RESEARCH ARTICLE

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Prevalence, Reach of Anti-smokeless Tobacco Messages and Quit Attempts by Product Type: A Secondary Data Analysis from the Global Adult Tobacco Survey (GATS – 2016-17)

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Abstract

Objective: India has the highest number of smokeless tobacco (SLT) products available in different forms, consumed in various ways. The current study aimed to understand the pattern of daily SLT use according to different product categories and whether Quit intention and Quit attempts vary by SLT type and exposure to media messages. **Methods:** Data from Global Adult Tobacco Surveys (GATS), 2016-17, was used to find access to media messages and warning labels by SLT type. Quit attempt and Quit intention were calculated for each of the SLT types. Logistic regression analyses were employed to identify whether access to media messages, warning labels influenced, quit intention and attempts vary by SLT type. **Results:** Khaini or tobacco lime mixture was the most common SLT type consumed by 37% of SLT users, whereas SLT users consuming more than one product accounted for 23% of SLT users. Exposure to media messages and warning labels was high among Gutkha/ paan masala tobacco users (74.7% and 81.2%) and low among oral tobacco (Mishri, Gul, Gudakhu) users (56.1% and 60.0%). Quit attempts and quit intention were high among Gutkha/ paan masala tobacco users (38.3% and 22.3%) and low among oral tobacco (Mishri, Gul, Gudakhu) users (25.3% and 13.6%). Users of Oral tobacco and khaini or tobacco-lime mixture were significantly less likely to attempt quitting (AOR 0.806(95%CI: 0.676-0.962), 0.839(95%CI: 0.736-0.956), and have quit intention (AOR 0.681(95%CI: 0.702-0.976), 0.733(95%CI: 0.627-0.857) compared to Gutkha/ paan masala with tobacco users. **Conclusion:** The reach of media messages and warning labels varies by SLT type. Quit intention and attempts vary by SLT type and access to media messages and warning labels. There is a need to re-strategise the tobacco control Information, Education and Communication (IEC) to reach out with effective messaging to the most unreached.

Keywords: Smokeless tobacco- anti-smokeless tobacco messages- warning label- Tobacco cessation- India

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Introduction

Smokeless tobacco (SLT) poses a complicated and pervasive threat to public health. The use of smokeless tobacco is documented in 120 countries, with India having the largest number of SLT users [1]. GATS-2 (2016-17) estimated Indian SLT users to be around 200 million [2]. Smokeless tobacco products are available in India in a wide variety of forms, such as tobacco leaves, khaini (a mixture of tobacco and lime), gutkha or mawa (mixtures of tobacco, lime, areca nut and other ingredients), betel quid with tobacco, and products applied on gums and teeth, inhaled (snuff) or gargled (Tuibur) forms. The products range from those manufactured by Indian tobacco companies to those produced in the cottage industry and within the communities [3]. The products are sold in packaged and loose forms and are often tailor-made per the consumer's demand at the point of sale.

The type of smokeless tobacco product used is often peculiar to the social position, social group and environment. Oral tobacco is more common among females (4.3%) than males (3.3%), but the khaini (tobacco-lime) mixture is much more common among males (17.9%) than females (4.2%). While most SLT products had the highest prevalence in the age group 65 and above, gutkha and paan masala with tobacco had the highest prevalence in the age group 25 to 44 years [2]. Betel quid use is very high in many North-Eastern states and Uttar Pradesh. Tobacco water (tuibur) is common only in two states in the North-Eastern region of India [4]. This explains that the types of SLT products predominantly used by gender, education, and residence combinations differ.

Media influences people's ideas, attitudes, and behaviour and is crucial for raising knowledge about tobacco-associated harms and motivating quitting. The effectiveness of mass media campaigns has been demonstrated in communities [5]. However, social

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inequities limit access to media, especially for social groups with gender, residence, and social position disadvantages. Since the type of smokeless tobacco used is intricately associated with social position, users of specific smokeless tobacco types may have differential access to media messages. Warning labels are not applicable for smokeless tobacco products that are freshly prepared and sold, such as betel quid with tobacco, khaini, kharra, etc. The reach of warning labels to the users in various social strata is not likely to be uniform because of the variation in the type of smokeless tobacco used.

