RESEARCH ARTICLE

Determinants of Tobacco Cessation Behaviour among Smokers and Smokeless Tobacco Users in the States of Gujarat and Andhra Pradesh, India

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Abstract

Background: This study was undertaken to identify the socio-demographic determinants of quit attempts among smokers and smokeless tobacco users to identify correlates of tobacco cessation behaviour in India Materials and Methods: This was a cross-sectional study for the outcome of quit attempts made by current tobacco users in last 12 months in twelve districts in two states. Simple and multivariable logistic regression analysis was used to obtain the odds ratios (ORs) of socio-demographic variables (age, gender, education, occupation, socio-economic status, community, area, type of family) and tobacco user status (smoker/smokeless). Results: In the combined analysis, a smoker had higher predicted probability of attempting quitting (OR- 1.41,CI 1.14 -1.90), in comparison to a smokeless tobacco user and a tobacco user in the state of Gujarat was less likely to attempt quitting than a user in Andhra Pradesh (OR-0.60, CI 0.47-0.78). The probability of making a quit attempt was higher among tobacco users who were more educated (OR-1.40, CI 1.04-1.94), having a higher socio-economic status (SES) (OR-2.39, CI 1.54-3.69), and belonging to non-agricultural labourer occupational group (OR-1.90, CI 1.29-2.78). The effects were maintained even after adjusting for all other variables. In disaggregated analysis, findings were similar except in smokeless as a separate group, education level was not significantly associated with quit attempts and with lower odds (OR-0.91, CI 0.58-1.42). Conclusions: This is one of the first studies to provide useful insight into potential determinants for quit attempts of tobacco users in India including smokeless tobacco users, exploring the socio-demographic patterning of correlates of quit attempts.

Keywords: Smoker - smokeless - quit attempts - determinants - India tobacco control

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Introduction

World Health Organization estimates that tobacco use kills 5.4 million people globally (WHO, 2008) and an estimated one million die in India every year (Jha et al., 2008). Tobacco use behaviours vary in different regions of the world (Corrao et al., 2000) and it is critical to identify the predictors of attempts to stop tobacco use and sustained tobacco cessation(Hyland et al., 2006). According to the Global Adult Tobacco Survey (GATS), there are 275 million tobacco users in India which includes 164 million smokeless tobacco users, 69 million smokers and 42 million using both smokeless and smoked forms (I.I.P.S, 2010). India has more smokeless tobacco users than smokers, and among smoking forms Bidi smoking is the most prevalent form. The effect of socio-demographic factors, nicotine dependence levels of smokers, self efficacy factors as important predictors of quit attempts and cessation reported from western countries may be different in India comprising of predominantly smokeless tobacco users and 'Bidi' smokers. Since most studies on predictors of tobacco cessation has been conducted in high income western populations of mostly cigarette smokers, there is an urgent need to conduct country specific tobacco control research in low to middle income countries (LMIC) like India with different socio-cultural context, norms, tobacco control policies and awareness levels to understand cessation behaviour and strengthen programmes for tobacco cessation to cut short the devastation brought by tobacco use(WHO, 1999). Against this background, this study was undertaken to map the socio-demographic correlates of quit attempts among smokers and smokeless tobacco users in India.

Study design

This was a cross-sectional study contributing to baseline data of a community based intervention study for tobacco control (STEPS project: Strengthening of Tobacco control Efforts through innovative Partnerships and Strategies).

Study population

The study participants were 813 smokeless tobacco users and 658 smokers totalling 1471 tobacco users surveyed in12 districts in India, six districts in each of the two states of Gujarat and Andhra Pradesh (Districts

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Banaskantha, Rajkot, Kheda, Anand, Surat, Tapi in Gujarat and Karimnagar, Vishakapatnam, East Godavari, Mahbubnagar, Kurnool, and Prakasam in Andhra Pradesh).

Materials and Methods

The states of Andhra Pradesh and Gujarat were selected as having the highest producers of tobacco in India apart from high prevalence of tobacco use. The six districts in each state were selected by the state government excluding the districts covered by the National Tobacco Control Programme (NTCP) of India and represent different geographical regions of each state.

