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Age of Onset (initiation) of Daily Tobacco Consumption in Adults of Ahmedabad

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ABSTRACT

Research Objective: To identify age of initiation of adult tobacco abuse on daily basis in Ahmedabad and provide future directions for research.

Method and measures: Samples of 605 adult smokers (between age 15 to 64 Years) and 882 adult tobacco chewers (between age 15 to 64 Years) were randomly selected by self-organized cross sectional survey. Ratios are estimated with 95% CI. For the evaluation of specific age initiation of consumption of tobacco products, different socio-demographic characteristics of subjects were selected as covariates. For the data collection a self-designed and pretested questionnaire was prepared in two languages English and local language Gujarati.

Statistical Analysis: Statistical analysis was carried out by using SPSS 21.0. Statistical tools used in the analysis and modeling are descriptive statistics and logistic regression for selection of epidemiologic measures (risk factors) of onset at specific age.

Conclusion: Majority of Female, Hindu, Muslims, and Schedule cast subjects, Illiterate subjects and economically backward respondents are found to be vulnerable of starting addiction of smoking and smokeless before age of 17 years. People with higher education, higher economical status, and male gender are vulnerable to initiate tobacco addiction between the age of 17 to 22 years.

Keywords : Onset, Smoking, smokeless tobacco, adults, Descriptive statistics, Logistic regression

I. INTRODUCTION

Tobacco control in mass consumers of tobacco without any proper knowledge of needful topics related to tobacco consumption can be considered as a practically difficult task. By focusing a proper identified group of vulnerable tobacco consumers is an easy way for successful tobacco control instead of applying tobacco control to the whole population of tobacco users. Age below 25 years is highly influenced age by emotional and psychosocial factors. It is an age when people easily adopt addiction of substances like tobacco. This age is an active market of tobacco consumers. Tobacco abuse in this early age of life may be attributable to history of parents' involvement in tobacco use, nature of experimentation, Easy availability of tobacco products, peer influence of friends and others, stress and non-friendly atmosphere etc. But all the above factors are psychological factors which needs proper counseling to know about. Socio-demographic factors are comparatively easy to know about. 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 tobacco consumption by considering a specific range of initiation age as a comparative criteria.

II. METHODS AND MATERIAL

2. Material, Methods and Data Collection

Design of Study: A self-organized cross sectional population based survey was conducted which included 605 adult smokers (between age 15 to 64 Years) and 882 adult tobacco chewers (between age 15 to 64 Years) residing in Ahmedabad city.

Selection of Subjects: To select random sample of subjects or respondents from adult population of Ahmedabad city a technique of multistage is used which includes two phases of selection. In first phase random selection of areas was done followed by second phase of random selection of respondents from the selected areas. In the procedure respondents were selected randomly by balancing the gender selection and subgroup probability proportional to referenced population size.

Data Collection: The face to face survey was conducted to collect required data using a predesigned and pretested questionnaire (prepared in English and local language Gujarati). It was given to selected subjects of age between 15 to 64 years who are residents of Ahmedabad city. An unbiased assistance was provided to those respondents who were unable to fill questionnaire at their own (e.g. illiterates, physically unable, psychologically ill etc.). Non responses were excluded from the sample.

3. Statistical Analysis

Statistical analysis of the collected dataset was carried out by means of SPSS 21.0 using multivariate logistic regression because of the dichotomous responses.

3.1 Theoretical expression of multivariate logistic regression

The two basic equations of multivariate logistic regression with m explanatory variables are

$\text{Logit}(\pi(x)) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots + \beta_m X_m$,

Where $\text{logit}(\pi(x)) = \ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots + \beta_m X_m$

and the odds $= \frac{p}{1-p}$

Or as a direct specification alternate

$p \text{ or } \pi(x) = \frac{\exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots\ldots\ldots + \beta_m X_m)}{1+\exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots\ldots\ldots + \beta_m X_m)}$,

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

that means logistic regression become a standard linear regression model, once we transform the dichotomous outcome into Logits. This transform changes the range of $\pi(x)$ from 0 to 1 to −1 to +1, as usual for linear regression. Here parameter

β_i = change in the logit of response variable y due to unit change in covariate x_i ,and

$\exp(\beta_i)$ = multiplicative effect on the odds of a unit increase in covariate x_i , at fixed levels of other covariates.