Cessation is determined by education and socioeconomic status [6]. Media messages and warning labels build quit intentions [7]. Specific smokeless tobacco type users may have a variation in their chance of quitting due to their social position and inequitable access to media messages and warning labels.

Tobacco control in India must know which smokeless tobacco users have weaker access to mass media messages and warning labels so that relevant IEC and labelling may be introduced. The study attempts to determine the prevalence of the use of specific smokeless tobacco types daily, the exposure of their users to mass media messages and its effect on intention to quit and quit attempts.

Materials and Methods

Data source

The study uses a quantitative approach based on secondary data from GATS-2 (2016-17). The primary data for The Global Adult Tobacco Survey (GATS) 2 was collected from August 2016 and February 2017 by conducting a household survey by the Tata Institute of Social Sciences (TISS), with assistance from the Ministry of Health and Family Welfare (MoHFW), the Centers for Disease Control and Prevention (CDC), and World Health Organisation (WHO). The sample survey employed multistage stratified sampling procedures for urban and rural areas of each of the 30 states and two union territories of Chandigarh and Puducherry. A total of 74,037 adults aged 15 and above participated in the study, out of whom daily smokeless tobacco users have been included in the analysis for this paper.

Outcome Variables

Quit intention and quit attempt were the key outcome variables. Question D16 was recoded to create the 'Quit Intention' variable where 'Quit within next month' and 'thinking within next 12 months' were recoded as "1", meaning having quit intention, refusal to answer the question was considered as "system missing" and all other responses were recoded as "0" meaning not having quit intention within next year. Questions D09 and C13 were used to compute the quit attempt variable. If a smokeless tobacco user had reported a quit attempt in the past 12 months, the code assigned was "1", the absence of a quit attempt as "0", and the refusal to answer as "system missing".

Independent variables

The type of daily smokeless tobacco used was the main independent variable. There were seven questions, each of which recorded the frequency of specific types of smokeless tobacco use. Each of these seven was recoded to new variables with daily consumption of the product between 0 and 888 as "1", whereas '0' and '888' were recoded as "0". A new variable, 'Type of smokeless tobacco use,' was created with the help of the seven recoded variables. Type of smokeless tobacco use had six categories: daily only betel quid with tobacco, daily only Khaini or tobacco lime mixture, daily only Gutkha/ paan masala with tobacco, daily only oral tobacco, daily only other smokeless tobacco, and finally, daily use of more than one of the above five types. In the Indian subcontinent, betel quid with tobacco has been in use for almost four centuries. Tobacco and other ingredients chiefly lime, areca nut and catechu are put on betel leaf (paan) and made into a quid and is consumed shortly after preparation; which can be prepared at home by tobacco user or it can be bought from local vendors [8]. Tobacco-lime mixtures are second variety for which the user mixes tobacco and lime and put the mixture in oral cavity usually pressed against gums; this is also usually freshly prepared by the user but can also be bought from local vendor who may locally prepare and sell but there are also manufactured pouches that are sold by the vendors. Third variety is Gutkha/paan masala became common in last quarter of 20th Century; finely chopped areca nut, catechu, lime, spice flavourings, saccharine and other additives are mixed with tobacco and made available to consumers by vendors in both freshly prepared forms and in pouches manufactured in industry. Fourth variety was for dental application; consumers can make powders at home by burning tobacco and then crushing it to make powders (mishri) or they can also buy manufactured dental powders, pastes. Other varieties include sniffing of tobacco powders, gargling of tobacco water.

The survey tool had questions about noticing anti-smokeless tobacco information in the previous 30 days, one each for a specific medium, viz. newspapers or magazines, television, radio, billboards, hoardings, cinemas, the internet, public walls, public vehicles and stations. A single measure of noticing anti-smokeless tobacco information was computed with value "1" if the answer to any of the questions for noticing anti-smokeless tobacco information in a specific medium was 'yes' and with value "0" if the answer to all questions about noticing anti-smokeless tobacco information were 'no' or 'not applicable'. If the respondent refused to answer one or more of these questions and had a 'no' or 'not applicable' response for the remaining questions, then the value was taken as 'system missing'. Noticing warning label on smokeless tobacco product was recoded as "1", not noticing warning label or not seeing warning label was recoded as "0" and "system missing" was assigned for those who refused to answer the question.

