SOCIO-DEMOGRAPHIC AND LIFESTYLE DETERMINANTS OF SMOKELESS TOBACCO CONSUMPTION AND ITS ASSOCIATION WITH OBESITY AND HYPERTENSION.

ANURUPA SEN; MOUMITA DAS; SUBHASHREE BASU[a]; GOURIPROSAD DATTA*.

Department of Physiology, Rammohan College, 85A, Raja Rammohan Sarani, Kolkata: 700009, West Bengal, India; aDepartment of Physiology, Tamralipta Mahavidyalaya, Tamluk, Purba Medinipur, West Bengal, India.

Now-a-days tobacco consumption is a major cause of morbidity and mortality. Prevalence of smokeless tobacco (SLT) consumption is increasing very rapidly around the world. In India, very sparse data are available on the prevalence and association of SLT use with hypertension and obesity. So, this study was undertaken to look into the association of SLT consumption with obesity and hypertension and also to find out the prominent risk factors of SLT consumption in an adult male urban population of India. 1216 male individuals of Kolkata were randomly selected for the cross-sectional study. Subjects were interviewed regarding their socio-demographic profile and lifestyle pattern. BMI, WC, WHR, WHtR and blood pressure of the subjects were recorded. All statistical computations were performed with SPSS, version 20.0. Prevalence of SLT use was 26.7%. Mean SBP, DBP, WC and WHR were higher in SLT users, whereas mean BMI was lower among them. Prevalence of hypertension was significantly higher in SLT users, on the other hand, prevalence of obesity parameters were lower in them. Increasing age, lower socio-economic status and alcohol consumption were the major risk factors of SLT use. SLT use was positively associated with obesity and hypertension. The study revealed a relatively high prevalence of SLT use in the study area. An increased prevalence of hypertension and a decreased prevalence of obesity are seen among SLT users. SES and alcohol consumption increases the risk. Lifestyle modification along with healthcare strategies and prevention of SLT consumption could be an important intervention in preventing the ongoing upswing in prevalence of chronic heart disease.

Tobacco consumption is one of the major risk factor for premature mortality and morbidity in India. Overall, mortality rates related to tobacco have increased significantly over the past decade. Tobacco was responsible for 6.3 million deaths worldwide in 2010, as compared to 5.3 million deaths in 1990, although these data reflected mortality primarily from smoking and exposure to second hand smoke (Lim *et al.,* 2013). According to the World Health Organization (WHO), nearly 6 million deaths occur every year due to tobacco use, which may escalate to 8 million deaths a year by 2030 (WHO,2008). India is home to over 70% of the world's adult smokeless tobacco users (Palipudi *et al.,* 2014). It is projected that tobacco deaths in

***Corresponding author:* Dr. Gouriprosad Datta,** *Department of Physiology, Rammohan College.85A, Raja Rammohan Sarani, Kolkata: 700009, West Bengal, India., Telephone number: +919831339024 , E-mail address: dattagp@yahoo.co.in*

India will increase from the current number of about 1 million each year and exceed 1.5 million annually by 2020 (Rani *et al.,* 2003). Smoking is responsible for a large number of premature deaths in India. The majority of smoking related deaths in India occur in the prime working age group of 15–59 years (Jha *et al.,* 2008).

Most ordinarily used smokeless tobacco (SLT) products incorporate—tobacco paan masala, tobacco with Chun (lime-calcium carbonate), and tobacco with pan and betel quid (Gupta *et al.,* 2003). Tobacco used with betel leaf, mostly used variety of chewing tobacco, known as Paan in the subcontinent, it is commonly used after having food, snacks, tea in small and large social gatherings. Easy accessibility and affordability, attractive advertisements in different media along with misunderstandings concerning its useful health effects are main contributing elements for augmented SLT consumption.

All SLT products have nicotine as a major constituent and are potentially addictive. Persons who experiment with SLT often develop a pattern of regular daily use (Henningfield *et al.,* 1997). Over time, many users increase the amounts they consume day by day (Hatsukami *et al.,* 1999).Users of both smokeless and smoking products find tobacco cessation even more difficult to achieve than those who use only SLT or only smoke (Hatsukami *et al.,* 1999; Tomar, 2002). Tobacco manufacturers encourage use of SLT products by smokers on occasions when they are not permitted to smoke (Henningfield *et al.,* 2002) and thereby promote individuals to adopt SLT use in conjunction with continued smoking.

