

---

RESEARCH ARTICLE

Editorial Process: Submission:10/30/2017 Acceptance:05/21/2018

---

## Challenges in Indian Women's Readiness to Quit Smokeless Tobacco Use

Jean J Schensul<sup>1\*</sup>, Shahina Begum<sup>2</sup>, Saritha Nair<sup>3</sup>, Cheryl Oncken<sup>4</sup>

### Abstract

**Introduction:** In India, there are few cessation programs for women smokeless tobacco (SLT) users who want to quit. This paper uses Fishbein's IM model to identify women SLT users' challenges to quitting and multilevel correlates of "readiness to quit". **Methods:** A survey of SLT use among women of reproductive age was conducted in 2010-13 in an urban slum community of Mumbai with a representative sample of 409 married women aged 18 to 40 years using at least one type of SLT daily. Data were analyzed using frequencies, bivariate statistics and logistic regression. **Results:** Social influences to continue SLT use included husband's use (71%), family influence and positive beliefs and norms about use. Pressure to quit from significant others influenced past quit attempts but media had no effect on reported behavior. Four groups represented different readiness to quit statuses based on intention to quit and past quit/reduce attempts. Seventeen percent had no intention of quitting or reducing; their husbands were more likely to be tobacco users. Half of (52%) the sample had attempted to quit/reduce tobacco and intended to do so in the future. These women were depressed. Fifteen percent had tried to quit but did not intend to again. Correlates were positive beliefs and norms about SLT and withdrawal symptoms. **Conclusions:** Cessation programs should be made available to women, addressing correlates of women's readiness to quit statuses. Results suggest the need for more complex social/contextual approaches to sustained cessation of SLT use including addressing depression and withdrawal, improved media messages and campaigns tailored to women, and support from family members.

**Keywords:** India- women- smokeless tobacco- cessation- poly-tobacco use

*Asian Pac J Cancer Prev*, **19** (6), 1561-1569

### Introduction

Smokeless tobacco (SLT) is widely used in S. Asia (India, Pakistan, Nepal, Bangladesh) and in UK and other areas with large S. Asian populations (Croucher et al., 2012; Gupta et al., 2014). SLT is well recognized a significant health threat for cancer (Gupta et al., 2011; Sinha et al., 2016). Indian women's use of smokeless tobacco (SLT) has been increasing at a worrisome rate (Ram et al., 2009; Ram et al., 2010) especially among poorer women with limited formal education (Bhan, Karan et al., 2016). Women use many different types and brands of powdered and rubbed, and chewed smokeless tobacco with or without betelnut and flavorings (Bhonsle et al., 1992; Narain and Sinha, 2011) often concurrently (Nair et al., 2015), initiating early and continuing throughout their reproductive careers (Nair et al., 2015; Begum et al., 2015). They are thus exposed both to cancer risk and perinatal health problems (Subramoney and Gupta 2008; Deshmukh et al., 1998; Gupta and Subramoney, 2006).

There is good evidence that quitting tobacco use confers short and long range health benefits (Jha et al., 2013). Despite this most Indian tobacco users do not succeed in quitting (Gupta and Subramony 2004; Dhupal et al., 2014). Government quit lines and websites (Mishra et al., 2014; Thankappan, 2014) are not accessible to low income women who want to quit use of SLT. There is no research on Indian women's efforts to quit. More research could improve much needed tobacco cessation programs for these women.

Fishbein's integrated model (IM) offers the most comprehensive theoretical approach with respect to behavior change as it combines background and contextual factors with beliefs, norms, prior experience and intentions to accomplish the desired behavior (Yzer, 2017). The IM model can also accommodate antecedent factors such as media exposure and family and community social-behavioral norms in predicting intentionality. Further, the IM model recognizes that even when intention and prior quit experience are present, lack of skills and environmental constraints may make it difficult

<sup>1</sup>Institute for Community Research, 2Hartford Square West, Ste 100, Hartford, <sup>4</sup>UCONN Health (Medicine), 263 Farmington Avenue, Farmington, CT, USA, <sup>2</sup>ICMR-National Institute for Research in Reproductive Health, Jehangir Merwanji Street, Parel, Mumbai, <sup>3</sup>ICMR-National Institute of Medical Statistics, Ansari Nagar, New Delhi, India. \*For Correspondence: Jean.schensul@icrweb.org

for people to engage in the desired behavioral change. The IM model has the potential to guide tailored intervention efforts by modifying predictors of intention, and improving the conditions/reducing the barriers leading to accomplishment of the desired goal.

Most research on tobacco use in India is cross sectional and focuses either on intention to quit or quit attempts. Grouping people by different combinations of intentions and past quit/reduce behaviors results in a temporal measure of “readiness to change” status that is a useful alternative to the stages of change hypothesis (Partos et al., 2013). Drawing from a cross-sectional survey of SLT use among low income women in Mumbai this paper will identify patterns of quitting among single and poly-tobacco users and predictors of “readiness to change” statuses. Data for the paper were collected in 2011-2013 from SLT-using married women of reproductive age in a slum community of Mumbai through a joint study of the National Institute for Reproductive Health (NIRRH), Mumbai, and the Institute for Community Research (ICR), U.S.A. The study was approved annually by the IRBs of both institutions and the Indian Council for Medical Research (ICMR), Delhi.

