, these apex institutions could undertake robust research around the wide range of indigenous methods and formulations under the AYUSH system, that could aid in tobacco cessation. As a result, it would facilitate the overall enterprise of the "Make in India" initiative.[38]

Strengths and limitations

To the best of our knowledge, this is the first study that provides insights into the potential of CAM for increasing cessation support in India utilizing national-level data. Further, it highlights the attributes that could be focused upon while developing customized cessation interventions and policies. It also emphasizes building strategies that could aid better in the effective implementation of Tobacco Control Policies in India and developing a built mechanism for sustaining the same. The overall prevalence of CAM use was very low. In such cases, the use of logistic regression in estimating and selecting risk factors may fail to provide meaningful results. The benefit of using penalized regression models in cases of low-prevalence (which further goes down with the product type) is not clearly seen as the likelihood function does not converge, resulting in an increased risk of bias in estimating the regression coefficients and hence decreased power of the study and inaccuracy of predictors.[39] The survey design, being cross-sectional, limits us from establishing a temporal relationship, and the responses collected during the survey are susceptible to self-reporting and recall bias. The prevalence of attempting to quit tobacco using any type of cessation method is generally low for India, with only 8.4% of users using counseling, 2.7% using prescription medicines, 2.6% using CAM or traditional medicines, 1.7% using NRT, and only 0.4% using the quitline. Other than counselling, the abovementioned cessation methods may also show promising results if explored independently or in combination.[40] Lastly, it was beyond the scope of this study to comment on the promoter/pressor, clinical efficacy/potency, and type/form of traditional medicine/CAM as a tobacco cessation strategy among the tobacco users (for instance, were the users referred or suggested/was it their own understanding). For operationalizing the use of CAM as a tobacco cessation strategy in India, further landscaping on these aspects along with studies employing mixed-methods design is recommended.

CONCLUSION

Findings from this study reveal that among the total tobacco users (adults aged ≥15 years) who have attempted to quit (GATS-1:33.3% and GATS-2:31.5%), 3.4% (GATS-1) and 2.6% (GATS-2) users had either attempted or succeeded in quitting tobacco use by complementary and alternative medicine/therapy (CAM) or traditional medicine. The usage for CAM was found to be higher among the eastern states of India, males, rural residents, users with no education or less than primary education, for smokers and dual users for both

Name of the state	Total tobacco users	GATS-1			Total tobacco users	GATS-2		
		Total users who attempted to quit tobacco	Total users who used CAM as a cessation method			Total users who attempted to quit tobacco	Total users who used CAM as a cessation method	
			n	%			*n*	%
Jammu and Kashmir	1874051	560567	32779	5.8	2027572	540722	23543	4.4
Himachal Pradesh	869401	288906	1088	0.4	757379	372412	5912	1.6
Punjab	1917383	382856	10102	2.6	2608129	731727	0	0.0
Chandigarh	115892	19589	207	1.1	109481	48871	0	0.0
Uttarakhand	1369333	491095	5563	1.1	1836760	765408	9084	1.2
Haryana	373012	137386	7915	5.8	4364199	1821114	33950	1.9
Delhi	290891	34998	0	0.0	2143842	1244440	27921	2.2
Rajasthan	11939444	5537130	243083	4.4	11293638	5765539	110076	1.9
Uttar Pradesh	37255018	19115301	272096	1.4	46399879	24293521	553331	2.3
Chhattisgarh	20587864	7962800	120256	1.5	7127151	1659048	19007	1.1
Madhya Pradesh	15125063	9893557	141228	1.4	16945849	7022509	119300	1.7
West Bengal	19128104	3411711	642787	18.8	22568015	7288986	463605	6.4
Jharkhand	8121139	2852637	85780	3.0	8246196	1740532	129331	7.4
Odisha	11763749	2598569	354096	13.6	13647850	5078448	300257	5.9
Bihar	24096884	11260020	166745	1.5	17836239	5350395	75894	1.4
Sikkim	114937	44003	6405	14.6	75358	22299	129	0.6
Arunachal Pradesh	284275	101706	6417	6.3	414182	129004	1360	1.1
Nagaland	585932	170754	6484	3.8	483554	128160	1442	1.1
Manipur	520193	312536	5328	1.7	943588	306464	0	0.0
Mizoram	395505	111506	0	0.0	462910	145573	4646	3.2
Tripura	1151245	390825	14189	3.6	1587098	606745	7859	1.3
Meghalaya	689155	241566	4307	1.8	871401	260780	3679	1.4
Assam	5788621	1783811	250645	14.1	10080670	3590294	42831	1.2
Gujarat	9639062	4795437	149902	3.1	11044188	2928590	23850	0.8
Maharashtra	22015996	8441802	296719	3.5	22343275	5441422	97947	1.8
Goa	97016	43413	2229	5.1	89311	28880	3281	11.4
Andhra Pradesh	14580076	8779935	123425	1.4	6995813	3338638	5671	0.2
Telangana	97016	Not applicable	Not applicable	Not applicable	4570201	2165905	76679	3.5
Karnataka	10504493	5252954	173626	3.3	10210754	5224946	191919	3.7
Kerala	3903424	2127746	68454	3.2	2772063	1642085	22913	1.4
Tamil Nadu	6651005	2478635	171641	6.9	10076001	3210967	38065	1.2
Puducherry	123220	69970	6501	9.3	103001	56292	0	0.0
Total	231871383	99693721	3369997	3.4	241035547	92950716	2393482	2.6

Table 3: State-wise prevalence using complementary and alternative medicine (CAM) as a tobacco cessation method in India

the rounds of GATS. Development and provision of CAM could pivot the tobacco control efforts of the country in the long run and support achieving Sustainable Development Goals.

List of Abbreviations

- AYUSH : Ayurveda, Yoga, Naturopathy, Unani, Siddha, and Homeopathy
- CAM : Complementary and Alternative Medicine/Therapy
- GATS : Global Adult Tobacco Survey
- GTSS : Global Tobacco Surveillance System
- INR : Indian National Rupees
- NTCP : National Tobacco Control Program
- SLT : Smokeless Tobacco Users

- WHO-FCTC : World Health Organization-Framework Convention on Tobacco Control.

Ethical approval and consent to participate
Not applicable.

Consent for publication
All authors have reviewed and consented to the publication of the manuscript.

Availability of data and materials
The dataset used for this research is available for public use from the Centre for Disease Control and Prevention, Global Tobacco Surveillance System (GTSS) homepage.

Author's contributions
SK, AD, and GB conceptualized the study, AD curated the

data, the methodology was finalized by SK, AD, GB, SG, and RJS, and formal analysis was conceptualized and undertaken by SK, AD, and GB. The original draft was written by SK, AD, and GB and reviewed and edited by SG and RJS. Overall supervision and review of the methodology, analysis, and manuscript writing were done by SG and RJS.

Conflicts of interest

There are no conflicts of interest.

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