In each district, a multi-stage sampling procedure was adopted using probability proportional to size (PPS) sampling technique to select 80-100 villages as primary sampling units (PSUs) in rural areas and 15-20 wards in urban areas. Within urban wards, localities were selected randomly. Within each locality or village, equal number of males and females above 15 years of age were selected by systematic sampling. A total of 2700 adults in 135 PSUs in Andhra Pradesh and 2500 adults in 125 PSUs in Gujarat were selected to be surveyed. The tobacco users were identified by a household survey in the study area and data collected by interviews using a pre-tested questionnaire after obtaining consent as part of baseline data. The data was collected from January to September 2011.

Data was collected on quit attempts in the last 12 months by the participant smokers and smokeless tobacco users and for the following socio-demographic variables as determinants for quit attempts: 1) Age; 2) Gender; 3) Education; 4) Occupation: categorized into six groups; 5) Socio-economic status (SES): measured by quintiles of monthly expenditures compiled by summing expenditures on 18 items; 6) Religion: Very small numbers in most subgroups except Hindus hence dropped from further analysis; 7) Area: Residence in rural or urban areas with great disparity in terms of development as well as in the levels of knowledge, attitudes, values and practices of health behaviour; 8) Type of community: grouped into three traditional societal hierarchical groups known as "caste" in India starting from lower caste (Scheduled caste/ Scheduled tribe) to upper caste (General). Caste of the family into which one is born, has social, cultural, economic and political implications leading to potential marginalization of lower caste individuals in India especially in rural areas; 9) Type of family: grouped into joint or nuclear. The joint family is the traditional structure, in which elderly parents stay in the same house with grown up children including married ones and grandchildren. Younger members in a joint family are not allowed to smoke in the presence of elders as it is considered disrespectful and a vice similar to alcoholism.

Other independent variables; 10) State: Whether the tobacco user resides in Andhra Pradesh or Gujarat state; 11) Tobacco user category: Whether participant tobacco user was a smoker or smokeless tobacco user

Data analysis

The model with the complete data set excluding the 73 non-responders to outcome (65 smokers and 8 smokeless users) was used for analysis for this paper. The logistic regression analysis was done using STATA software to obtain Odds Ratios (ORs), on the combined sample of all tobacco users keeping tobacco use status (smokers versus smokeless tobacco users), state and the socio-demographic correlates (all categorical variables) as controlling variables of cessation behaviour and also considering smokers and smokeless tobacco users as separate groups. Included there were 73 dual users (5.2 percent) who smoked as well as chewed tobacco who were identified in the sample and they were included in both groups for analysis.

The variables with statistically significant odds ratio in the univariable logistic regression analysis were then fitted into a multi variable logistic regression model to obtain adjusted odds ratios.

Table 1. Quit Attempts by Socio-demographic Characteristics of Smokers and Smokeless Tobacco Users

Socio-demographic variable	Prevalence of quit attempts during past 12 months n (%)			
	Smoking n= 658	Quit attempts	Smokeless n= 813	Quit attempts
State				
Andhra Pradesh	442	113 (25.6)	256	67 (26.1)
Gujarat	216	50 (23.2)	557	82 (14.7)
Age groups				
15-24	42	13 (30.9)	107	21 (19.6)
25-44	280	67 (23.9)	420	78 (18.6)
45-64	272	74 (27.2)	225	40 (17.8)
65+	64	9 (14.1)	61	10 (16.4)
Gender				
Male	620	158 (25.5)	523	94 (17.9)
Female	38	5 (13.2)	290	55(18.9)
Education				
Illiterate	260	50 (19.2)	319	57 (17.9)
Primary	236	65 (27.5)	247	41 (16.6)
Secondary	138	39 (28.3)	213	46 (21.6)
Higher Sec & above	24	9 (37.5)	34	5 (14.7)
Occupation				
Agricultural Labourers	188	42 (22.3)	206	31 (15.1)
Non Agricultural Labourers	133	42 (31.6)	115	29 (25.2)
Both	43	9 (20.9)	64	10 (15.6)
Self employed	148	29 (19.6)	180	33 (18.3)
Govt./Non-govt. empl	87	30 (34.5)	129	21 (16.3)
Others	59	11 (18.6)	119	13 (21.0)
Area				
Rural	509	128 (25.3)	575	105 (18.3)
Urban	152	35 (23.0)	238	44 (18.5)
Type of family				
Nuclear	444	101 (22.8)	383	88 (22.9)
Joint	214	62 (28.9)	430	61 (14.2)
Community				
Scheduled Caste/ Scheduled Tribe	228	63 (27.6)	321	58 (18.0)
OBC	314	71 (22.6)	314	54 (17.2)
General	116	29 (25.0)	178	37 (20.8)
SES (monthly expenditure quintile)				
Quintile 1 (lowest)	143	23 (16.1)	174	18 (10.3)
Quintile 2	165	43 (26.1)	191	42 (21.9)
Quintile 3	147	44 (29.9)	189	30 (15.9)
Quintile 4	111	24 (29.7)	146	34 (23.3)
Quintile 5 (highest)	92	20 (21.7)	113	25 (22.1)