Studies were carried out in western population to find out the association of SLT consumption with occurrence of adverse cardiovascular events like myocardial infarction, stroke, and ischemic heart disease (Bolinder *et al.,* 1992; Westman, 1995; Bolinder *et al.,* 1998; Accortt et al., 2002; Hergens et al., 2008). Results from these studies showed a mixed representation with showing increased incidence of these adverse events in some studies (Bolinder et al., 1994; Henley et al., 2005; Hergens et al., 2007; Hergens et al., 2008) while others presenting no such association (Huhtasaari *et al.,* 1999; Hergens et al., 2005; Johansson et al., 2005). Similarly, contradictory results have also been seen in studies evaluating increased risk factors for cardiovascular diseases in SLT consuming population (Siegel et al., 1992; Khurana, 2000; Gupta et al., 2007). In India, very few studies have shown that SLT consumption is associated with increased prevalence of cardiovascular risk factors like dyslipidemia, hypertension, and electrocardiographic abnormalities as compared to non tobacco users. A study on Assam tea garden workers found that the consumption of locally prepared alcohol, intake of extra salt, and the habit of using khaini independently increased the risk of hypertension (Hazarika et al., 2002). Another study found a statistically significant increase in heart rate (HR) and blood pressure (BP) following the chewing of betel quid with tobacco for 15–30 min (Nanda, 1988). Pandey and colleagues, in a community-based cross-sectional study in Faridabad, India, showed that the mean systolic blood pressure (SBP) and diastolic blood pressure (DBP) was significantly higher in exclusive SLT users as compared with non-users (Pandey et al., 2009). In a small case control study in Bikaner in North-Western India, Gupta and colleagues found a significantly greater prevalence of hypertension, hypercholesterolemia, hypertriglyceridemia, radiographic cardiomegaly, and positive stress test results in tobacco chewers as compared to controls (Gupta et al., 2007). Another study found that mortality was significantly higher among SLT users with stage

2 hypertension than among non-users and normotensives (Eliasson, 2003). Also, a more recent study conducted by Sen *et al.,* (2015) among the policemen of Kolkata showed that SLT is a major risk factor for hypertension. On the other hand, there is a lack of study showing relation between SLT use and obesity.

So, this cross-sectional study was undertaken to find out the association of SLT consumption with obesity and hypertension (if any), a well known risk factor for development of cardiovascular disease, in an adult male urban population of India. In addition, the prominent risk factors of SLT consumption have also been identified.

MATERIALS AND METHODS

Selection of subjects:

This community based cross-sectional study was conducted from 1st October, 2015 to 31st December, 2016 among randomly selected 1500 male individuals of different socio-economic status (SES) from central Kolkata of West Bengal, India, with age ranged 20–60 years. Of these, 18.93% subjects (n = 284) were excluded due of presence of either physical disability or based on medical history such as any major surgery, pacemaker insertion, and cerebral or cardiac stroke. Finally, 1216 individuals were participated in this study. The individuals are classified into four groups according to age i.e., 20-29 years (n= 158), 30-39 years (n=294), 40-49 years (n=364) and > 50 years (n=400).

Study design:

For the present study, face-to-face interviews using questions based on the WHO STEP-wise tool (WHO, 2013) was used and the WHO-NCD risk factor Questionnaire was suitably modified. The information on socio-demographic variables and lifestyle related NCD risk factors (tobacco use, alcohol use and physical activity) as well as information regarding personal and family history of hypertension and diabetes were also included. For data collection, the subjects were requested to make an appointment, and measurements were made at their respective working place during their free time.

Evaluation of SES:

Depending on the modified "Kuppuswamy's Socioeconomic Status Scale" (Vijaya, 2013) the subjects were classified as belonging to upper SES if the total score is 26–29, middle SES (upper middle and lower middle) if the total score is 11–25 and lower SES (upper lower and lower) if the total score is<11.

Evaluation of educational status:

Primarily the subjects were classified into 7 (seven) groups according to "Kuppuswamy's Socioeconomic Status Scale" (Vijaya, 2013), like illiterate, primary school, middle school, high school, intermediate, graduate or post graduate and profession or honours. For analysis, above mentioned groups were merged into three groups: Lower education (people either illiterate or completed primary school and middle school), Moderate education (completed

high school or Intermediate) and Higher education (having graduate or post graduate and profession or honours degree).