Other independent variables included age group in years (15-24, 25-44, 45-64, 65+), sex (male, female), residence (urban, rural), education (No formal education, less than primary education completed, completed primary but less than secondary, and secondary and above). These were included in the analysis because they influence

cessation outcomes.

Analysis

Statistical software package SPSS-version 20 was used to perform the data analysis for the study. Access to media messages (Model 1) and warning labels (Model 2) were hypothesised to depend upon the type of smokeless tobacco use and social determinants. Quit intention (Model 3) and attempts (Model 4) were hypothesised to depend upon access to media messages and warning labels, smokeless tobacco type and social determinants. Since the outcome variables were dichotomous, binary logistic regression was performed. The significance level for each of the analyses was set at 0.05.

Results

Out of 74,037 interviewed; 12722 (18.2%) of adults were daily users of smokeless tobacco. The most common smokeless tobacco product used daily was khaini or tobacco-lime mixture (6.7% of all adults; 37% of SLT users). The second most common group was those who used more than one type of smokeless tobacco product daily (4.2% of all adults; 23% of SLT users). The third most common was the use of gutkha/ paan masala with tobacco (tobacco, lime, areca nut mixture), the prevalence of which was 3.1% among adults (17% of SLT users). Betel quid with tobacco and oral tobacco products were next most common with 1.8% prevalence each among adults (10% of SLT users each). Other SLT products were reported by 0.6% adults (3% of SLT users). The North-East region had highest prevalence of smokeless tobacco use and the North region had the least (Table 1). Prevalence of betel quid with tobacco was highest in North-East (10.6%), Khaini or tobacco-lime mixture in East (12.3%), Gutkha/ paan masala with tobacco in Central and West (5.2% each), Oral tobacco products in East (3.0%), and use of multiple products was highest in North-East (7.0%).

Exposure to anti-smokeless tobacco information on media and warning labels by type of smokeless tobacco product consumed is presented in Table 2. 7442 (out of 12722; 66.0%) reported noticing anti-smokeless tobacco information in the previous 30 days. Exposure to media messages was highest among Gutkha/ paan masala with tobacco users (74.7%) and least among oral tobacco product users such as Gul, Gudakhu, and Mishri (56.1%).

The exposure to media messages was better among men (72.0%) than women (50.1%) and in urban (81.5%) compared to rural (60.9%) participants. These gender and rural-urban differentials were observed for each daily smokeless tobacco product type. Overall, 8818 (out of 12722; 72.6%) reported noticing warning labels on smokeless tobacco products in the previous 30 days. Exposure to warning labels on smokeless tobacco products was highest among the users of Gutkha/ paan masala with tobacco (81.2%) and least among oral tobacco users (60.0%).

The exposure to warning labels was better among men (79.2%) than women (56.5%) and in urban (79.9%) compared to rural (70.3%) participants. The pattern was common across gender and residence groups. A total of 1985 (out of 12722; 18.7%) daily smokeless tobacco users expressed intention to quit within the next 12 months. The intention to quit was highest among Gutkha/ paan masala users (22.3%) and lowest among oral tobacco users (13.6%). A total of 3566 (out of 12722; 30.6%) daily smokeless tobacco users had attempted quitting smokeless tobacco in the previous 12 months. The proportion of quit attempters was highest among Gutkha/ paan masala users (38.3%) and lowest among oral tobacco users (25.3%).

Table 3 presents the results of multivariate logistic regression for the exposure to media messages and warning labels during the previous 30 days. The adjusted odds ratios (AORs) of exposure to media messages were significantly lower among the daily users of khaini or tobacco lime mixture (AOR0.635(95%CI: 0.553-0.730)) and oral tobacco products (AOR0.642(95%CI: 0.540-0.764)) compared to gutkha, paan masala with tobacco users. Women (AOR0.478(95%CI: 0.434-0.527)) compared to men and rural (AOR0.498(95%CI: 0.448-0.554)) compared to urban residents had lower odds of noticing media messages. Compared to those with no formal education, all groups with formal education had better chances of noticing the media messages.

