



Tobacco Abuse in Adolescents And Young Adults of Ahmedabad And Pertinent Epidemiologic Measures

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ABSTRACT

Research Objective: To monitor and investigate current prevalence of smoking and smokeless tobacco use in adolescents and young adults of Ahmedabad and identify epidemiologic measures.

Method and measures: A sample of 570 adolescents and young adults (between age 15 to 24 Years) was randomly selected by self organized survey. Selected unweighted data was a part of survey design. Prevalence rates and required ratios are estimated with 95% CI. For the evaluation of consumption of tobacco products, different socio-demographic characteristics and awareness about ill effects of subjects were selected as covariates. For the data collection a self designed and pretested questionnaire was prepared in two languages English and Gujarati.

Statistical Analysis: Statistical analysis of the collected data was carried out by means of SPSS 21.0 using descriptive statistics and logistic regression for selection of epidemiologic measures (risk factors).

Conclusion: Male, Muslims, schedule cast subjects and illiterate subjects are found to be vulnerable of addiction of smoking. No significant effect of awareness of ill effects is found on prevalence of smoking and smokeless tobacco. Male, schedule cast subjects and illiterates are significantly at high risk of getting addicted by smokeless tobacco abuse.

KEYWORDS

Tobacco, adolescents, young adults, Binary Logistic regression

1. Introduction

Adolescents between ages 10 to 19 years and young adults between ages 20 to 24 years are two different important development stages of human life. Combination of these two stages can be considered as pre stage of full-fledged adulthood. It is a stage of immaturity and highly influenced nature. The experiences and developing behaviours during these ages are most effective and long lasting. These are the stages when humans learn good and bad habits simultaneously according to their nature. Drug abuse is one of the major risks which rapidly get adopted in these ages. Tobacco, a cheapest and easily available legal drug which is widely used by these communities as result of influenced and pleasure seeking mental status. Tobacco is an attractive but dangerous bridge between life and death. Hundreds of thousands of young men start daily consumption of tobacco in their late teens and early twenties. Tobacco addiction is a breakable one and user can also choose not to use it at all. But this event requires efforts, Efforts to save our young generation by improving their knowledge about current prevalence of tobacco use and dangerous consequences of it. By keeping this fact in mind, we have conducted study in our city Ahmedabad with the following objectives,

1. To determine the prevalence of tobacco consumption in young adults and adolescents who are having age between 15 to 24 years and residing in Ahmedabad.
2. To identify risk factors of different types of tobacco consumption among subjects.

2. Material, Methods and Data collection

Design of study: A self organized cross sectional population based survey was conducted which included 570 adolescents (15 to 19 years) and young adults (20 to 24 years) from Ahmedabad city.

Selection of subjects: To select the subjects or respondents from young population of Ahmedabad city a technique of simple random sampling is used. 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 24 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 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

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

where $\text{logit } (\pi (x)) = \ln (p/1-p) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_m X_m$
and the odds = $p/1-p$

Or as a direct specification alternate

$$p \text{ or } \pi(x) = \frac{\exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_m X_m)}{1 + \exp(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_m X_m)} , \quad (\pi(x)) = P(Y/X = x)$$

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 = effect of covariate x_i on the log odds that Y assumes 1, controlling other covariates x_j , for instance, $\exp(\beta_i)$ is the multiplicative effect on the odds of a unit increase in covariate

x_i , at fixed levels of other covariates x_j .

3.2 Selection of the variables

3.2.1 Response variable: The present study focuses on the phenomenon of consumption of tobacco therefore it can be considered as response variable with two categories consumer (code 1) and non consumer (code 0).

