

Initiation of habit of daily consumption of non combusted tobacco products in male population and logit model

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Abstract

The objective of present research study is to identify age of starting or initiation of habit of use of smokeless or non combusted or chewing tobacco products on daily basis in male population of Ahmedabad. For the research a sample of 650 adult male tobacco chewers (between age 15 to 64 Years) was randomly chosen through self organized cross sectional type survey. For the identification of specific age initiation of consumption of non combusting tobacco products, different socio-demographic factors or characteristics of participants were selected as covariates. The data was collected through self designed and pretested questionnaire which was prepared in English and a local language Gujarati. The analytical portion consists of a statistical analysis which was done with the help of statistical software SPSS 21.0. Statistical or calculative tool used in the analysis and modeling is logit model (logistic regression) for selection of epidemiological measures (risk factors) of initiation of tobacco use at specific age. From the results it was conclude that Income and education have significant effects on initiation of habit of non combusting tobacco use. No significant effect found of other social and demographic factors on age of initiation of habit of daily consumption of non combusting tobacco products in male participants.

Key Words: Initiation (onset), non combusting tobacco, adult male, Logit model.

1. Introduction

It is practically difficult to think about control of tobacco abuse in mass users of tobacco products without enough knowledge of proper and recent scenario of tobacco abuse. Focusing a proper vulnerable tobacco consumer group is a convenient and proper way for successful tobacco control instead of the application of tobacco control strategies to the whole population of tobacco abusers. 25 years or less is an age group

which is highly influenced by psychological, social and emotional factors. It is an age when youngsters easily adopt addiction of easily available legal street drugs like tobacco. This age group can be considered as an active market of tobacco consumers. Tobacco abuse in younger age may be attributable to history of tobacco use in parents, experimentation of tobacco products, Easy availability, friends' and relatives' influences, state of mind (pressure) etc. But all

these are psychological factors which needs proper counseling to know about. Effects of Social or demographic factors on tobacco abuse are comparatively easy to know about. If we talk about tobacco abuse it includes combusting and non combusting tobacco use. In Gujarat chewing tobacco is a tradition not an addiction that of in male population due to which tobacco research on non combusting tobacco use is conducted rarely. By keeping this fact in mind in present study we have emphasized on effects of different socio-demographic factors like age, gender, education, income etc on age of initiation of daily consumption of non combusting tobacco products by considering a specific range of initiation age as a comparative criteria in male population of Ahmedabad.

2. Material, Data collection and Methods

Design of study: To collect the data I have conducted a population based survey which was cross sectional and fully self organized. A sample of 650 male tobacco chewers was drawn having age between 15 to 64 years in Ahmedabad city (only residents of Ahmedabad were included in the sample).

Participants' selection: A random sample of participants or respondents from adult male population of Ahmedabad city was selected using a technique of multiphase which includes two selection phases. The first phase includes random selection of areas which was followed by second phase of selection of male respondents randomly from the selected areas. In the procedure

respondents were selected randomly by balancing subgroup probability proportional to referenced population size.

Data collection: A predesigned and pretested questionnaire (prepared in English and local language Gujarati) was used as an aid of collection in data collection procedure. It questionnaire was provided to selected participants of age between 15 to 64 years who were permanent residents of Ahmedabad city. An unbiased assistance was provided to the respondents who were not able to fill questionnaire at their own (e.g. illiterates, physically unable, psychologically ill etc.). I have excluded the non responses from the sample.

3. Statistical Analysis

Statistical analysis of the whole dataset was carried out by means of SPSS 21.0 using logit model because of the dichotomous or categorical responses.

3.1 Theoretical expression of Logit model

Logit model (logistic regression model) with j independent or explanatory variables is

$$\ln(\pi(x)) = b_0 + b_1X_1 + b_2X_2 + \dots + b_jX_j$$

$$\text{Where } \ln(\pi(x)) = \ln\left(\frac{\hat{p}}{1-\hat{p}}\right)$$

$$= b_0 + b_1X_1 + b_2X_2 + \dots + b_jX_j$$

$$\text{The odds can be defined as Odds} = \frac{\hat{p}}{1-\hat{p}}$$

Or as a direct specification alternate

$$\hat{p} = \frac{\exp(b_0 + b_1X_1 + b_2X_2 + \dots + b_jX_j)}{1 + \exp(b_0 + b_1X_1 + b_2X_2 + \dots + b_jX_j)}$$

$$(\pi(x)) = P(Y/X = x)$$

Above presentation shows logit model or logistic regression transforms in a standard linear

regression model, once we transform the dichotomous outcomes into Logits. As usual for linear regression this transformation changes the range of $P(Y/X=x)$ from 0 to 1 to -1 to $+1$. Here parameter b_i = effect of covariate x_i on the log odds that Y assumes 1, controlling other covariates x_m , for instance, $\exp(b_i)$ is the multiplicative effect on the odds of a unit increase in covariate x_i , at fixed levels of other covariates x_m .