3.2 Selection of the Variables

3.2.1 Response Variable : The present study focuses on the phenomenon of age of initiation of consumption of tobacco therefore specific age between 17 to 22 years was considered as response variable with two categories consumer initiated daily tobacco use during above age (code 1) and consumer not initiated daily tobacco use during above age (code 0).

3.2.2 Explanatory Variables : The following is a detailed review of explanatory variables which we believe have an effect on responses.

Variable name	Categories	code	Variable name	Categories	code
Gender	Female	1	Occupation	Professionals (Pro)	1
	Male	2		Employers (Emp)	2
Age	55-64(A-1)	1		Employees (Empl)	3
	45-54(A-2)	2		Self-employed workers /street vendors (SE/SV)	4
	35-44(A-3)	3		Students (STD)	5
	25-34(A-4)	4		Unemployed /	6

				Unpaid workers/ Housewives (UNE/UNP/HSW)	
	15-24(A-5)	5		Labourers (LAB)	7
Religion	Other religion(OTH)	1	Level of Education	Education of 16 or more years (ED-1)	1
	Christian(CHR)	2		Education of 13 to 15 years (ED-2)	2
	Sikh(SIKH)	3		Education of 8 to 12years (ED-3)	3
	Muslim(MUS)	4		1-7 years of education(ED-4)	4
	Hindu(HIN)	5		No education (ED-5)	5
Cast	Other backward Class(OBC)	1	Annual Income:	10 lakhs or more (I-1)	1
	Schedule tribe(ST)	2		5-9.99 lakhs(I-2)	2
	Schedule cast(SC)	3		2.5-4.99 lakhs (I-3)	3
	General (OPEN)	4		0-2.49 lakhs (I-4)	4

3.2.3 Verifications of assumptions and checking of explanatory variables:

There is no violation of any assumption of MLR (Multiple logistic regression).Our dependent variable is dichotomous by nature. There is no multicolinearity between explanatory variables included in the study. There are no outliers, high leverage values or highly influential points. 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 Frequency and percentage distribution of age at initiation of daily smoking in Ahmedabad (in population of subjects of age between 15 years to 64 years)

Background characteristics	Age at initiation of daily use of combusting tobacco products						
	Below 14 # (%)	14 -16 # (%)	17-19 # (%)	20-22 # (%)	23 or above # (%)	Total # (%)	Average age of initiation
Total consumers	29(4.8)	133(21.98)	282(46.6)	126(20.82)	35(5.8)	605(100)	17.99
Gender: Female	17(18.7)	26(28.6)	34(37.3)	10(11)	4(4.4)	91(100)	16.7
Male	12(2.3)	107(20.8)	248(48.2)	116(22.6)	31(6.1)	514(100)	18.2
Age: (A-1)	7(4.9)	33(22.9)	52(36.1)	34(23.6)	18(12.5)	144(100)	18.2
(A-2)	5(5.6)	20(22.2)	34(37.8)	22(24.4)	9(10)	90(100)	18.3
(A-3)	1(1)	26(26.5)	41(41.8)	24(24.5)	6(6.2)	98(100)	18.1
(A-4)	3(2.34)	28(21.9)	59(46.1)	36(28.1)	2(1.56)	128(100)	18.2
(A-5)	13(9)	26(17.9)	96(66.2)	10(6.9)	0(0)	145(100)	17.5
Religion: OTH	0(0)	0(0)	7(53.8)	2(15.4)	4(30.8)	13(100)	19.3
CHR	0(0)	9(20)	24(53.3)	11(24.4)	1(2.3)	45(100)	18.2
SIKH	0(0)	1(5.3)	7(36.8)	11(57.9)	0(0)	19(100)	19.9
MUS	4(3.1)	36(27.7)	67(51.5)	20(15.4)	3(2.3)	130(100)	17.6
HINDU	25(6.3)	87(21.8)	177(44.5)	82(20.6)	27(6.8)	398(100)	17.98
Cast: OBC	8(6.2)	25(19.4)	69(53.5)	21(16.3)	6(4.6)	129(100)	17.9
ST	3(6.4)	12(25.5)	19(40.4)	10(21.3)	3(6.4)	47(100)	17.8
SC	16(9.4)	42(24.7)	74(43.5)	28(16.5)	10(5.9)	170(100)	17.6