Classification of smokers:

For the present study, smokers were classified as non-smoker (if they have not smoked ever), light smoker (who smoke 1-9 cigarettes or bidis/ day), moderate smoker (who smoke 10-19 cigarettes or bidis/ day), heavy smoker (who smoke >20 cigarettes or bidis/ day) and ex-smoker (if they smoked regularly for >6 months but not smoke anymore for last 1 year).

Classification in accordance to SLT consumption:

Current SLT user was defined as one who has ever consumed tobacco orally in past 1 month and SLT included moist oral snuff, chewing tobacco and tobacco used with betel quid, areca nut, Pan Masala. The population was categorized into: non-user of SLT and SLT user.

Classification of alcoholics:

Alcoholics were grouped into five categories: non- drinker (subjects who had never drink in their lifetime), light drinker (who drank on a daily basis up to 120ml/day), moderate drinker (who drink 120-300ml/day), heavy drinker (who drink more than 300ml/day) and ex-drinker (who previously consumed alcohol but did not consume any alcohol in the previous one year).

Classification according to physical activity:

Physical activity was assessed by asking about both work-related and leisure-time physical activities. The participants were categorized into two groups:

a) People regularly involved in exercise i.e., leisure time physical activity > 30 minutes a day and for at least 3 days in a week.

b) People not involved in regular physical exercise.

Determination of different physiological parameters:

Resting HR was measured from the radial artery for 1 min with the help of stopwatch (Racer, Coimbatore, Tamil Nadu, India). BP was measured with standard mercury sphygmomanometer (Life Line, Kolkata, West Bengal, India) and stethoscope (Duo Sonic, Kolkata, West Bengal, India) after the participants had rested for 5 min (Perloff, 1993). At least two readings at 5-min interval were recorded, and if a high BP (>140/90 mm Hg) was noted, a third reading was taken after 30 min. The lowest of the three readings was taken as blood pressure. A person was considered as suffering from hypertension if SBP was 140 mm Hg or above and/or DBP 90 mm Hg or above or is already under treatment for hypertension (Sen et al., 2015). Systolic hypertension was defined as SBP more than 140 mm Hg and diastolic hypertension was defined as DBP more than 90 mm Hg.

Body height and body weight were measured to the nearest 0.1 cm and 0.1 kg by an anthropometric rod and portable weighing machine (Advanced Technocracy, Ambala City, Haryana, India), respectively, with the subjects standing barefoot and in light clothing. The body mass index (BMI) was calculated as weight (kg)/ height (meters^2). BMI >23.0 and >25.0

kg/m^2 was taken as cut off value for overweight and obesity, respectively (WHO, 2000). The waist circumference (WC) was measured at the midpoint between the inferior border of the subcostal margin and iliac crest in the midaxillary line after normal expiration in standing posture; the hip circumference (HC) was measured at the widest part of the hip across both greater trochanters, from which the waist-to-hip circumference ratio (WHR) was calculated. Truncal obesity was diagnosed when WHR was >0.90 and abdominal obesity, when WC was >90 cm in men (WHO, 2000). Another obesity parameter, WHtR was calculated by WC (cm)/ height (cm). Individual having value of WHtR= 0.50 was considered as obese (Ashwell & Gibson, 2016).

Ethical clearance:

This non invasive study was approved by the ''Institutional Ethics Committee for Biomedical Research involving Human Subjects, Rammohan College,'' constituted in accordance to the guidelines framed by Indian Council of Medical Research. Written consent was obtained from each participant to act as volunteers in the study without any support in terms of cash or kind.

Statistical analysis:

Data was entered using Microsoft excel and analyzed using Statistical Package for Social Sciences software (SPSS, version 20.0). The mean and its corresponding standard error (SE) of mean were computed for continuous variables and frequencies and percentages for categorical variables. Chi square test was used to test the association between categorical variables and independent sample t-test was used to compare means of continuous variables. Odds ratio (OR) was calculated to look into association between the desired variables using logistic regression models. The risks were reported as ORs or adjusted odds ratio (aOR) with corresponding 95% confidence intervals (CIs).The main dependant variable in the analysis is the SLT use. For all analyses, $p < 0.05$ was considered statistically significant.