With respect to the warning labels, the adjusted odds ratios were significantly lower among the daily users of khaini or tobacco lime mixture (AOR0.796(95%CI: 0.688-

Table 1. Number and Percentage of Daily Smokeless Tobacco User Types by Geographic Regions, GATS-2India, 2016-17#

Region	Only betel quid with tobacco	Only Khaini or tobacco lime mixture	Only Gutka/ pan masala with tobacco	Only Oral tobacco use as mishri, qul, gudakhu	Others	Combination of products	Total
	Count (%)	Count (%)	Count (%)	Count (%)	Count (%)	Count (%)	Count (%)
North	35 (0.3)	415 (3.0)	143 (1.3)	36 (0.2)	30 (0.2)	112 (0.6)	771 (5.7)
Central	85 (0.8)	943 (7.3)	609 (5.2)	442 (2.2)	55 (0.4)	707 (6.5)	2841 (22.4)
East	154 (1.7)	1477 (12.3)	181 (1.8)	384 (3.0)	62 (0.5)	514 (4.7)	2772 (24.0)
North-east	1246 (10.6)	1064 (11.4)	255 (2.7)	301 (0.7)	89 (0.4)	991 (7.0)	3946 (32.8)
West	38 (0.8)	375 (6.4)	371 (5.2)	141 (2.1)	103 (1.3)	245 (4.2)	1273 (20.0)
South	475 (3.3)	152 (1.2)	121 (1.0)	96 (0.8)	81 (0.7)	194 (1.4)	1119 (8.4)
Total	2033 (1.8)	4426 (6.7)	1680 (3.1)	1400 (1.8)	420 (0.6)	2763 (4.2)	12722 (18.2)

#, All Percentages are weighted

Table 2. Percentage of Daily Smokeless Tobacco Users who Noticed Anti-Smokeless Tobacco Information in at Least One Medium and Smokeless Tobacco Warning Labels during the Previous 30 Days according to Gender and Residence, GATS-2India, 2016-17#

Type of daily users of smokeless tobacco products	Percentage of daily Smokeless tobacco users who noticed anti-smokeless tobacco information in at least one medium in the previous 30 days					Percentage of daily Smokeless tobacco users who noticed warning labels on smokeless tobacco packages in the previous 30 days				
	Overall n=12,722	Male n=5,930	Female n=2,052	Urban n=2,109	Rural n=5,333	Overall n=12,722	Male n=6,191	Female n=2,627	Urban n=2,200	Rural n=6,618
Gutkha/paan masala with tobacco	74.70%	79.10%	51.50%	84.20%	69.70%	81.20%	85.20%	62.10%	84.20%	79.60%
Daily user of multiple SLT products	68.90%	75.10%	50.70%	82.60%	64.00%	75.40%	81.60%	58.70%	80.60%	73.60%
Khaini or tobacco-lime mixture	61.70%	66.00%	35.60%	81.70%	57.20%	73.30%	76.40%	55.40%	82.00%	71.40%
Other SLT products	73.60%	85.60%	58.80%	80.20%	71.50%	68.40%	80.90%	55.10%	80.60%	64.40%
Betel quid with tobacco	66.90%	83.00%	55.30%	81.00%	61.90%	62.20%	71.20%	55.50%	69.50%	59.60%
Oral tobacco	56.10%	60.60%	54.40%	71.90%	51.40%	60.00%	74.80%	54.20%	72.00%	56.20%
Overall	66.00%	72.00%	50.10%	81.50%	60.90%	72.60%	79.20%	56.50%	79.90%	70.30%

*p<0.05; #, All percentages are weighted

0.921)) and oral tobacco products (AOR0.580(95%CI: 0.488-0.690)) compared to gutkha, paan masala with tobacco users. Women (AOR0.502(95%CI: 0.456-0.553)) compared to men and rural (AOR0.776(95%CI: 0.698-0.862)) compared to urban residents had lower odds of noticing media messages. Compared to those with no formal education, all groups with formal education had better chances of noticing the media messages. The odds of noticing warning labels were better in age groups 25 and above than those aged 15-24.