General	4(1.6)	54(20.9)	118(45.7)	67(25.97)	15(5.81)	258(100)	18.3
Occupation: PRO	0(0)	11(12.4)	31(34.8)	33(37.1)	14(15.7)	89(100)	19.7
EMP	1(2.3)	7(16.3)	23(53.5)	11(25.6)	1(2.3)	43(100)	18.3
EMPL	0(0)	31(23.8)	64(49.2)	30(23.1)	5(3.9)	130(100)	18.1
SE/SV	4(12)	10(30.3)	9(27.3)	5(15.2)	5(15.2)	33(100)	17.3
STD	7(6.6)	19(8.4)	82(76.6)	9(8.4)	0(0)	107(100)	17.5
UNE/UNP/HSW	13(18.8)	24(34.8)	18(26.1)	14(20.3)	2(2.9)	69(100)	16.2
LAB	4(3.3)	31(25.4)	55(45.1)	24(19.6)	8(6.6)	122(100)	17.9
Education: ED-1	0(0)	14(11.8)	55(46.2)	34(28.6)	16(13.4)	119(100)	18.9
ED-2	0(0)	17(15.6)	62(56.9)	28(25.7)	2(1.8)	109(100)	18.3
ED-3	8(5.9)	23(16.9)	80(58.8)	24(18.1)	1(0.7)	136(100)	17.9
ED-4	17(12.5)	39(28.7)	51(37.5)	22(16.2)	7(5.1)	136(100)	17.2
ED-5	4(3.8)	40(38)	34(32.4)	18(17.2)	9(8.6)	105(100)	17.3
Income: I-1	1(1)	9(9.9)	38(41.8)	34(37.4)	9(9.9)	91(100)	19.3
I-2	0(0)	28(17.4)	88(54.7)	37(22.9)	8(5)	161(100)	18.3
I-3	8(6.2)	23(17.8)	71(55)	22(17.1)	5(3.9)	129(100)	17.9
I-4	18(8.1)	73(32.9)	85(38.3)	33(14.9)	13(5.9)	222(100)	17.2

Table 2 Frequency and percentage distribution of age at initiation of daily consumption of smokeless tobacco products in Ahmedabad
(in population of subjects of age between 15 years to 64 years)

Background characteristics	Age at initiation of daily use of non combusting tobacco products						
	Below 14 # (%)	14 -16 # (%)	17-19 # (%)	20-22 # (%)	23 or above # (%)	Total # (%)	Average age of initiation
Total consumers	72(8.2)	246(27.9)	336(38.1)	137(15.5)	91(10.3)	882(100)	17.6
Gender: Female	39(16.8)	78(33.6)	81(34.9)	17(7.3)	17(7.3)	232(100)	16.5
Male	33(5.1)	168(25.8)	255(39.2)	120(18.5)	74(11.4)	650(100)	18
Age: (A-1)	18(9.5)	55(28.9)	59(31.1)	26(13.7)	32(16.8)	190(100)	17.6
(A-2)	14(9)	34(21.8)	54(34.6)	31(19.9)	23(14.8)	156(100)	18.2
(A-3)	7(3.6)	54(28.1)	69(35.9)	36(18.8)	26(13.5)	192(100)	18.02
(A-4)	10(5.7)	52(29.7)	70(40)	33(18.9)	10(5.7)	175(100)	17.6
(A-5)	23(13.6)	51(30.2)	84(49.7)	11(6.5)	0(0)	169(100)	16.9
Religion: OTH	0(0)	4(28.6)	3(21.4)	5(35.7)	2(14.3)	14(100)	19.5
CHR	0(0)	5(20.8)	12(50)	7(29.2)	0(0)	24(100)	18.3
SIKH	0(0)	0(0)	2(33.3)	2(33.3)	2(33.3)	6(100)	21
MUS	7(3.2)	76(34.5)	89(40.5)	35(15.9)	13(5.9)	220(100)	17.4
HINDU	65(10.5)	161(26.1)	230(37.2)	88(14.2)	74(12)	618(100)	17.6
Cast: OBC	16(7.4)	58(26.9)	85(39.4)	34(15.7)	23(10.6)	216(100)	17.7
ST	8(11.3)	20(28.2)	26(36.6)	9(12.7)	8(11.3)	71(100)	17.4
SC	43(13.9)	94(30.3)	110(35.5)	33(10.6)	30(9.7)	310(100)	17
General	5(1.8)	74(26)	115(40.4)	61(21.4)	30(10.4)	285(100)	18.2
Occupation:	0(0)	4(6.1)	19(28.8)	34(51.5)	9(13.6)	66(100)	20.4