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

Variable name	Categories	code	Variable name	Categories	code
Gender	Female	1	Level of Education	Education of 16 or more years (ED-1)	1
	Male	2		Education of 13 to 15 years (ED-2)	2
Religion	Other religion(OTH)	1		Education of 8 to 12years (ED-3)	3
	Christian(CHR)	2		1-7 years of education(ED-4)	4
	Sikh(SIKH)	3		No education (ED-5)	5
Cast	Muslim(MUS)	4	Awareness of ill effects of active smoking (ASA)	Yes	1
	Hindu(HIN)	5		No	0
Cast	Other backward Class(OBC)	1	Awareness of ill effects of passive smoking (PSA)	Yes	1
	Schedule tribe(ST)	2		No	0
Cast	Schedule cast(SC)	3	Awareness of ill effects of consumption of smokeless tobacco (SLA)	Yes	1
	General (OPEN)	4		No	0

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 multi-co-linearity 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 Analysis of association between covariates and 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	25	11	0.127*	0.072	0.226
	Male	119	34.7	1	-	-
Religion	OTH	4	19	1.201	0.359	4.016
	CHR	10	29.4	1.270	0.515	3.134
	SIKH	2	9.5	0.410*	0.089	0.899
	MUS	34	33.7	1.813*	1.030	3.191
	HINDU	94	23.9	1	-	-
Cast	OBC	22	20.8	0.786	0.437	1.413
	ST	4	12.9	0.897	0.271	2.965
	SC	47	32	2.846*	1.525	5.311

	General	71	24.8	1	-	-
Level of Education	ED-1	21	18.9	0.475	0.192	1.178
	ED-2	17	25	0.543	0.225	1.307
	ED-3	22	17.3	0.361*	0.160	0.813
	ED-4	41	31.1	0.736	0.370	1.463
	ED-5	43	32.6	1	-	-
ASA	NO	14	33.3	1.523	0.602	3.856
	YES	130	24.6	1	-	-
PSA	NO	84	28.9	1.055	0.576	1.935
	YES	60	21.5	1	-	-
SLA	NO	43	30.5	0.950	0.494	1.830
	YES	101	23.5	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 2 Analysis of association between covariates and daily use of smokeless tobacco in respondents of Ahmedabad

Demographic variables		Proportion		Adjusted Odds ratio		
Variable name	Categories	#	%	O.R.	95 % C.I.	
					L.B.	U.B.
Gender	Female	78	34.4	0.390*	0.236	0.643
	Male	112	32.7	1	-	-
Cast	OBC	26	24.5	0.866	0.495	1.517
	ST	2	6.5	0.301	0.061	1.473
	SC	93	63.3	5.205*	3.036	8.922
	General	69	24.1	1	-	-
Level of Education	ED-1	19	17.1	0.228*	0.097	0.536
	ED-2	11	16.2	0.128*	0.053	0.310
	ED-3	21	16.5	0.149*	0.071	0.312
	ED-4	55	41.7	0.449*	0.243	0.829
	ED-5	84	63.6	1	-	-
ASA	NO	25	59.5	1.877	0.792	4.452
	YES	165	31.3	1	-	-
PSA	NO	139	47.8	1.614	0.887	2.937
	YES	51	18.3	1	-	-
SLA	NO	72	51.1	0.700	0.380	1.290
	YES	118	27.5	1	-	-

Note : *O.R. ,p< 0.05 and O.R.=Odds ratio, U.B. =Upper bound, L.B.=lower bound, C.I. = Confidence interval

4. Discussion

Present study is a statistical analysis of data of consumption of combusted and non combusted tobacco among respondents. Responses are measured as effects of different socio-demographic predictors including awareness of hazardous health effects of tobacco consumption. According to the visible proportions of tobacco consumption of subjects, high prevalence of smoking is frequent in male tobacco users than female users. Muslim and Christian subjects have high prevalence of smoking whereas Hindu and Muslim subjects have high prevalence of smokeless tobacco use. Schedule cast subjects are found to have highest prevalence rates of smoking and smokeless tobacco use as well. Illiterate subjects came out with highest prevalence rates of smoking and smokeless tobacco use. In both type of tobacco use higher prevalence are found in subjects with no awareness of ill effects of any of active smoking, passive smoking or smokeless tobacco use on human body. But these study results are individual proportions only which may not clear the picture of combined effects of set of predic-

tors. We used an advance statistical analysis to overcome this problem.