## Materials and Methods

The study was conducted in a typical geographically diverse slum community in Mumbai of about 60 – 70 thousand residents (Schensul et al., 2013). Eligibility criteria included: between ages of 18 and 40, married and daily use of at least one type of SLT. Using a systematic random sampling procedure every fourth household was approached and women were screened for eligibility. Of a total of 1,290 households with age-eligible women (83% of households screened), 406 households included at least one woman who met the eligibility criteria giving an estimated SLT prevalence rate of 31.4% among women in the study area. Of these, 85% or 347 women consented and completed the survey. Reasons for refusals included time constraints or husband or other household members’ concerns about participation. A census of all pregnant SLT-using women was carried out by identifying

pregnant women through house listing, or through introductions to pregnant women by other respondents or key informants. Of 223 additional pregnant women, 67 (16.5%) were eligible based on study inclusion criteria; 62 were enrolled. Pregnant users in the census and the systematic random sample were statistically similar, so they were pooled giving a total of 409 SLT users.

The study survey included questions on tobacco and pregnancy history, patterns and contexts of use, exposure to tobacco messages through media, and quit/reduce-related behaviour, attitudes, norms and intentionality with respect to each form of tobacco used. It was translated from English into Hindi and Marathi and back translated. Both literate and illiterate participants were consented by reading approved consent forms and obtaining signatures or thumb prints and witness co-signatures. Signed consent forms were kept at NIRRH. Trained survey researchers administered the survey to 409 women in the participant’s choice of language and in a private location. Data were analysed using SPSS 19.0 software (IBM, Armonk, NY, USA).

Fishbein’s Integrated Model (IM model) (see Figure 1) was adapted to include smokeless tobacco measures in this study.

### Measures

*Panel 1: Background variables (demographic media influences, individual differences)*

This cluster of variables includes demographics: age ( $\geq 30$  or  $< 30$  cutoff based on mean age at the time of the interview), type of family (nuclear or extended), currently pregnant (yes or no), duration of stay in Mumbai divided at median ( $<15$  years  $\geq 15$  years); education (literate or illiterate based on whether respondent could read or not); working for cash income either outside or inside the house (yes or no) and average monthly family income; media influences: exposure to pro-tobacco messages (yes or no to one or more of sources of exposure to 18 pro-tobacco or 9 anti-tobacco message sources), recognize meaning of scorpion on package (yes or no). Individual differences: food insecurity (index of 8 items indicating insufficient daily household availability recoded to no to

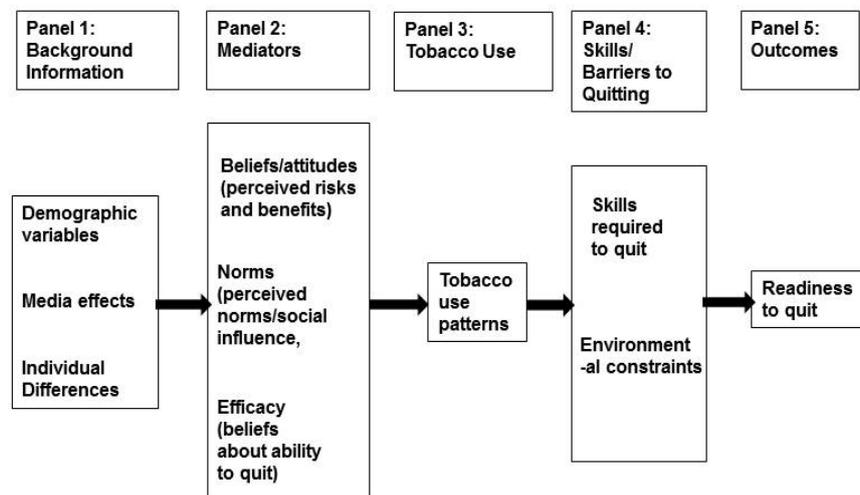


Figure 1. Fishbein’s IM Model adapted for Tobacco Cessation

all = no and one or more = yes, depression (single item unhappy/depressed yes/no) and tension ('tenshun') (index based on 14 items reflecting sources of tension coded presence/absence and summed).

#### *Panel 2: Mediators Tobacco Beliefs, Attitudes, Norms and Self efficacy*

Positive cultural beliefs about tobacco: yes/no agreement with each of 14 positive beliefs about tobacco use (e.g. smokeless tobacco relieves gastric problems, smokeless tobacco relieves body pain, using smokeless tobacco relieves hunger) summed and divided at the median level (high  $\geq 5$  vs low  $< 5$ ). Cultural beliefs about SLT effects on infants: 7 item Likert scale ranked from 1 = completely disagree to 5 = completely agree summed, divided at the median as  $< 6$  vs  $\geq 6$ ). Examples included "causes baby's skin to peel", "collects in baby's chest". Injunctive SLT norms: 7 normative statements endorsing SLT use (e.g. "mishri should be used for toothache"; "paan with tobacco should be used at weddings") 'and' summed 'up' and divided at the mean into 2 categories:  $< 2$  and  $\geq 2$ ). Descriptive SLT norm: whether husband used SLT (yes = 1; no = 0). Social influence (normative): whether husband or other person has advised quitting (yes to either = 1; no to both = 0). Self-efficacy: Perceived difficulty in quitting: a single question asking about ease of quitting tobacco with 5 point Likert scale. Very difficult/difficult coded 0 (difficult) and easy/very easy to quit coded as 1 (easy).