Table 4 shows the results of multivariate logistic regression for the cessation variables. Adjusted odds

Table 3. Multivariate Logistic Regressions for Noticing Anti-Smokeless Tobacco Messages in Media and Warning Labels on Smokeless Tobacco Packages during Previous 30 Days and Type of Smokeless Tobacco Product Used, GATS-2India, 2016-17*

Variables	Noticed anti-smokeless tobacco messages in media in previous 30 days	Noticed warning labels on smokeless tobacco products in previous 30 days
	Adjusted Odds Ratio (Confidence Interval)	Adjusted Odds Ratio (Confidence Interval)
Type of daily smokeless tobacco user		
Gutkha/paan masala with tobacco (tobacco, lime, areca nut mixture)	Reference	Reference
Khaini or tobacco-lime mixture	0.635 (0.553, 0.730)*	0.796(0.688, 0.921)*
Betel quid with tobacco	0.954 (0.809, 1.124)	0.913 (0.773, 1.079)
Oral tobacco user (mishri, gul, gudakhu)	0.642 (0.540, 0.764)*	0.580 (0.488, 0.690)*
Other SLT products	1.275 (0.971, 1.674)	0.709 (0.552, 0.911)*
Daily user of more than one type of SLT products	0.888 (0.765, 1.030)	0.921 (0.788, 1.076)
Age group		
15-24	Reference	Reference
25-44	1.047 (0.886, 1.238)	1.970 (1.598, 2.428)*
45-64	1.080 (0.905, 1.288)	2.188 (1.912, 2.505)*
65+	0.834 (0.679, 1.024)	1.615 (1.408, 1.851)*
Sex		
Male®	Reference	Reference
Female	0.478 (0.434, 0.527)*	0.502 (0.456, 0.553)*
Residence		
Urban®	Reference	Reference
Rural	0.498 (0.448, 0.554)*	0.776 (0.698, 0.862)*
Education		
No formal education	Reference	Reference
Less than primary	1.742 (1.543, 1.968)*	1.405 (1.244, 1.588)*
Primary completed but less than secondary	2.413 (2.178, 2.675)*	1.995 (1.794, 2.217)*
Secondary and above	3.662 (3.205,4.185)*	2.654 (2.309, 3.050)*
Constant	2.667	1.735

*p<0.05

Table 4. Multivariate Logistic Regressions for Intention to Quit Smokeless Tobacco within 12 Months and History of Quit Attempt in Previous 12 Months and Type of Smokeless Tobacco Product Used, GATS-2India, 2016-17*

Variables	Intention to quit smokeless tobacco within next 12 months	History of quit attempt in previous 12 months
	Adjusted Odds Ratio (Confidence Interval)	Adjusted Odds Ratio (Confidence Interval)
Type of daily smokeless tobacco user		
Gutkha/paan masala with tobacco (tobacco, lime, areca nut mixture)	Reference	Reference
Khaini or tobacco-lime mixture	0.733 (0.627, 0.857)*	0.839 (0.736, 0.956)*
Betel quid with tobacco	0.709 (0.582, 0.864)*	0.890 (0.758, 1.044)
Oral tobacco user (mishri, gul, gudakhu)	0.681 (0.549, 0.845)*	0.806 (0.676, 0.962)*
Other SLT products	0.937 (0.681, 1.289)	0.952 (0.734, 1.234)
Daily user of more than one type of SLT products	0.828 (0.702, 0.976)*	0.922 (0.803, 1.058)
Age group		
15-24	Reference	Reference
25-44	1.104 (0.901, 1.353)	0.952 (0.810, 1.118)
45-64	1.046 (0.841, 1.300)	0.873 (0.735, 1.038)
65+	0.904 (0.691, 1.184)	0.806 (0.652, 0.998)*
Sex		
Male®	Reference	Reference
Female	0.925 (0.813, 1.053)	0.884(0.796, 0.981)*
Residence		
Urban®	Reference	Reference
Rural	1.032 (0.913, 1.167)	0.846(0.767, 0.933)*
Education		
No formal education	Reference	Reference
Less than primary	1.049 (0.887, 1.242)	1.068 (0.933, 1.223)
Primary completed but less than secondary	1.127 (0.981, 1.294)	1.144(1.023, 1.280)*
Secondary and above	1.191 (1.015, 1.396)*	1.228(1.079, 1.398)*
Exposure to anti-smokeless tobacco message in media in previous 30 days		
Did not notice anti-smokeless messages in media	Reference	Reference
Noticed anti-smokeless messages in media	1.281 (1.137, 1.443)*	1.347(1.225, 1.482)*
Exposure to warning labels on smokeless tobacco products in previous 30 days		
Did not notice warning labels	Reference	Reference
Noticed warning labels	1.103 (0.972, 1.251)	1.299(1.173, 1.439)*
Constant	0.171	0.357