Like all other regressions, multiple logistic regression technique is also a predictive analysis. To predict membership of categories of response variable we have used multiple logistic regression technique. 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 1 and 2 presents estimated odds ratios for use of combusting (smoking) and 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 proportions and the output of procedure of multiple logistic regression of use of combusting tobacco products among adolescents and young adults of Ahmedabad. Girls are comparatively less likely (OR=0.127*<1) to get addicted by smoking than Boys. Sikhs are less likely (OR=0.410*<1) and Muslims are more likely (OR=1.813*>1) to become daily smokers than Hindus. Subjects having education of 8 to 12 years are significantly less likely (OR=0.361*<1) to get an exposure of smoking than illiterates.

Predicting response probabilities:

$$\text{Log odds (p)} = T = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_m X_m$$

$$\begin{aligned} \text{Log odds (p)} = & -0.363 - 2.062(\text{FEMALE}) + 0.183 (\text{OTH}) + \\ & 0.239 (\text{CHR}) - 0.892(\text{SIKH}) + 0.595(\text{MUS}) \\ & -0.241(\text{OBC}) - 0.109(\text{ST}) + 1.046(\text{SC}) - \\ & 0.744(\text{ED-1})-0.611(\text{ED-2})- 1.018 (\text{ED-3}) \\ & -0.307(\text{ED-4})+ 0.421(\text{ASA-NO})-0.51(\text{PSA-NO})- \\ & 0.363(\text{SLA-NO}) \end{aligned}$$

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

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

For an example, let a case of predicting probability of getting an exposure of smoking of a subject with following details

Gender	Religion	Cast	Education	ASA	PSA	SLA
male	Muslim	SC	1 to 7 year	Yes	No	Yes

$$\text{Log odds} = -0.363 + 1(0) + 0.595 (1) + 1.046(1) - 0.307(1)+1(0)- 0.535(1)+1(0) = -0.564$$

Odds = EXP (-0.564) = 0.569

Predicted Probability = 0.569 /1+0.569 = 0.36

This value 0.36 is the predicted probability of the considered case get addicted by smoking.

Table 2 summarizes proportions and the output of procedure of multiple logistic regression of use of non combusting tobacco products among adolescents and young adults of Ahmedabad. Girls are significantly less likely (OR=0.390*<1) to get addicted by smoking than Boys. Subjects of schedule cast are significantly more likely(OR=5.205*>1)to get an exposure

of smoking than General cast subjects. Educated subjects are significantly less likely to get an addiction smoking than illiterates .

**Predicting response probabilities:
Let a case of predicting probability of getting an exposure of daily smokeless tobacco use of a subject with following details**

Gender	Cast	Education	ASA	PSA	SLA
female	OBC	No education	No	No	No

$$\begin{aligned} \text{Log odds (p)} = & 0.082- 0.942(\text{FEMALE})- 0.143(\text{OBC})- \\ & 1.202(\text{ST}) +1.650(\text{SC}) -1.481(\text{ED-1})- \\ & 2.052(\text{ED-2})- 1.903(\text{ED-3})-0.801(\text{ED-4})+ \\ & 0.630(\text{ASA-NO})+0.479(\text{PSA-NO})- \\ & 0.357(\text{SLA-NO}) \end{aligned}$$

$$\text{Log odds} = 0.082- 0.942(1)- 0.143(1)+1(0)+0.630(1)+ 0.479(1)-0.357(1) = -0.251$$

Odds = EXP (-0.251) = 0.778

Predicted Probability = 0.778 /1+0.778 = 0.44

This value 0.44 is the predicted probability of considered case get addicted by smokeless tobacco use.

6. Conclusion

From the study results we can conclude that a majority of the respondents were habituated with smokeless tobacco use. Male, Muslims, schedule cast subjects and illiterate subjects are found to be vulnerable of addiction of smoking. No significant effect of awareness of ill effects is found on prevalence of smoking and smokeless tobacco. Male, schedule cast subjects and illiterates are significantly at high risk of getting addicted by smokeless tobacco abuse.

7. References

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