Table 2. Logistic Regression Analysis: Determinants of Quit Attempts by Tobacco Users - Crude and Adjusted Odds Ratios (ORs)

Determinants	Tobacco users (n=1398)		Smoking# (n=658)	Smokeless# (n=813)
	Unadj. OR (95% CI)	Adj. OR (95% CI)	Adj. OR (95% CI)	Adj. OR (95% CI)
State				
Andhra Pradesh	1.00	1.00	N.A	1.00
Gujarat	0.60 (0.47-0.78)*	0.66(0.50-0.89)*	N.A	0.61 (0.40-0.94)*
Tobacco use category				
Smokeless only	1.00	1.00	N.A	N.A
Smoker	1.47(1.14-1.9)*	1.25(0.94-1.66)	N.A	N.A
Age groups				
15-24	1.00	N.A	1.00	N.A
25-44	0.92(0.60-1.42)	N.A	0.73(0.34-1.55)	N.A
45-64	1.05(0.67-1.63)	N.A	0.98(0.45-2.12)	N.A
65+	0.63(0.34-1.18)	N.A	0.49(0.18-1.36)	N.A
Gender				
Male	1.00	N.A	N.A	N.A
Female	0.78(0.57-1.06)	N.A	N.A	N.A
Education				
Illiterate	1.00	1.00	1.00	N.A
Primary	1.25(0.92-1.7)	1.28(0.93-1.77)	1.55(1.00-2.40)*	N.A
Secondary	1.4(1.01-1.94)*	1.61(1.12-2.33)*	1.69(0.98-2.92)	N.A
Higher Sec & above	1.26(0.65-2.42)	1.37(0.68-2.77)	2.39(0.89-6.37)	N.A
SES (expenditure per mth quintiles)				
Quintile 1 (lowest)	1.00	1.00	1.00	1.00
Quintile 2	2.10(1.38-3.18)*	2.20(1.44-3.37)*	1.86(1.04-3.33)	2.84(1.53-5.26)*
Quintile 3	1.85(1.21-2.82)*	1.85(1.19-2.87)*	2.09(1.16-3.76)*	1.81(0.94-3.49)
Quintile 4	2.39(1.54-3.69)*	2.43(1.56-3.8)*	2.23(1.19-4.15)*	2.82(1.49-5.33)*
Quintile 5 (highest)	1.83(1.14-2.94)*	1.90(1.17-3.09)*	1.32(0.66-2.63)	2.83(1.42-5.62)*
Occupation				
Agricultural Labourers	1.00	1.00	1.00	1.00
Non Agricultural Labourers	1.90(1.29-2.78)*	1.71(1.15-2.54)*	1.63(0.98-2.73)	1.71(0.94-3.11)
Combined agri & non-agri labour	0.89(0.50-1.57)	0.84(0.47-1.51)	0.83(0.36-1.91)	1.10(0.50-2.44)
Self employed	1.03(0.70-1.51)	0.81(0.54-1.22)	0.69(0.40-1.21)	1.19(0.69-2.08)
Govt./Non-govt. employees	1.27(0.84-1.92)	1.01(0.64-1.6)	1.36(0.73-2.53)	1.15(0.62-2.16)
Others	1.13(0.72-1.76)	1.03(0.65-1.65)	0.80(0.36-1.79)	1.20(0.66-2.20)
Area of residence				
Rural	1.00	N.A	N.A	N.A
Urban	0.92(0.69-1.23)	N.A	N.A	N.A
Type of family				
Nuclear	1.00	N.A	N.A	N.A
Joint	0.78(0.6-1.01)	N.A	N.A	N.A
Community				
Scheduled Caste/ Sch Tribe	1.00	N.A	N.A	N.A
OBC	0.87(0.65-1.15)	N.A	N.A	N.A
General	0.96(0.68-1.36)	N.A	N.A	N.A