*p<0.05

ratios for smokeless tobacco quit intention were significantly lower for all smokeless tobacco product users than those of Gutkha or Paan masala with tobacco. Those with secondary or higher education were likelier (AOR1.191(95%CI: 1.015-1.396)) to have higher quit intention compared to those without formal education. Those who noticed anti-smokeless tobacco messages in the media in the previous 30 days were likelier to have higher quit intention within the next 12 months with an AOR1.281(95%CI: 1.137-1.443) than those who did not see media messages. None of the other variables were significantly associated with intention to quit smokeless tobacco.

With respect to quit attempts in the previous 12 months, there was no significant difference among various types of smokeless tobacco users. Females were less likely to have had a quit attempt (AOR0.88495%CI: 0.796-0.981)) compared to males. Rural residents were less likely than their urban counterparts to have had a quit attempt (AOR0.846(95%CI: 0.767-0.933)). Education was correlated with quit attempts; primary education completed AOR was 1.144(95%CI: 1.023-1.280), and secondary education completed AOR was 1.228(95%CI: 1.079-1.398). Those who noticed anti-smokeless tobacco messages had a higher AOR of making quit attempt, 1.347(95%CI: 1.225-1.482), than those who did not see media messages. Those who had noticed warning labels also had a higher AOR of making quit attempt 1.299(95%CI: 1.173-1.439) compared to those who did not see warning labels.

Discussion

Tobacco epidemic is the most preventable cause of premature mortality and morbidity and is a global public health threat. While considerable progress has happened in high-income countries with reduction in smoking prevalence, smokeless tobacco has received weaker focus at policy and research levels. More than half of the global users of smokeless tobacco live in a single country, India. Unlike the smoked products, the smokeless products are manufactured, sold, used in a wide variety of forms [8]. The various types of smokeless tobacco products are common in specific sub-groups of population. This study found that more than three-fourth of the smokeless tobacco users are using only one type of smokeless tobacco product. It is known from GATS data that certain products are common in certain geographies or age groups or gender. GATS report shows that prevalence of Gutkha use is higher among youth, urban residents, and men residents whereas that of oral tobacco use is more common among rural residents, elderly and women.

Media messages: The reach of anti-smokeless tobacco messages to these groups was found to be unequal which may be because of inequitable access to media. Media messages have traditionally focused on cigarettes rather than smokeless tobacco products and even the smokeless tobacco messaging may focus on only a few forms. The reach of these groups to media could be different. Younger age, higher education, being males and residing in urban areas are associated with greater awareness, improved access and increased mobility of individuals. Persons with no formal education, rural residents, and women were less likely to receive anti-smokeless tobacco messages. A study conducted in India found that anti-tobacco mass media campaign recall was better in urban than in rural areas although there was no significant difference between men and women [5]. Users of khaini or tobacco-lime mixtures and oral tobacco product users also were at disadvantage of receiving anti-smokeless tobacco messages. High reach and consistent access is important to achieve quit intentions [9]. Information, education and communication campaigns have to take into consideration inequities in access to information and have to devise means of reaching to the most vulnerable.

This study found unequal reach of anti-smokeless tobacco messaging among various types of smokeless tobacco users. Content of message and the reaction evoked is crucial. Multiple negative fear emotion messages were expected to work better among the disadvantaged groups [10]. It is not known whether different smokeless tobacco user groups react differently to the mass media messages and there is a need to study that. A survey about women's readiness to quit smokeless tobacco concluded that the media messages and campaigns are not tailored to needs to women and there is a need of the same [11].