RESULT

Table1demonstrates the socio-demographic and lifestyle related information of the study population. Higher education level was observed among 33.9% people, while individuals having moderate (37.5%) education were mostly prevalent in the study. Another 28.6% people were found to have lower level of education. Only 15.1% of the study population had higher SES, whereas lower SES was prevalent among 27.8%. On the other hand, majority (57.1%) of the population were in the middle SES. 26.7% of the study population was smokeless tobacco user. Light smoking, moderate smoking and heavy smoking was observed among 19.2%, 10.4% and 9.5% people, respectively. Only 8.8% people of the total population quitted smoking. 24.3% people were light drinker, whereas only 3% and 2.8% people was moderate and heavy drinker. Previous drinking habit was observed among 3.9% people. 72.9% people were physically inactive, i.e., not involved in regular physical exercise.

From table 2 it can be noted that SLT users were shorter and lighter than non user. The mean age of non user of tobacco was slightly higher than SLT users. Both the groups had same mean values for WHtR. Significantly higher SBP value ($p<0.001$) was observed among the SLT users. Though non-significant, but the users had higher mean values of HR, DBP, WC and WHR. SLT users also had a lower mean BMI value when compared to non users.

Addiction for SLT consumption prevailed among 26.7% of the population. The socio-demographic and lifestyle characteristic of SLT users and non users of SLT are shown in Table 3. Increase in age increased use of SLT and aged people were mostly addicted. Majority of the SLT users were moderately educated and belong to middle SES. SLT users were significantly physically inactive and alcoholic also, whereas tobacco smoking was less frequent among them.

Table 4 shows that prevalence of overweight and obesity was lower among SLT users. Similar result was also observed for abdominal obesity and WHtR, whereas prevalence of truncal obesity was slightly higher among tobacco users. Hypertension was significantly higher among the SLT users. Prevalence of systolic and diastolic hypertension was found to be significantly higher in SLT consumers as compared to non users.

Table 5 shows positive association between SLT consumption with age, education status, SES and alcohol consumption. On the other hand, a negative association was also observed between smoking habit and physical activity with SLT consumption. Odds of SLT use were higher among lower and moderately educated group, but the association was statistically non-significant. Age group 30-40 years and 50-60 years had higher odds for tobacco use. After adjusting the non-significant variables in multivariate analysis, SLT consumption showed a statistically significant correlation with SES (Table 5), people of lower and middle SES were 10.09 and 5.81 time more prone to consume SLT, respectively. Regular physical activity lowers the risk of SLT use. Less SLT consumption was also noticed among light, moderate and heavy smokers whereas, though non-significant, ex-smokers had a greater risk. Significantly increased risk of SLT consumption was observed among light, moderate and heavy drinkers, whereas ex-alcoholics had the highest odds.

After adjusting the socio-demographic and lifestyle variables, it can be observed from Table 6 that, SLT use was associated with obesity, hypertension, systolic and diastolic hypertension. The risk of developing systolic and diastolic hypertension among the SLT users was 1.71 and 1.63 times higher, respectively, than the non users. Also odds for developing hypertension increases with SLT consumption by 1.43 times. Obesity and waist-height ratio had a negative association with SLT consumption. Though statistically non-significant, the odds ratio for abdominal and truncal obesity in male SLT users was found to be 1.13 and 1.31, respectively.

DISCUSSION

SLT consumption was observed among 26.7% of the urban population which is lower than a study reported by Siddiqi *et al.* (2015) but higher than GATS survey 2009-2010 (International Institute for Population Sciences, 2010) and a study conducted by Rani et al., (2003).

In the present study, age distribution showed a lack of uniformity in the very young and old age group, whereas some uniformity of the distribution of age was observed among other two groups. Highest percentage (32.9%) of people were in the age group of >50 years while 20-29 years age group have the lowest percentage (13%). 24.2% individuals were in 30-39 age group and 29.9% in 40-49 age group. Age has been found to be an important determinant of tobacco use in earlier studies and frequency of SLT use increases with age which corroborates with other studies (Rani *et al.,* 2003; Rooban *et al.,* 2010). As reported by Singh (2014), with increase in age, the odds of using SLT significantly increases in India. In the present study too, odds of being SLT user increased with increase in age, though age became non-significant in univariate analysis. Elderly and middle-aged people had higher odds of consuming SLT.