#### *Panel 3: Tobacco use*

Type of tobacco use: Single vs poly-tobacco (use of more than one type of tobacco concurrently): Single use = 1; use of more than one = 2. Index of number of tobaccos used concurrently: constructed by coding use of each type of tobacco as 0 = no; 1 = yes, and summing to obtain total (range of 1 – 5 types). Duration of SLT: use calculated as difference between current age and age at initiation of first type of tobacco, split at the median (4.9) ( $\leq 5$  years/  $> 5$  years). Amount of use: To obtain this measure, each woman was asked on average how much SLT they used each time, based on typical "units" of application for each type of loose or powdered tobacco (e.g. a "pinch" (held between two fingers), a tablespoon, a small packet (one chew) or large packet (double the size of small packet), a quid (a cupped hand). To evaluate the amount of tobacco each respondent consumed, amounts were weighed and gram weights of tobacco were calculated for typical units of each type of tobacco ( $\frac{1}{2}$  a table spoon, tablespoon, small packet or full packet). For quid tobacco which is sprinkled on paan, five pan shop owners provided the amount they sprinkled on a betel quid, and the total weight was calculated on a scale and divided by five to approximate the amount. For each woman, amounts were calculated for each type of tobacco x number of times consumed a day. Consumers were divided at the median into those using above or below 5 grams of tobacco per day. Ratio of tobacco expense to overall household expenses: Based on respondent estimate of amount spent each week on all types of tobacco, multiplied by 4. The ratio was constructed by dividing

this amount by total monthly household income and coded as  $\leq 1\%$  versus  $> 1\%$ .

Twelve month quit history was calculated for each tobacco used. For each participant, each type of tobacco (4 in total) was coded as 1 if the participant made a quit attempt. Quit attempts for all tobaccos were summed. The difference between tobaccos used and tobaccos quit was calculated for each person. That number constituted the 12 month quit history. Range was 0 (all tobaccos quit) through 4 (used all 4 tobaccos and quit none).

#### *Panel 4. Skills required to quit and Constraints to Quitting*

Advice to quit was defined as yes = 1 to the question of whether husband or others (in-laws, other family members, health professionals, NGOs, friend, street play) had advised the respondent to quit. Family support to quit: coded as yes = 1, no = 0. Best way to quit was defined as self-determination = 1 or other means (medicine, support therapy, individual counseling, educational program, help from family friends, advice from health care provider) = 2. Willingness to become anti-tobacco activist was based on the question: Would you participate in a street play to reduce smokeless tobacco use? Responses were yes = 1; no = 0). Husband use of SLT: no/yes regardless of whether husband was a single or poly user. Perceived difficulty in quitting was coded as 'difficult' (very or somewhat difficult) or "easy" (somewhat or very easy).

#### *Panel 5: Readiness to Quit (Outcome Variable)*

Readiness to quit consisted of four groups constructed of 2 variables, quit/reduced any tobacco in the past 12 months and current intention to quit. 1. Least ready to quit: Those who had no intention to quit and had never reduced or quit any SLT in the past 12 months. 2. Considering quitting: those who had intention to quit but had never reduced or quit any SLT in the past 12 months; 3. Ready to quit: those who had intention to quit and had reduced or quit at least one form of SLT in the past 12 months and 4. Resistant to quit: Those who had attempted quitting or reducing but had no future intention to quit.

#### *Analysis*

To determine multicollinearity among the variables, collinearity diagnostic tests were conducted. In none of the cases were the "tolerance values" less than 0.2 and no variance inflation factor was greater than 10. For each woman number of tobaccos used was compared to number of tobaccos quit in past year and graphed. Percentages were calculated for all key predictors and chi square was applied to determine probability of association of these variables with the four readiness-to-quit groups. Using all variables with probabilities of 0.25 or less a multinomial logistic regression was performed to assess predictors of Readiness to Quit for groups 2 – 4 with group 1 as the reference category. Withdrawal symptoms were examined for groups with quit/reduce histories (groups 3 and 4).

## **Results**

Results are summarized in Table 1.

Table 1. IM Model Variables

IM Model Variables	Total N=409	"Readiness to Quit" Groups (Outcome Variable)				p value
		Gp 1: Least Ready to Quit N=73 (17%)	Gp 2: Considering Quitting N=61 (15%)	Gp 3: Ready to Quit N=213 (52%)	Gp 4: Resistant to Quit N=62 (15%)	
Background Variables						
Demographic and Socioeconomic Variables						
Age						
≤30	217 (53.0)	14.7	13.8	58.1	13.4	0.07
>30	192 (47)	21.4	16.1	45.3	17.2	
Education						
Illiterate	223 (54.5)	22.4	13.5	49.8	14.3	0.06
Literate	186 (45.5)	12.4	16.7	54.8	16.1	
Type of family						
Nuclear	303(74)	19.8	14.2	50.5	15.5	0.31
Extended	106 (26)	12.3	17.0	56.6	14.2	
Currently pregnant						
No	307 (76)	16.9	15.6	53.4	14.0	0.47
Yes	102 (25)	20.6	12.7	48.0	18.6	
Work for cash						
No	343(83.8)	19.5	14.3	51.6	14.6	0.21
Yes	66 (16.2)	9.1	18.2	54.5	18.2	
Average monthly family income (±SD)	7,300 (±5277.4)	6,126 (±3621.2)	7,818.8 (±4940.9)	7,668.3 (±6111.6)	6,905.2 (±3798.3)	
Duration of stay in Mumbai						
≤10	159 (38.8)	19.5	18.2	49.1	13.2	
>10	250 (61.2)	16.8	12.8	54.0	16.4	0.33
Individual Characteristics						
Mean score of food insecurity	2.5±2.7	1.8±2.7	1.8±2.1	2.8±2.9	2.5±2.3	
Mean score of tension	2.4±4.0	2.6±4.5	1.9±3.4	2.7±4.2	1.9±3.2	
Depression						
No	275 (67.2)	11.5	16.7	60.4	13.5	0.04
Yes	134 (32.8)	19.8	14.4	49.5	18.7	
Media Influences Recognize meaning of scorpion causes cancer						
No	196 (47.9)	21.4	20.4	46.9	11.2	0.001
Yes	213 (52.0)	14.6	9.9	56.8	18.8	
Pro- tobacco messages on any mass media						
No	182 (44.5)	20.3	18.7	51.1	9.9	0.01
Yes	227(55.5)	15.9	11.9	52.9	19.4	
Anti-tobacco messages on any mass media						
No	231 (56.5)	25.5	15.2	45.5	13.9	
Yes	178 (43.5)	7.9	14.6	60.7	16.9	0.001
Beliefs, norms and attitudes about tobacco (Mediator variables)						
+ve beliefs about tobacco	189 (46.2)	20.6	18.5	52.4	8.5	0.00
<5	220 (53.8)	15.5	11.8	51.8	20.9	
≥5	4.9±2.6	4.5±2.4	4.1±2.3	4.9±2.8	6.1±2.4	
Beliefs about SLT effects on infants						
<6	192 (46.9)	19.8	13.5	50.5	16.1	0.65
≥6	217 (53.1)	16.1	16.1	53.5	14.3	
Mean score	4.3±2.5	3.9±2.7	4.5±2.6	4.5±2.4	4.2±2.5	
Tobacco Use Variables						
Mean age at initiation	20.1±7.5	20.8±7.93	20.3±8.3	20.3±7.2	18.5±7.3	
Type of user						
Single	261 (63.8%)	21.8	16.5	47.5	14.2	0.01
Poly	148 (36.2%)	10.8	12.2	60.1	16.9	