PRO							
EMP	0(2.3)	9(17.3)	23(44.2)	17(32.7)	3(5.8)	52(100)	18.7
EMPL	2(1.4)	36(25.7)	63(45)	24(17.1)	15(10.7)	140(100)	16.3
SE/SV	10(11.6)	17(19.8)	31(36.1)	10(11.6)	18(20.9)	86(100)	18.1
STD	19(15.6)	39(32)	53(43.4)	11(9)	0(0)	122(100)	16.7
UNE/UNP/HSW	25(21)	56(47.1)	22(18.5)	10(8.4)	6(5)	119(100)	15.4
LAB	16(5.4)	85(28.6)	125(42.1)	31(10.4)	40(13.5)	297(100)	17.6
Education: ED-1	0(0)	11(13.8)	31(38.8)	28(35)	10(12.5)	80(100)	19.3
ED-2	1(1.1)	13(13.7)	56(58.9)	23(24.2)	2(2.1)	95(100)	18.3
ED-3	2(1.4)	30(21.1)	69(48.6)	25(17.6)	16(11.3)	142(100)	18.2
ED-4	37(12.8)	97(33.7)	83(28.8)	33(11.5)	38(13.2)	288(100)	16.9
ED-5	32(11.6)	95(34.3)	97(35)	28(10.1)	25(9)	277(100)	16.9
Income: I-1	0(1)	10(12.5)	39(48.8)	28(35)	3(3.8)	80(100)	18.8
I-2	0(0)	15(16.5)	35(38.5)	31(34.1)	10(11)	91(100)	19.1
I-3	6(3.5)	39(22.9)	83(48.8)	26(15.3)	16(9.4)	170(100)	17.9
I-4	66(12.2)	182(33.6)	179(33.1)	52(9.6)	62(11.5)	541(100)	16.9

Table 3 Analysis of association of covariates with initiation age of daily smoking in respondents of Ahmedabad included in study

Demographic variables		Proportion		Adjusted Odds ratio		
Variable name	Categories	#	%	O.R.	95 % C.I.	
					L.B.	U.B.
Gender	Female	44	48.4	.573*	.327	1.004
	Male	365	71	1	-	-
Age	(A-1)	112	77.2	1.567	.576	4.260
	(A-2)	95	74.2	1.560	.867	2.804
	(A-3)	65	66.3	1.065	.572	1.984
	(A-4)	56	62.2	1.034	.550	1.946
	(A-5)	81	56.3	1	-	-
Religion	OTH	9	69.2	.783	.204	2.999
	CHR	35	77.8	1.936	.827	4.533
	SIKH	18	94.7	5.543	.689	44.607
	MUS	87	66.9	1.339	.775	2.313
	HINDU	260	65.3	1	-	-
Cast	OBC	90	69.8	1.134	.664	1.938
	ST	29	61.7	.730	.333	1.599
	SC	102	60	.799	.468	1.361
	GEN	188	72.6	1	-	-
Occupation	PRO	64	71.9	.104*	.034	.313
	EMP	34	79.1	.164*	.048	.562
	EMPL	94	72.3	.139*	.055	.354
	SE/SV	14	42.4	.245*	.095	.634
	STD	91	77.8	.261*	.080	.853
	UNE/UNP/HSW	33	46.5	.134*	.054	.331