Education and SES were the most important determinants of tobacco use irrespective of the type of use. The relation between these SES markers and tobacco consumption is similar to relations observed in developed countries and other studies done in previous decades in India (Rani *et al.,* 2003; Subramanian *et al.,* 2004). Higher prevalence of SLT use has been reported in poorer and less educated populations compared to wealthier and more educated populations (Rani *et al.,* 2003; Subramanian *et al.,* 2004; Singh, 2014). In line with this, our study also reveald that lower SES and less education was positively associated with higher risk of use of SLT among the study population. SLT use was higher among the middle SES group and moderately educated people. Men in the lower and middle SES group had 10.09 and 5.81 times higher odds of being SLT users than men in the higher SES. Also, men with lower and moderate education were 1.48 and 1.44 times more likely to use SLT than men with higher education (in univariate analysis). This can often be attributed to less knowledge and awareness about the health risk of tobacco use among the less educated people.

SLT users had increased levels of HR and BP levels. This finding was also supported by some studies who observed that an acute level of SLT was associated with a significant increase in heart rate, central aortic SBP and DBP, peripheral brachial SBP and DBP (Bolinder, 1998; Hazarika *et al.,* 2002; Gupta *et al.,* 2007; Martin *et al.,* 2010). SLT consumption was positively associated with hypertension in the adult male urban population. This finding is also comparable to some previous studies done in India (Khurana, 2000; Hazarika *et al.,* 2002; Gupta et al., 2007) as well as in western population (Bolinder *et al.,* 1992; Westman, 1995; Bolinder, 1998; Accortt *et al.,* 2002; Hergens, 2008). Significantly higher prevalence of diastolic hypertension and mean DBP value in the SLT users as compared to non-users corroborates with findings in previous studies (Bolinder *et al.,* 1992; Gupta *et al.,* 2007). SLT users had increased risk for developing systolic and diastolic hypertension by 1.71 times and 1.63 times, respectively. Also odds for developing hypertension increased with SLT consumption by 1.43 times. Evidence suggests that chewing tobacco leads to blood nicotine levels similar to that seen in smoking. Moreover, due to prolonged absorption, high levels of nicotine are achieved for longer durations of time. There are several possible mechanisms for the association between SLT use and heart disease. The sympathico-adrenal activating properties of nicotine and high sodium content of oral tobacco preparations could be the main contributing factors for high BP in tobacco consumers (Asplund, 2003). Also, betel

quid activates the sympathetic nervous system (Chu, 2004) leading to reduced vascular conductance, impaired baro-reflex buffering, and decreased heart responsiveness to ß-adrenergic stimulation, etc (Seals, 2004). In comparison to the non-users, physical inactivity and more alcohol consumption by the SLT users may also be contributed to increased BP and hypertension among them.

SLT users were found to have less body weight and they also had lower BMI value than the non users which is due to the presence of nicotine, the main ingredient of SLT products. SLT's effect on body weight could lead to weight loss by increasing the metabolic rate, decreasing metabolic efficiency, or decreasing caloric absorption (reduction in appetite). Similar to ours, studies conducted in humans (Mannan, 2000; Benjamin, 2001) found that SLT was associated with obesity. Risk of getting abdominal and truncal obesity increased by 1.13 fold and 1.31 fold in SLT users in comparison to non users. The mechanism of betel-induced abdominal obesity may depend on arecoline, the active ingredient of Areca catechu. On the other hand, betel-quid use may increase serum triacylglycerol level, secondary to the induction of central obesity.

Majority of the SLT consumers were non-smokers as the desired effect of smoking can be achieved by chewing tobacco. On the other hand, the risk of SLT consumption was significantly lower among light, moderate and heavy smokers. The smokers who quitted smoking became dependent on chewing tobacco and the odds of SLT consumption were greater among the ex-smokers.

It's no mystery that smoking and drinking go hand in hand. So far, we have considered the parallels between smoking and drinking as separate behaviours, but in fact they often occur together. Present study observed that, alcoholics as well as ex-alcoholics had significantly higher odds for SLT use. This can be explained as ethanol and nicotine have effects which partially counteract each other, and users apparently use them to titrate each other's effects. Lê *et al.,* (2000) found that repeated administrations of nicotine stimulated alcohol consumption. Johnson *et al.* (1991) and Chen *et al.* (2001) have identified another connection: that nicotine reduces the intoxicating effects of alcohol. As the desired effect of alcohol is significantly diminished by nicotine – particularly among heavy or binge drinkers this may be to achieve the pleasurable or expected effect.