Table 1. Continued

IM Model Variables	"Readiness to Quit" Groups (Outcome Variable)					p value
	Total N=409	Gp 1: Least Ready to Quit N=73 (17%)	Gp 2: Considering Quitting N=61 (15%)	Gp 3: Ready to Quit N=213 (52%)	Gp 4: Resistant to Quit N=62 (15%)	
<b>Tobacco Use Variables</b>						
<b>Duration of SLT use</b>						
0-5 years	143 (34.9%)	18.2	16.1	55.9	9.8	0.17
6 or more	266 (65.1%)	17.7	14.3	50.0	18.0	
mean duration	10.0±7.8	9.9±8.1	10.1±8.6	9.3±7.2	12.3±7.9	
<b>Amount of SLT use</b>						
<5 grams	211 (51.5%)	21.8	16.6	44.1	17.5	0.00
≥5 grams	198 (48.5%)	13.6	13.1	60.6	12.6	
mean amount	7.2±8.8	7.5±13.5	6.5±8.6	7.5±7.3	6.3±7.1	
<b>Ratio to HH expenditure</b>						
<1	299 (73.1%)	17.1	16.7	53.8	12.4	0.02
≥1	110 (26.8%)	20.0	10.0	47.3	22.7	
<b>Perceived difficulty in quitting</b>						
No (easy)	96 (23.4)	11.5	16.7	60.4	11.5	0.11
Yes (difficult)	313 (76.5)	19.8	14.4	49.5	16.3	
<b>Skills to Quit and Environmental Constraints</b>						
<b>Skills required to quit Advise to quit</b>						
None	120 (29.3)	28.3	12.5	39.2	20.0	0.00
Husband	189 (46.2)	14.3	15.3	60.8	9.5	
Others	94 (22.9)	12.8	14.9	52.1	20.2	
<b>Family Support to Quit</b>						
No	186 (47.0)	20.4	15.1	44.6	19.9	0.02
Yes	223 (54.5)	15.7	14.8	58.3	11.2	
<b>Best way to quit SLT</b>						
Self determination	275 (67.2)	16.0	17.8	52.7	13.5	0.04
Other	313 (32.8)	21.6	9.0	50.7	18.7	
<b>Willingness to attend Street Play</b>						
No	197 (48.2)	23.9	19.3	42.1	14.7	.001
Yes	212 (51.8)	12.3	10.8	61.3	15.6	
<b>Environmental Constraints Husband use SLT</b>						
No	115 (28.1)	16.5	12.2	58.3	13.0	0.45
Single users	140 (34.2)	20.	16.4	47.1	16.4	
Poly users	154 (37.5)	16.9	15.6	51.9	15.6	

*Panel 1: Demographics and other Background Characteristics*

The mean age of study participants was 30.1 (±6.2) years. All women but one reported at least one pregnancy. Most respondents had been in Mumbai for more than ten years, and were first generation migrants to Mumbai from Uttar Pradesh and other parts of Maharashtra. Fifty-seven percent were illiterate. Sixteen percent worked for cash and the average monthly household income was estimated at Rs 6500, slightly over the poverty level of Rs 5600/mo. per household of four (Zhong, 2014).

Media played a role in women's SLT use. About 45% had seen an ant tobacco warning and 52% recognized that the scorpion sign was associated with cancer. Most women had never received a tobacco promotion. Fifty-five percent reported tenshun, 67% reported at least one form of food insecurity and 63% reported being unhappy/depressed.

*Panel 2: Mediators*

Women's responses to pro-tobacco beliefs varied across readiness to quit groups from 4.1 to 4.6. The most frequently mentioned beliefs "which" were "smokeless tobacco relieves "labor pain" (86%) and body pain" (81%), "mishri strengthens the teeth during pregnancy" (75%) "paan with tobacco is natural with no chemicals" (70%). Pro-tobacco injunctive norms means ranged from 1.6 to 3.0 across readiness to quit groups. Most frequently mentioned were "paan should be eaten after a non-vegetarian meal (60%) or after any meal" (56%), "paan should be used in wedding gatherings" (48.4%) and "mishri should be used for toothache" (45%). Concerns about effects of tobacco on children's health had a mean of 3.9 with no differences across groups. Sixty-nine percent of respondents reported that a person close to them had advised them to quit.