3.2 Selection of the variables

3.2.1 Dependent variable: The present study focuses on the phenomenon of age of starting of consumption of non combusting tobacco. Age between 17 to 22 years was taken as response variable with two categories consumer initiated daily non combusting tobacco use during the above age (code 1) and consumer not initiated daily non combusted tobacco use during above age (code 0).

3.3 Results of analysis:

3.2.2 Independent Variables: Different social and demographic variables like age, religion, cast, occupation, education and income are taken as independent variables for the logit model to get responses.

3.2.3 Verifications of assumptions and checking of explanatory variables:

All assumption of MLR (Multiple logistic regression) are satisfied without any violation. Nature of dependent variable is dichotomous. No multi-collinearity exists between explanatory variables used in the study. No outliers, high leverage values or highly influential points are included in the sample. The procedure of different phases of recalculated model fitting includes checking of standard errors, statistical significance of parameter estimates and goodness of fit. Explanatory variables with unusual results are excluded as per the requirement of validation.

Table 1 Odds ratios of initiation age of daily consumption of non combusting tobacco products in male tobacco chewers of Ahmedabad

Covariates	Categories	#	%	O.R. (Adjusted)	L.B.	U.B.
Age : 55-64	A-1	67	53.2	0.853	0.315	2.315
	A-2	92	59.7	1.251	0.718	2.181
	A-3	85	55.2	1.053	0.605	1.832
	A-4	67	64.4	1.033	0.556	1.922
	A-5	64	57.1	1	-	-
Religion : Other	OTH	8	57.1	0.445	0.126	1.567
	CHR	19	79.2	1.638	0.551	4.865
	SIKH	4	66.7	0.599	0.099	3.615
	MUS	100	55.2	1.061	0.672	1.675
	HIN	244	57.4	1	-	-
Cast : Other backward Class	OBC	93	52.5	0.871	0.558	1.360

Schedule tribe	ST	27	58.7	1.009	0.487	2.088
Schedule cast	SC	93	56	0.924	0.562	1.520
General	OPEN	162	62.1	1	-	-
Occupation: Professionals	PRO	53	80.3	1.099	0.363	3.329
Employers	EMP	40	76.9	0.877	0.284	2.709
Employees	EMPL	86	61.9	0.619	0.284	1.349
Self employed workers /street vendors	SE/SV	38	54.3	1.758	0.908	3.405
Students	STD	57	53.8	1.044	0.348	3.133
Unemployed / Unpaid workers/ Housewives	UEM/UPW/HSW	29	52.7	0.760	0.346	1.667
Labourers	LAB	72	44.4	1	-	-
Level of Education: 16 or more years of education	ED-1	59	73.8	1.254	0.479	3.278
13-15 years of education	ED-2	74	82.2	2.486*	1.063	5.818
8-12 years of education	ED-3	85	64.4	0.997	0.483	2.055
1-7 years of education	ED-4	94	41.8	0.500*	0.291	0.860
No education	ED-5	63	51.2	1	-	-
Annual Income: 10 lakhs or more	I-1	66	84.6	5.784*	2.202	15.193
5-9.99 lakhs	I-2	63	71.6	2.786*	1.251	6.203
2.5-4.99 lakhs	I-3	103	63.6	2.127*	1.141	3.965
0-2.49 lakhs	I-4	143	44.4	1	-	-
Note : *O.R. ,p< 0.05 and O.R.=Odds ratio, U.B. =Upper bound, L.B.=lower bound						

4. Discussion

Present study is a statistical analysis of data of age of initiation of daily consumption of non combusting tobacco products among respondents. Responses are measured as effects of different socio-demographic predictors. According to the visible proportions of age of initiation between 17 to 22 years of tobacco consumption of participants, the higher middle age participants with age 35 to 54 years have started daily tobacco chewing between the age of 17 to 22 years and majority of the else start it at somewhat early age to 17 years. Muslim and Hindu participants have shown initiation during the specified age. General category

participants are having highest proportion of starting tobacco chewing during the specified age. Illiterate subjects came out with highest rates of initiation of tobacco chewing during specified age. But these study results are individual proportions only which may not clear the picture of combined effects of set of predictors. We used an advance statistical analysis to overcome this problem.

Like all other regressions, logistic regression or logit model is also a predictive analysis. To predict membership of categories of response variable we have used logistic regression. It can be considered as a zoomed profile of simple proportionate values of tobacco

initiation during the age of 17 to 22 according to their socio-demographic characteristics. Table 1 and 2 presents estimated odds ratios for use of non combusting (smokeless) tobacco products respectively using MLR model. It can be seen that some of the categories of predictors are not statistically significant (without *). Odds ratios or EXP(b) of the explanatory variables are predicted changes in odds for the unit increase in respective responses. The values greater than 1, less than 1 and equal to 1 of odds ratio represent corresponding increase, decrease and no effect on dependent variable respectively.