	LAB	79	64.8	1	-	-
Level of Education	ED-1	89	74.8	4.429*	1.577	12.438
	ED-2	90	82.6	5.840*	2.267	15.040
	ED-3	105	77.2	3.868*	1.625	9.202
	ED-4	73	53.7	1.313	.668	2.582
	ED-5	52	49.5	1	-	-
Annual Income:	I-1	72	79.1	4.263*	1.687	10.775
	I-2	125	77.6	2.891*	1.307	6.394
	I-3	94	72.9	2.368*	1.102	5.087
	I-4	118	52.7	1	-	-
Note : *O.R. ,p< 0.05 and O.R.=Odds ratio, U.B. =Upper bound, L.B.=lower bound, C.I. = Confidence interval						

Table 4 Analysis of association of covariates with initiation age of daily use of smokeless tobacco in respondents of Ahmedabad included in study

Demographic variables		Proportion		Adjusted Odds ratio		
Variable name	Categories	#	%	O.R.	95 % C.I.	
					L.B.	U.B.
Gender	Female	98	42.2	1.036	.691	1.553
	Male	375	57.7	1	-	-
Age	(A-1)	95	56.2	2.132*	1.014	4.479
	(A-2)	103	58.9	1.399	.857	2.283
	(A-3)	105	54.7	1.159	.722	1.860
	(A-4)	85	54.5	1.040	.633	1.711
	(A-5)	85	44.7	1	-	-
Religion	OTH	8	57.1	.454	.128	1.610
	CHR	19	79.2	1.858	.617	5.595
	SIKH	4	66.7	.593	.097	3.621
	MUS	124	56.6	1.359	.897	2.059
	HINDU	318	51.4	1	-	-
Cast	OBC	119	54.8	.999	.657	1.517
	ST	35	49.3	.605	.324	1.132
	SC	143	46.1	.879	.556	1.391
	GEN	176	62	1	-	-
Occupation	PRO	53	80.3	.352	.124	.999
	EMP	40	76.9	.271*	.095	.773
	EMPL	87	62.1	.209*	.104	.421
	SE/SV	41	47.7	.688	.400	1.184
	STD	64	52.5	.172*	.072	.412
	UNE/UNP/HSW	32	26.9	.168*	.094	.299
	LAB	156	52.5	1	-	-

Level of Education	ED-1	59	73.8	2.226	.917	5.400
	ED-2	79	83.2	4.777*	2.211	10.318
	ED-3	94	66.2	1.731	.924	3.242
	ED-4	116	40.4	.744	.490	1.129
	ED-5	125	45	1	-	-
Annual Income:	I-1	67	83.8	8.741*	3.480	21.957
	I-2	66	72.5	4.760*	2.209	10.256
	I-3	109	64.1	3.562*	1.987	6.385
	I-4	231	42.7	1	-	-
Note : *O.R. ,p< 0.05 and O.R.=Odds ratio, U.B. =Upper bound, L.B.=lower bound, C.I. = Confidence interval						

III. RESULTS AND DISCUSSION

4. Discussion

Present study is a statistical analysis of data of age of initiation of daily smoking and use of smokeless tobacco products among respondents. Proportions of initiation ages are measured according to different socio-demographic predictors like gender, age, religion, cast, occupation, education and income. We have measured Average age of initiation of each category of socio-demographic factors. But these study results are individual proportions only which may not clear the picture of combined effects of set of categorized factors. We used an advance statistical analysis to overcome this problem.

Like all other regressions, multiple binary logistic regressions are also a predictive analysis. To predict membership of categories of response variable we have used multiple binary logistic regressions. It can be considered as a zoomed profile of simple proportionate values of tobacco use in any form according to their socio-demographic characteristics and awareness of ill effects. Table 3 and 4 presents estimated odds ratios for age of initiation of daily use of combusting (smoking) and non-combusting (smokeless) tobacco products respectively between 17 to 22 years 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

Tables 1 and 2 summarize number and percentage of smokers and users of smokeless tobacco initiating daily smoking during specific ages in Ahmedabad city respectively. Looking at the age bifurcation majority of the smokers and smokeless tobacco users start the daily consumption tobacco products between the age of 17 to22 years mainly between the age of 17 to 19 years as an effect of urban culture. With an increase in age of users, a visible increase in age of initiation of daily smoking has found. Age effect on initiation age of daily smokeless tobacco consumption is inversely proportional. For remaining categories majority of respondents have started daily tobacco consumption before the age of 17 years. Therefore main comparison is between initiation of tobacco abuse between 17 to 22 years of age and initiation before it. Illiterate or less educated, economically and socially backward, Hindu and Muslim tobacco users initiate their daily tobacco users at somewhat early age than other categories of tobacco users respectively.