Table 2. Multinomial Logistic Regression, Reference Category is No Intention

Background characteristics	p value	Adjusted odds ratio (95% of CI)		p value	Adjusted odds ratio (95% of CI)	
		Intention only	intention+ quit or reduce		Quit or reduce only	
Age						
≤30	0.59	1.23 (0.58, 2.59)	0.07	1.78 (0.96, 3.30)	0.77	1.12 (0.53, 2.35)
>30		1.00		1.00		1.00
Education	0.16		0.64			0.03
Illiterate		0.56 (0.25, 1.27)		0.85 (0.43, 1.68)		0.40 (0.18, 0.90)
Literate		1.00		1.00		1.00
Type of family	0.38		0.13		0.68	
Nuclear		0.66 (0.26, 1.66)		0.55 (0.25, 1.19)		0.82 (0.32, 2.08)
Extended		1.00		1.00		1.00
Type of user	0.04		0.00		0.05	
Single		1.00		1.00		1.00
Poly		2.56 (1.03, 6.32)		4.55 (2.14, 9.65)		2.39 (0.99, 5.80)
Advise to quit	0.02		0.00		0.41	
No		1.00		1.00		1.00
Yes		2.93 (1.17, 7.31)		3.22 (1.54, 6.71)		1.44 (0.61, 3.42)
Duration of SLT use	0.93		0.79		0.14	
0-5 years		1.04 (0.46, 2.37)		1.10 (0.56, 2.16)		0.52 (0.22, 1.23)
6 or more		1.00		1.00		1.00
Amount of SLT use	0.97		0.08		0.68	
<5 grams		1.00		1.00		1.00
≥5 grams		0.99 (0.45, 2.18)		1.77 (0.93, 3.38)		0.84 (0.38, 1.88)
Ratio to HH expenditure	0.15		0.09		0.75	
<1		2.01 (0.77, 5.23)		1.88 (0.89, 3.94)		1.15 (0.48, 2.72)
≥1		1.00		1.00		1.00
Perceived difficulty in quitting	0.03		0.00		0.46	
No (easy)		3.11 (1.13, 8.57)		4.99 (2.08, 11.99)		1.50 (0.51, 4.40)
Yes (difficult)		1.00		1.00		1.00
Best way to quit SLT by	0.04		0.21		0.88	
Self determination		0.41 (0.17, 0.96)		0.66 (0.35, 1.26)		0.94 (0.44, 2.04)
Other way		1.00		1.00		1.00
Unhappy/depressed	0.08		0.00		0.11	
No		1.00		1.00		1.00
yes		1.97 (0.92, 4.25)		3.31 (1.75, 6.27)		1.89 (0.87, 4.12)
+ve beliefs about tobacco	0.73		0.54		0.02	
<5		0.87 (0.38, 1.96)		0.81 (0.41, 1.60)		0.36 (0.15, 0.86)
≥5		1.00		1.00		1.00
Beliefs about effects of SLT on baby	0.86		0.71		0.82	
<6		0.93 (0.43, 2.01)		0.89 (0.47, 1.67)		1.09 (0.51, 2.35)
≥6		1.00		1.00		1.00
Norms	0.16		0.76		0.05	
<2		1.80 (0.79, 4.11)		0.90 (0.44, 1.82)		0.38 (0.14, 1.00)
≥2		1.00		1.00		1.00
Family support to quit	0.76		0.16		0.34	
No		0.88 (0.39, 1.98)		0.62 (0.32, 1.20)		1.48 (0.66, 3.33)
Yes		1.00		1.00		1.00
Noticed health warning in last 30 days	0.93		0.10		0.22	
No		1.04 (0.42, 2.57)		0.55 (0.27, 1.13)		0.58 (0.24, 1.38)
Yes		1.00		1.00		1.00
Meaning of Scorpio	0.45		0.16		0.21	
No		1.38 (.60, 3.18)		0.61 (0.30, 1.22)		0.57 (0.28, 1.38)
Yes		1.00		1.00		1.00

Reference category, no intention with no quit or reduce; Intention only, intention with no quit or reduce in the past; intention+ quit or reduce; intention with quit or reduce in the past; Quit or reduce only; no intention but quit or reduce in the past

Seventy-six percent said it would be difficult to quit the use of tobacco, but fewer thought it would be difficult to reduce and 28% said quitting was impossible. Of those who tried, 52% of mishri users said they could not quit followed by 41% of paan chewers and 39% of packet tobacco users. Chewed tobacco users reported needing to increase their use more often than other users.

*Panel 3: Tobacco use Patterns*

Main types of tobacco reported were mishri (toasted black tobacco rubbed on the gums N=111, 27%), chewed paan (betel quid) with tobacco and flavorings (N=211, 51.6%), gutkha (packaged tobacco with flavorings and betelnut, N=75, 18%), shredded loose or packaged leaf with lime and flavors (27%), and gul, a powdered tobacco favored in north India N=108, 26%). Thirty six percent of women used more than one type of tobacco and 10% used 3 forms of tobacco or more. Mean age of tobacco initiation was approximately 20 years and 68% began their tobacco use after marriage. Seventy two percent of women reported that their husbands used SLT, and half of these husbands were poly-tobacco users (53%).