Warning labels: Women, rural folks, uneducated and users of tobacco-lime mixtures and oral tobacco products are disproportionately having poor access to warning labels. It is important to note that some of the types of smokeless tobacco are indeed freshly prepared and consumed, therefore warning labels do not apply for them. Even when the smokeless tobacco products are sold in packaging; the packaging does not have a warning label or uses one that is too small in size and crumbled or too blurred to make them inconspicuous [12, 13]. A study assessed the health warning labels on SLT products in rural areas of five Indian states and found that only 55% of the packs had the accurate label mandated by the law. 6% had warnings that were selectively blurred to hide the picture, while 53% had warning images that were completely blurred. 10% were found with labels that were heavily tinted, worn, and stretched in some way [14]. Warning labels on smokeless tobacco products have been shown to be less effective [7]. The size of the image, covering both sides of packaging and being impactful were identified as three major areas for improvement of warning labels.

The intention to quit also had lower odds among all other smokeless tobacco users compared to users of gutkha or paan masala with tobacco. Media messages were found to be associated with intention to quit but only two-third of the smokeless tobacco users received the messages and some groups had poorer penetration. Analysis of quit attempts in the past 12 months revealed that there was no major difference according to the type of smokeless tobacco product. Being woman, rural resident, not formally educated had less likelihood of having attempted quitting. Exposures to media messages and warning labels were associated with higher chances of quit attempts.

Strengths and Limitations

This is the first study to analyse quit intention and quit attempts among specific type of smokeless tobacco users, based on a nationally representative dataset. There were some limitations though. The data on exposure to anti-smokeless tobacco information on media, including warning labels have been collected for the past 30 days whereas quit attempts by smokeless tobacco users have been considered for the past 12 months. The temporality between noticing message and quit attempt could not be established. After the ban on gutkha, the market shifted to pan masala and tobacco which are often bought separately and mixed together. For this study, these categories were merged. Khaini is usually prepared fresh and sold or the user mixes tobacco and lime and consumes it. However, it is also sold in packaged form. 22.8% of daily smokeless tobacco users consume a combination of SLT products. Thus, within one broad category, there is heterogeneity of forms which the survey did not capture. Since the focus of the paper is on product type, a major limitation was that the huge variety of SLT products could be classified in six categories.

Smokeless tobacco is consumed in a variety of ways and thus requires nuanced control strategies. Quit intention and quit attempts are dependent upon exposure to anti-smokeless media messages and warning labels which is in turn dependent upon residence, gender, education and specific type of smokeless tobacco product used. Oral tobacco users notice the least anti-tobacco information and HWLs and are less likely to quit. This calls for improving the reach of the media messages

and warning labels among the disadvantaged groups. The unpackaged forms need closer attention and policy measures to bring them under stricter regulations. The data showed that although North-East had highest prevalence of smokeless tobacco use, different types of products were more common in different regions. There is a need to design IEC strategies that reach unreached groups, that are region or state specific to address the specific types of products used, to enforce law so that warning labels are more prominent and impactful and policy shift to bring all smokeless tobacco products under stricter regulatory environment.

Author Contribution Statement

SC conceptualized the study in discussion with NG. The objectives and methods were designed by SC and the proposal was reviewed by NG and PG. The analysis was conducted by SC and reviewed by NG and PG. The final manuscript was prepared by SC and revised by NG as per comments from PG.

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Ethical Declaration

The GATS India data set is available in the public domain from CDC and are de-identified. All the Global Adult Tobacco Surveys were approved by ethical boards of survey countries and CDC, Atlanta. Study protocols and survey materials for GATS 1 were approved by the Ethics Review Committee and Institutional Review Board (IRB) of the International Institute for Population Sciences, Mumbai. Study protocols and survey materials for GATS 2 were approved by the Ethics Review Committee and IRB of Tata Institute of Social Sciences, Mumbai. Consent was obtained from all participants. Parent or guardian consent was obtained for interviews of minors aged 15–17 years.

Data Availability

The data underlying this article are available in [Global Tobacco Surveillance System Data (GTSSData) at https://nccd.cdc.gov/GTSSDataSurveyResources/Ancillary/DataReports.aspx?Country=180&CAID=2&Survey=4&WHORegion=2&Site=3840002016. The datasets were derived from sources in the public domain. Code is available upon request.

Conflict of Interest

Authors declare that they have no conflict of interest.

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