Table 3 summarizes the analysis of data of initiation age of daily smoking in smokers found in selected sample according to their socio-demographic characteristics (or status) by using multiple logistic regressions.

Explanation of Odds Ratios in Table 3:
Odds ratios with * sign in Table 3 are O.R.s with statistical significance with p values less than 0.05.They can be interpreted in following way.

Odds ratios of female category of variable gender is 0.573*(0.327-1.004) compared to baseline category of male. Odds of female initiate consumption of combusting tobacco products between the age of 17 to 22 years is 0.573 times that of odds of male initiate consumption of combusting tobacco products between the age of 17 to 22 years. Which means female smokers are less likely to initiate their daily consumption of combusting tobacco products between the age of 17 to 22 years than male smokers. All categories of occupation variable are statistically significant. Which show that odds of all occupation smokers except smokers labourers initiate their daily smoking between the age of 17 to 22 are significantly less than the odds of labourer smokers initiate their daily smoking between the age of 17 to 22 years. Which means all occupation smokers except smoker labourers are significantly less likely to initiate their daily smoking between the age of 17 to 22 years than labourer smokers. The odds of smokers with education between 8 to 12 years, between 13 to 15 years and 16 or more years initiate their daily smoking between the age of 17 to 22 years are 3.868*(1.625-9.202), 5.840*(2.267-15.040) and 4.429*(1.577-12.438) times that of odds of illiterate smokers initiate their daily smoking between the age of 17 to 22 years. Which means smokers with higher education are more likely to initiate their daily smoking between the age of 17 to 22 years than illiterate smokers. Odds of smokers with any income higher than 2.5 lakhs initiate their daily smoking between the age of 17 to 22 years are significantly higher than odds of smokers with income less than 2.5 initiate their daily smoking between the age of 17 to 22 years. Smokers with higher income than 2.5 lakhs are more likely to initiate daily smoking between the age of 17 to 22 years than smoker with income less than 2.5 lakhs.

Predicting response probabilities:

Log odds (p) = $T = \alpha + \beta_1 X_1 + \beta_2 X_{2+\ldots\ldots\ldots+} \beta_m X_m$
Log odds (p) = 0.417 - 0.556(Female) + 0.449(A-1) + 0.444(A-2) + 0.063(A-3) + 0.034(A-4) - 0.245(OTH) + 0.661(CHR) + 1.713(SIKH) + 0.292(MUS) + 0.126(OBC) - 0.314(ST) - 0.225(SC) - 2.264(PRO) - 1.805(EMP) - 1.970(EMPL) - 1.406(SE/SV) - 1.343(STD) - 0.011(UNE/UNP/HSW) + 1.488(ED-1) + 1.765(ED-2) + 1.353(ED-3) + 0.273(ED-4) + 1.450(I-1) + 1.062(I-2) + 0.862(I-3)
Now Odds (p) = EXP (Log odds (p))

And predicted probability (p) = $\frac{Odds\,(p)}{1+Odds\,(p)}$

For example, let a case of predicting probability of person initiate daily consumption of combusting tobacco products in a specific age of 17 to 22 years with following details

Gender	Age	Religion	Cast	Occupation	Education	Income
Male	26 years	Muslim	General	Employee	More than 16 years of education	Between 2.5 to 4.99 lakhs

Log odds = 0.417+ 0(1)+ 0.034(1) + 0.292(1)+ 0(1) – 1.970(1)+ 1.488(1) + 0.862(1) =1.123
Odds =exp (1.123) = 3.074
Predicted Probability = 3.074 /1+ 3.074 = 0.75

This value 0.75 is the probability of the considered male getting addicted by consumption of non-combusting tobacco products.

Table 4 summarizes the analysis of data of initiation age of consumption of non-combusting tobacco products in current and former users of non-combusting tobacco products found in selected sample according to their socio-demographic characteristics (or status) by using multiple logistic regressions.