Sixty-seven percent (n=274) reported intending to quit one or more of the types of tobacco they were using. Among those who used only one type of SLT, (N=261), only 39% tried to quit at least once in the past year. Among users of two types of tobacco, 21% tried to quit one type and only 15% tried to quit both; among users of three types of tobacco (34), 15% tried to quit one, an additional 15% tried to quit two, and only 9% tried to quit all three types of SLTs. Only one of the six women using 4 types of tobacco tried to quit all four (Figure 2).

*Panel 4: Skills and Barriers to quitting*

Women believed that there were few resources to help them quit their use. Most (67%) thought that the best way to quit was on their own and only 12% mentioned help from a health care provider. However, 54% reported that someone in their family would support them to quit and 65% expressed interest in speaking to an anganwadi (child-care) worker about reducing their use. Women were also willing to take an active public stance in efforts to control tobacco use, expressing willingness to attend a tobacco prevention street play (85%) or participate in one (51%).

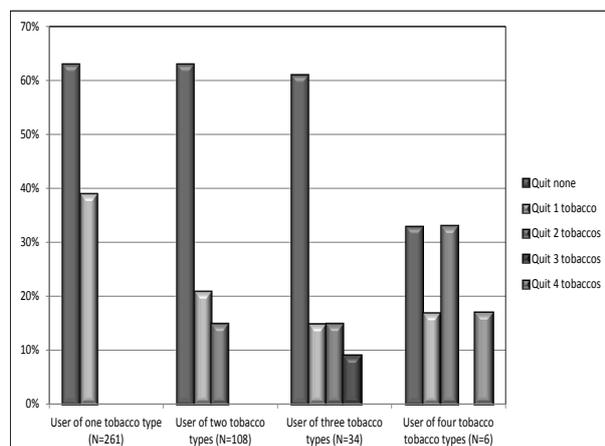


Figure 2. Types of Tobaccos Used against Quit Attempts

*Panel 5: Readiness to Quit*

Across the four “readiness to quit” groups the Least Ready to Quit group (Group 1) constituted 17% of the total sample (73) The Considering Quitting group (Group 2) constituted 15% of the sample; the Readiness to Quit group (Group 3) included 52% of the sample while the Resistance to Quitting group (Group 4) that claimed past quit attempts but no intention to try again constituted 15% of the sample. Table 2 summarizes the results of the Multinomial Logistic Regression with Group 1 as the reference group.

As compared to those in Group 1, Least Ready to Quit, those in the Considering Quitting group (Group 2) - who had never tried to quit - were more likely to be poly-tobacco users, to have been given advice to quit, to perceive less difficulty in quitting and to feel more efficacious about quitting on their own. Those in the Ready to Quit group (Group 3) differed from Group 2 in that they were more likely to be depressed. Those in the Resistance to Quitting group (Group 4) were more likely to be literate, and to hold positive beliefs and norms about tobacco use. They were also significantly more likely to have experienced craving as compared to those in the Readiness to Quit group (3) (Chi Sq. 4.6, do. 1, Fisher’s exact .043; 2 sided). Husband’s tobacco use, pregnancy, other demographic or attitudinal variables, available family support to quit and pro or anti-tobacco warnings were not significant predictors of group membership.

**Discussion**

Women’s use of SLT especially during the reproductive period continues to be a problem because of known effects on the health of the woman and infants. In this study more than 85% of women actually tried unsuccessfully to reduce or quit at least one type of tobacco in the past year. The study’s 39% 12 month quit attempt rate among single users is comparable to the overall 42% reported by Srinivasta et al., (2013) but in that study males had a much higher probability of quit attempts than women and the study did not distinguish between smoked and smokeless tobacco. The 12-month quit attempt rate for Sarkar et al.’s 2013 study of smokers and SLT users in Gujarat and Andra Pradesh was much lower (18%) for both males and females (Sarkar et al., 2013). Though an analysis of the 2010 GATS data showed that men were more likely to quit tobacco use than women (Ram et al., 2009-2010), some studies such as. Sarkar et al., (2013) show that women those who were better educated and were exposed to warning messages were more likely to quit tobacco (Dhumal et al., 2014). The reverse was true in this study.

Quit attempts in this study were highest among single users (40%); most poly-tobacco users quit only some but not all of the types of tobacco they used. Poly-tobacco users consume more tobacco than single users (Nair et al., 2015) and thus their dependency level is higher. Once using multiple tobaccos, women typically do not return to single tobacco use and if they do, they may actually increase their overall tobacco intake to compensate for the shift (Nair et al., 2012). There are no studies on tobacco – specific difficulties in quitting. In this study,

some tobaccos were associated with more difficulty quitting or reducing over others (e.g. mishri, paan with tobacco and chewed tobacco). These tobaccos are the cheapest, the most frequently used during the day, and most likely to be associated with daily routines, all factors making it difficult to quit.

Most research does not address reductions in use. Yet reduction in tobacco, alcohol or tobacco use can be a harm reduction strategy particularly under specific circumstances such as pregnancy. In this study, women perceived reducing to be easier than quitting altogether, and reduction efforts in the past 12 months were strongly correlated with quit attempts. Schiller notes that planning can lead to reductions and that a small percentage of reductions lead to cessation (Schiller et al., 2012) and other Indian interventions have shown temporary reductions during pregnancy (Pratinidhi et al., 2010). Thus under certain circumstances, reduction may lead to quitting altogether and may be a potentially useful harm reduction strategy (McNeill and Munafò, 2013 )