*p<0.05 hence statistically significant, #Non-responders to question on quit attempts are excluded (n=65 for smoking and n=8 for smokeless tobacco use) & smoker and smokeless categories includes dual users who use both forms of tobacco (n=73)

Non-responders

There were 8.9 % non-responder smokers (65 out of 723) and 0.9 % non responder smokeless tobacco users (8 out of 821) to the outcome question on quit attempts. They were excluded from the analysis. The combined model of tobacco users with smokers and smokeless combined would be a more robust model as the non-response proportions are much lower than the only smokers model in which the non-responders tend to cluster within strata of the categorical variables. With the exception of variable age group in which the non-responders are uniformly distributed across strata, the non responders cluster to a proportion of more than 10 percent in specific stratum within most variables in the smokers model as follows: education (illiterates-56/316-17.7 percent), gender (females 8/46-17.4 percent), occupation (agricultural labourers-52/240-21.6 percent), SES (expenditure quintile5-22/114-19.3 percent) which is a potential source of bias in disaggregated analysis.

Results

Overall combining both states, 24.7 percent of smokers and 18.3 percent smokeless tobacco users made attempts to quit in last one year out of a total of 1398 current tobacco users. Lower proportion (17%) of tobacco users in Gujarat reported making a quit attempt in last 12 months versus a higher proportion (25.7%) by tobacco users in Andhra Pradesh. Overall smokeless tobacco users made less attempts than smokers. Within the smokeless tobacco users group, quit attempts made were much lower in Gujarat (14.7% in comparison to Andhra Pradesh (26.1%). The distribution of socio-demographic variables studied and prevalence of quit attempts in each group are shown in Table 1.

In combined analysis of tobacco users (see Table 2), for outcome of quit attempts by tobacco users in last 12 months, the predicted probability of a quit attempt by a smoker was much higher OR-1.47 (CI 1.14-1.90),

p=0.003, than a only smokeless tobacco user in univariable logistic regression analysis. In multivariable logistic regression analysis, this effect was reduced (Adjusted OR-1.25, CI 0.94-1.66) and lost statistical significance. In the same model, controlling for the variable state, a tobacco user in Gujarat was less likely to attempt quitting (adjusted OR-0.66, CI 0.50-0.89, p=0.006) versus a tobacco user in Andhra Pradesh. Overall the probability of making a quit attempt was higher among tobacco users who were more educated upto secondary level, adjusted OR-1.61 (CI 1.1-2.33), p=0.01, belonged to higher socio-economic status (SES) adjusted OR-2.43 (CI 1.56-3.80), p=0.000 for quintile 4 of higher expenditure per month category, was a non-agricultural labourer by occupation Adjusted OR-1.70 (CI 1.14-2.53), p=0.008. The crude and adjusted Odds ratios for all the variables studied in the combined model are shown in Table 2, column 2 and 3.