Explanation of Odds Ratios of Table 4:
Odds ratios with * sign in Table 4 are O.R.s with statistical significance with p values less than 0.05.They can be interpreted in following way.

Odds ratio of age category 55 to 64 years is 2.132*(1.014-4.479). Which shows that tobacco chewers (smokeless tobacco users) between the age of 55 to 64 years are more likely to initiate daily tobacco chewing between the age of 17 to 22.Categories of occupation variable like employers, employees, students and unemployed/unpaid workers/housewives are statistically significant with odds ratios 0.271*(0.095-0.773), 0.209*(0.104-.0.421), 0.172*(0.072-0.412) and 0.168*(0.094-0.299) respectively. Which show that odds of above occupation tobacco chewers except labourer tobacco chewer initiate their daily chewing of tobacco between the age of 17 to 22 are significantly less than the odds of labourer tobacco chewers initiate their daily smoking between the age of 17 to 22 years. Which means tobacco chewers with above occupation except

labourers are significantly less likely to initiate their daily tobacco chewing between the age of 17 to 22 years than labourer tobacco chewers. The odds of tobacco chewers with education between 13 to 15 years initiate their daily tobacco chewing between the age of 17 to 22 years are 4.777*(2.211-10.318) times that of odds of illiterate tobacco chewers initiate their daily tobacco chewing between the age of 17 to 22 years. That means tobacco chewers with higher education between 13 to 15 years are more likely to initiate their daily tobacco chewing age between 17 to 22 years than illiterate tobacco chewers. All categories of income are statistically significant. Which shows higher income tobacco chewers are more likely to initiate tobacco chewing on daily basis between age of 17 to 22 years than tobacco chewers with income less than 2.49 lakhs.

Predicting response probabilities:

Log odds (p) = T = $\alpha + \beta_1 X_1 + \beta_2 X_{2+\ldots\ldots\ldots+} \beta_m X_m$

Log odds (p) = 0.020 + 0.035 (FEMALE) + 0.757 (A-1) + 0.336 (A-2) + 0.147 (A-3) + 0.040 (A-4) - 0.790 (OTH) + 0.619 (CHR) - 0.522 (SIKH) + 0.307 (MUS) - 0.001 (OBC) - 0.502 (ST) - 0.128 (SC) - 1.043 (PROF) - 1.305 (EMP) - 1.566 (EMPL) - 0.374 (SE/SV) - 1.758(STD) - 1.786 (UNE/UNP/HSW) + 0.8 (ED-1) + 1.564 (ED-2) + 0.549 (ED-3) - 0.296 (ED-4) + 2.168 (I-1) + 1.560 (I-2) + 1.270(I-3)

Now Odds (p) = EXP (Log odds (p))

And predicted probability (p) = $\frac{Odds\,(p)}{1+Odds\,(p)}$

For example, let a case of predicting probability of person initiate daily consumption of combusting tobacco products in a specific age of 17 to 22 years with following details

Gender	Age	Religion	Cast	Occupation	Education	Income
Male	48 years	Hindu	SC	Self-employed worker	8 to 12 years of education	Between 2.5 to 4.99 lakhs

Log odds = 0.020+ 0(1)+ 0.336(1)+ 0(1)- 0.128(1)- 0.374(1)+ 0.549(1)+ 1.270(1) = 1.673

Odds = exp (1.673) = 5.328

Predicted Probability = 5.328 /1+ 5.328 = 0.84

This value 0.84 is the probability of the considered case getting addicted by consumption of non-combusting tobacco products.

IV. CONCLUSION

From the study results we can conclude that a majority of the respondents were getting habituated with smoking and smokeless tobacco use between there teen age and early twenties. Majority of Female, Hindu, Muslims, schedule cast subjects, Illiterate subjects and economically backward respondents are found to be vulnerable of starting addiction of smoking and smokeless before age of 17 years. People with higher education, higher economical status, and male gender are vulnerable to initiate tobacco addiction between the age of 17 to 22 years. Tobacco addiction and its initiation can be curbed by applying proper tobacco control programs aiming above ages and groups.

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