Readiness to quit has been noted as one of the most important components of a tobacco cessation program (Burkhalter et al., 2005; Weinstein et al., 2005), usually measured as intention to quit within a designated period of time. In this paper, using typical cross sectional tobacco epidemiology variables we have defined four groups representing different position in relation to readiness to quit. The results of our Readiness to Quit analysis show distinct differences across all four use statuses that suggest different approaches to tailored cessation efforts. For example, Group 1 (Least Ready to Quit) members could benefit from media based interventions to raise awareness and community intervention approaches in promoting them to consider reducing or quitting their use (Kumar et al., 2012; Mishra et al., 2014). Group (2) consisted of heavy tobacco users who had been encouraged to quit and had intention and high perceived self-efficacy to quit. Negatively framed media appeals addressing health impacts of tobacco use and normative influence to quit including peer quit support (Danaher et al., 2009) and group cessation approaches could be tailored to this group. Those in the Ready to Quit group reported depression. Interventions with this group could consider replacing SLT's pharmacological properties (enhancing mood, and increasing energy) (Benowitz, 2010) with alternative coping strategies and address women's mental health needs directly The Unwilling to Quit group (Group 4) was better educated, and more likely to have pro tobacco norms and positive beliefs about tobacco use than the other groups. Committed tobacco users often cite greater benefits of tobacco use even when they are aware of negative consequences (Weinstein et al., 2005). Craving may have reduced their desire to quit in the future. Craving and other consequences of tobacco cessation are known to impede cessation efforts (Srivastava et al., 2006; Taggar et al., 2015). Interventions that reframe tobacco norms and reduce SLT craving and other withdrawal systems including yoga, varenicline or nicotine replacement patches have shown some success in India as well as elsewhere (Jain et al., 2014; Sarkar et al., 2014; Jhanjee et al., 2015) and might be appropriate for

this group. Finally, women in all groups are equally aware that there are negative consequences of SLT use for their babies, information that can be used to tailor cessation programs for pregnant or pregnancy planning with women.

There are limitations in this paper including the cross-sectional nature of the data, and the exclusion of quitters from the sample. It is based on a single community in Mumbai which at the same time is representative of other such communities as well as rural and urban areas of the country. Since the data were collected, mass media approaches either generic or targeted to smokers have been implemented along with selected tobacco bans but they do not reach women or change their overall tobacco consumption.

Though women believe they can quit on their own, there are few incentives for quitting, and many practical personal family and contextual reasons for continuing their use making it difficult for them to quit without programs that can help them. Since signing the WTFC the Indian government has promoted and acted upon the importance of making tobacco cessation programs more widely available (Varghese et al., 2012; Thankappan, 2014). To date these programs have not reached SLT-using low income women who are ready to quit their SLT use; there are few publically available cessation programs for low income men or women, and only one in the Mumbai area targeted specifically to women (Mishra et al., 2014). Thus the need for expanded opportunities for tobacco cessation programs addressing the needs of specific groups of women continues. Tailored de-addiction opportunities along with more effective anti-tobacco community campaigns and social support systems and taxation of all chewed tobaccos could offer women much needed support to quit their tobacco chewing habit and improve their health.

## Acknowledgements

The authors wish to acknowledge the ongoing support of Dr. Prakash Gupta, Healix-Sekhsaria Institute for Public Health and Dr. Balaiah Donta, NIRRH, for the study that resulted in the data for this paper. We also appreciate the contributions of the study staff coordinated by Sameena Bilgi, M.Phil. and the critical inputs and collaboration of the many women in the study community who cooperated in the study, participated in interviews, and joined in data dissemination and intervention planning.

## References

- Begum S, Schensul JJ, Nair S, et al (2015). Initiating smokeless tobacco use across reproductive stages. *Asian Pac J Cancer Prev*, **16**, 7547-54.
- Benowitz NL (2010). Nicotine addiction. *N Engl J Med*, **362**, 2295-303.
- Bhan N, Karan A, Srivastava S, et al (2016). Have socioeconomic inequalities in tobacco use in India increased over time? trends from the national sample surveys (2000–2012). *Nicotine Tob Res*, **18**, 1711-8.
- Bhonsle RB, Murti PR, Gupta PC (1992). Tobacco habits in India. Control of tobacco-related cancers and other diseases: Proceedings of an international symposium. Prakash, PC.