Smokers and smokeless as separate groups

The adjusted ORs observed by treating smokers (n=658) and smokeless (n=813) as separate groups by multi-variable regression analysis are shown in Table 2, column 4 and 5 respectively. In disaggregated analysis, in smokeless group, education level did not predict higher quit attempts (OR 0.91, CI 0.58-1.42) whereas in smoker group it predicted higher probability of quit attempts (OR 1.6, CI 1.02-2.67), rest of findings were similar to the combined model. In the univariable analysis of state as a variable, smokeless tobacco users in Gujarat were less likely to attempt quitting, (OR 0.48, CI 0.39-0.70, p=0.000) and the effect was maintained even after adjusting for all other factors in multivariable analysis, (adjusted OR 0.61, CI 0.40-0.94, p=0.023) in comparison to those in Andhra Pradesh as shown in Table 2, column 5. In multivariable analysis in smokeless group, a smokeless user had higher predicted probability of attempting quitting if in higher SES group, adjusted OR 2.82 (1.49-5.33), p=0.001 for quintile 4, The effect of higher SES was similar in smokers OR 2.23(1.19-4.15) for quintile 4.

Discussion

Our study is probably one of the first studies conducted in India to identify the predictors of quit attempts by tobacco users in India though predictors of tobacco consumption has been studied (Rani, 2003) and some community interventions for tobacco cessation have been conducted and evaluated (Gupta et al., 1986; Anantha et al., 1994; Arora, 2011) earlier. Recently some attempts have been made to assess nicotine dependence levels among smokers (Jayakrishnan et al., 2012) in India and measures of nicotine dependence among smokeless tobacco users have also been suggested (Jena, 2012) to characterize population groups.

Our study finding of education (primary/secondary) to be a significant predictor of quit attempts for smokers in disaggregated analysis as well as for tobacco users in combined analysis is aligned to similar findings reported from western countries (Hatziandreu et al., 1990; Lee and Kahende, 2000) and also South East Asia (Siahpush, 2008). However, in our study smokeless tobacco users did not show an influence of education which is similar to the European CEASE study (Monso, 2001) and ITC-South East Asia study on Malaysian sample (Siahpush et al., 2008) which did not find education to have a significant effect on outcome. Our study found that higher socio-economic status (SES) measured by monthly expenditure quintiles to be a significant determinant for quit attempts among both smokers as well as smokeless tobacco users, which is similar to the findings in previous studies (Hymowitz et al., 1997; Reid, 2010).

Our study did not find age, gender or urban/rural residence to be a significant predictor which is similar to the findings from the four country ITC survey (Hyland, et al., 2006) of western countries in year 2006 but different from the recent ITC study from Malaysia and Thailand in 2010 which reported both age and urban/ rural residence to be a significant predictors of quit attempts (Lin et al., 2010). It has also investigated some unique factors like type of family structure, community (caste), rural versus urban residence, which have strong socio-cultural influence in rural areas which were not found to be associated in the present case but may certainly be worth studying further by qualitative methods in any future comprehensive assessment.

This study has several limitations. Its study design being cross-sectional, it could not investigate the relationship of the quit attempts to successful quitting and being focussed only on socio-demographic variables, investigation of all the factors for cessation behaviour was beyond its scope. The socio-demographic profile of non responders (8.9% of smokers and 0.9% of smokeless) excluded from the analysis and the included dual users (5.2% of total) in smokers and smokeless categories may have led to certain inaccurate inferences. Further, inclusion of only statistical significant variables in the multivariable model can also be debated. However, the authors feel that the combined model of tobacco users with its large sample size of 1398 participants sampled across a wide geographical area in 12 districts lends credence to the findings of this study.

It has observed higher predicted probability of quit attempts among tobacco users who are smokers, live in state of Andhra Pradesh, with higher education, higher socio-economic status measured by expenditure quintiles, and non-agricultural labourer by occupation. Further, the analysis of smokeless tobacco users as a separate group with lower quit attempts observed in this study and also the finding of education not influencing the cessation behaviour (quit attempts) in this group, is aligned to the findings of the national level GATS India survey 2010 with a sample size of more than 70,000 which has also reported a lower proportion of quit attempts (35.4%) by smokeless tobacco users in comparison to smokers (38.4%). This provides a basis for future tobacco cessation research to identify predictors of quit attempts and understand cessation behaviour of smokeless tobacco users in India to ascertain what underlies any differences in quit attempts observed in India and compare with experience in other countries with smokeless tobacco users apart from investigating dual users as a separate group and other known predictors of cessation.

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