5. Results

Table 1 summarizes the analysis of data of initiation age of consumption of non combusting tobacco products in current and former male users of non combusting tobacco products found in selected sample according to their socio-demographic characteristics (or status) by using Multiple Logistic Regression.

Explanation of odds ratios of Table 1

The odds of male tobacco chewers with education between 13 to 15 years and 1 to 7 years initiate their daily tobacco chewing between the age of 17 to 22 years are 2.486*(1.063-5.818) and 0.500*(0.291-0.860) times that of odds of illiterate male tobacco chewers initiate their daily smoking between the age of 17 to 22 years respectively. Which means male tobacco chewers with education between 13 to 15 years are more likely to initiate their daily tobacco chewing

between the age of 17 to 22 years than illiterate male tobacco chewers and male tobacco chewers with education between 1 to 7 years are less likely to initiate their daily tobacco chewing between the age of 17 to 22 years than illiterate male tobacco chewers. All categories of income are statistically significant. Which shows higher income male tobacco chewers are more likely to initiate tobacco chewing on daily basis between age of 17 to 22 years than male tobacco chewers with income less than 2.49 lakhs.

Predicting Response Probabilities

$$\text{Log odds (p)} = 0.003 - 0.158(A-1) + 0.224(A-2) + 0.051(A-3) + 0.033(A-4) - 0.809(OTH) + 0.493(CHR) - 0.512(SIKH) + 0.059(MUS) - 0.138(OBC) + 0.009(ST) - 0.079(SC) + 0.095(PRO) - 0.132(EMP) - 0.480(EMPL) + 0.564(SE/SV) + 0.043(STD) - 0.275(UEM/UPW/HSW) + 0.226(ED-1) + 0.911(ED-2) - 0.003(ED-3) - 0.693(ED-4) + 1.755(I-1) + 1.025(I-2) + 0.755(I-3)$$

For example, let us assume that we have to predict probability of initiation daily consumption of non combusting tobacco products of a specific person during the age of 17 to 22 years with following details.

AGE	RELIGION	CASTE	OCCUPATION	EDUCATION	INCOME
59 YRS	MUS	OBSC	EMP	12 YRS	9 LAKHS

$$\text{Log odds} = 0.003 - 0.158(1) + 0.059(1) - 0.138(1) - 0.132(1) - 0.003(1) + 1.025(1)$$

$$= 0.656$$

$$\text{Odds} = \text{EXP}(0.65) = 1.927$$

$$\begin{aligned} \text{Predicted Probability} &= 1.927 / (1 + 1.927) \\ &= 0.66 \end{aligned}$$

This value 0.66 is the probability of the considered male to get addicted by consumption of non combusting tobacco products.

6. Conclusion

From the study results it was concluded that majority of the respondents have started their smokeless or non combusting tobacco use during the age of 17 to 22 years. Income and education have significant effects on initiation of habit of non combusting tobacco use. No significant effect found of other socio-demographic factors of male respondents on their age of initiation of habit of use of non combusting tobacco products.

7. References

- 1) Patel, M. A., & Bhavsar, C. D. (2016). Age of Onset (initiation) of Daily Tobacco Consumption in Adults of Ahmedabad.
- 2) Hosmer D W, Lemeshow S. (2000): Applied logistic regression. US, Wiley-Inter science.
- 3) Joshi, U., Modi, B., & Yadav, S. (2010). A study on prevalence of chewing form of tobacco and existing quitting patterns in urban population of Jamnagar, Gujarat. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*, 35(1), 105.
- 4) Global Youth Tobacco Survey Collaborative Group (2002): Tobacco use among youth: a cross country comparison, *Tobacco Control*, 11(3), 252.
- 5) Gupta S, Sarpal SS, Kumar D, Kaur T, Arora S (2013): Prevalence, pattern and familial effects of substance use among the male college students—A North Indian Study, *Journal of Clinical and Diagnostic Research*, 7(8):1632-1636.
- 6) Charkazi, A., Sharifirad, G., Zafarzadeh, A., Shahnazi, H., Mansourian, M., Shaheryari, A., & Mirkarimi, K. (2016). Age at smoking onset, nicotine dependence and their association with smoking temptation among smokers. *Bulletin of Environment, Pharmacology and Life Sciences*, 5(5), 8-13.
- 7) Joshi, U., Modi, B., & Yadav, S. (2010). A study on prevalence of chewing form of tobacco and existing quitting patterns in urban population of Jamnagar, Gujarat. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*, 35(1), 105.