- Hamner JEI and Murti PR. Bombay, Oxford University Press, pp 25-46.
- Burkhalter JE, Springer CM, Chhabra R, et al (2005). Tobacco use and readiness to quit smoking in low-income HIV-infected persons. *Nicotine Tob Res*, **7**, 511-22.
- Croucher R, Shanbhag S, Manu, D, et al (2012). Smokeless tobacco cessation in South Asian communities: a multi-centre prospective cohort study. *Addiction*, **107**, 45-52.
- Danaher BG, Lichtenstein E, Andrews JA, et al (2009). Women helping chewers: Effects of partner support on 12-month tobacco abstinence in a smokeless tobacco cessation trial. *Nicotine Tob Res*, **11**, 332-5.
- Deshmukh JS, Motghare DD, Zodepy SP, et al (1998). Low birth weight and associated maternal factors in an urban area. *Indian Pediatr*, **35**, 33-6.
- Dhumal GG, Pednekar MS, Gupta PC, et al (2014). Quit history, intentions to quit, and reasons for considering quitting among tobacco users in India: Findings from the Wave 1 TCP India Survey. *Indian J Cancer*, **51**, 39-45.
- Gupta B, Johnson NW (2014). Systematic review and meta-analysis of association of smokeless tobacco and of betel quid without tobacco with incidence of oral cancer in South Asia and the Pacific. *PloS One*, **9**, Epub 11/30/2014.
- Gupta PC, Ray CS, Sinha, DN, et al (2011). Smokeless tobacco: A major public health problem in the SEA region: A review. *Indian J Public Health*, **55**, 199.
- Gupta PC, Subramoney S (2006). Smokeless tobacco use and risk of stillbirth: a cohort study in Mumbai, India. *Epidemiology*, **17**, 47-51.
- Gupta PC, Subramony S (2004). Smokeless tobacco use, birth weight, and gestational age: population based, prospective cohort study of 1217 women in Mumbai, India. *Brit Med J*, **328**, 1538.
- Jain R, Jhanjee S, Jain V, et al (2014). A double-blind placebo-controlled randomized trial of varenicline for smokeless tobacco dependence in India. *Nicotine Tob Res*, **16**, 50-7.
- Jha P, Ramasundarahettige C, Landsman V, et al (2013). 21st-century hazards of smoking and benefits of cessation in the United States. *N Engl J Med*, **368**, 341-50.
- Jhanjee S, Jain R, Jain V, et al (2015). Evaluating the effects of varenicline on craving, withdrawal, and affect in a randomized, double-blind, placebo-controlled clinical trial of varenicline for smokeless tobacco dependence in India. *J Psychoactive Drugs*, **47**, 325-30.
- Kumar MS, Sarma PS, Thankappan KV, et al (2012). Community-based group intervention for tobacco cessation in rural Tamil Nadu, India: A cluster randomized trial. *J Subst Abuse Treat*, **43**, 53-60.
- McNeill A, Munafò MR (2013). Reducing harm from tobacco use. *J Psychopharmacol*, **1**, 13-8.
- Mishra GA, Kulkarni SV, Majumdar PV, et al (2014). Community-based tobacco cessation program among women in Mumbai, India. *Indian J Cancer*, **51**, 54-9.
- Nair S, Schensul JJ, Begum S, et al (2015). Use of smokeless tobacco by Indian women aged 18–40 years during pregnancy and reproductive years. *PloS One*, **10**, e0119814.
- Nair S, Schensul JJ, Bilgi S, et al (2012). Local responses to the Maharashtra Gutkha and Pan Masala Ban: a report from Mumbai. *Indian J Cancer*, **49**, 443.
- Narain JP, Sinha DN (2011). Tobacco epidemic in South-East Asia region: Challenges and progress in its control. *Indian J Public Health*, **55**, 151.
- Partos TR, Borland R, Yong HH, et al (2013). The quitting rollercoaster: how recent quitting history affects future cessation outcomes (data from the International Tobacco Control 4-country cohort study). *Nicotine Tob Res*, ntt025.
- Pratinidhi AS, Gandham A, Shrotri A, et al (2010). Use of 'Mishri' A smokeless form of tobacco during pregnancy and its perinatal outcome. *Indian J Com Med*, **35**, 14-8.
- Ram F, Lahiri S, Parasuraman S, et al (2009-2010). Global adult tobacco survey GATS India. Delhi, India, Ministry of Health and Family Welfare.
- Sarkar BK, Arora M, Gupta VK, Reddy KS (2013). Determinants of tobacco cessation behaviour among smokers and smokeless tobacco users in the states of Gujarat and Andhra Pradesh, India. *Asian Pac J Cancer Prev*, **14**, 1931-5.
- Sarkar BK, Shahab L, Gupta VK, et al (2014). A cluster randomized controlled trial of a brief tobacco cessation intervention for low-income communities in India: study protocol. *Addiction*, **109**, 371-8.
- Schensul JJ, Nair S, Bilgi S, et al (2013). Availability, accessibility and promotion of smokeless tobacco in a low-income area of Mumbai. *Tob Control*, **22**, 324-30.
- Schiller KR, Luo X, Anderson AA, et al (2012). Comparing an immediate cessation versus reduction approach to smokeless tobacco cessation. *Nicotine Tob Res*, **14**, 902-9.
- Sinha DN, Abdulkader RS, Gupta PC, et al (2016). Smokeless tobacco-associated cancers: A systematic review and meta-analysis of Indian studies. *Int Jr Cancer*, **138**, 1368-79.
- Srivastava P, Currie GP, Britton J (2006). Smoking cessation. *BMJ*, **332**, 1324-26.
- Srivastava S, Malhotra S, Harries A, et al (2013). Correlates of tobacco quit attempts and cessation in the adult population of India: secondary analysis of the Global Adult Tobacco Survey, 2009–10. *BMC Pub Health*, **13**, 263.
- Subramoney S, Gupta PC (2008). Anemia in pregnant women who use smokeless tobacco. *Nicotine Tob Res*, **10**, 917-20.
- Taggar JS, Lewis S, Docherty G, et al (2015). Do cravings predict smoking cessation in smokers calling a national quit line: secondary analyses from a randomised trial for the utility of 'urges to smoke' measures. *Subs Abuse Treat*, **10**, 1.
- Thankappan KR (2014). Tobacco cessation in India: A priority health intervention. *Indian J Med Res*, **139**, 484-6.
- Varghese C, Kaur J, Desai NG, et al (2012). Initiating tobacco cessation services in India: Challenges and opportunities. *WHO SEA J Pub Health*, **1**, 159-68.
- Weinstein ND, Marcus SE, Moser RP (2005). Smokers' unrealistic optimism about their risk. *Tob Control*, **1**, 55-9.
- Yzer M (2017). Theory of reasoned action and theory of planned behavior. The international encyclopedia of media effects, John Wiley and Sons, Inc.
- Zhong R (2014). New poverty formula proves test for India. *Wall Street J*, **27**, 2014.



This work is licensed under a Creative Commons Attribution-Non Commercial 4.0 International License.