CONCLUSION

Prevalence of SLT use was relatively high among the urban population. An increased prevalence of hypertension, systolic hypertension and diastolic hypertension and a decreased prevalence of overall obesity are seen among the male individuals of urban population of Kolkata who are SLT users. Smoking habit and physical activity lowers the risk of SLT use whereas SES and alcohol consumption increases the risk. This is an indicator of increased tendency to have major adverse cardiac events later in their life time. Prevention of SLT consumption could be an important intervention in preventing the ongoing upswing in prevalence of chronic heart disease that is threatening to engulf every region of the world. More research should be undertaken to evaluate nicotine and toxin exposures and health hazards to individuals from use of SLT products.

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Table1: Socio-demographic and lifestyle characteristics of study population

Variables	%(n)
Education level	
Lower	28.6(348)
Moderate	37.5(456)
Higher	33.9(412)
SES	
Lower	27.8(338)
Middle	57.1(694)
Higher	15.1(184)
SLT consumption	**26.7 (325)**
Smoking Habit	
Non Smoker	52.1(634)
Light Smoker	19.2 (233)
Moderate Smoker	10.4 (126)
Heavy Smoker	9.5 (116)
Ex-smoker	8.8 (107)
Alcohol consumption	
Non-drinker	66.0 (803)
Light drinker	24.3 (296)
Moderate drinker	3.0 (36)
Heavy drinker	2.8 (34)
Ex- drinker	3.9 (47)
Physical inactivity	**72.9(886)**

Values are represented as % (n). SES- Socio-economic status; SLT- Smokeless tobacco.

Table 2: Comparison of physiological and anthropometric parameters between SLT users and non users

Variables	Non User of SLT (n= 891)	SLT User (n= 325)
Age (years)	42.81 ± 0.359	41.89 ± 0.596
Height (cm)	168.46 ± 0.231	168.43 ±0.43
Weight (kg)	66.68 ± 0.357	66.22 ± 0.668
HR (beats/min)	76.77 ± 0.281	76.86 ± 0.440
SBP (mm Hg)	127.35± 0.455	130.40 ± 0.866*
DBP (mm Hg)	80.45 ± 0.253	81.38± 0.451
WC(cm)	89.86 ± 0.331	89.87 ± 0.615
WHR	0.97 ± 0.002	0.98 ± 0.004
BMI (kg/ m2)	23.45 ± 0.107	23.26 ± 0.191
WHtR	0.53 ± 0.001	0.53 ± 0.003

Values are mean ± SD; * denotes statistical significance ($p<0.05$); BMI- Body Mass Index ; DBP- Diastolic Blood Pressure; HR- Heart rate; SES- Socio-economic status; SBP- Systolic Blood Pressure; SLT- Smokeless tobacco; WC-Waist Circumference; WHR- Waist-to-hip ratio; WHtR- Waist-to-height Ratio.

Table 3: Comparison of socio-demographic and lifestyle characteristics between SLT users and non users

Variables	Non User of SLT (n= 891)	SLT User (n= 325)
Age Group		
20-30 years	12.57 (112)	14.15 (46)
30-40 years	23.34 (208)	26.46 (86)
40-50 years	30.86 (275)	27.38 (89)
50-60 years	33.22 (296)	32 (104)
Education Status*		
Lower	24.24 (216)	40.62 (132)
Moderate	35.69 (318)	42.46 (138)
Higher	40.06 (357)	16.92 (55)
SES*		
Lower	23 (205)	40.92 (133)
Middle	57.13 (509)	56.92 (185)
Upper	19.87 (177)	2.15 (7)
Physical inactivity*	69.47 (619)	82.15 (267)
Smoking Habit*		
Non Smoker	48.9 (436)	60.9 (198)
Light Smoker	20.1 (179)	16.6 (54)
Moderate Smoker	12.6 (112)	4.3 (14)
Heavy Smoker	10.7 (95)	6.5 (21)
Ex-smoker	7.7 (69)	11.7 (38)

Variables	Non User of SLT (n= 891)	SLT User (n= 325)
Alcohol consumption*		
Non-drinker	70.5 (628)	53.8 (175)
Light drinker	21.3 (190)	32.6 (106)
Moderate drinker	2.8 (25)	3.4 (11)
Heavy drinker	2.6 (23)	3.4 (11)
Ex- drinker	2.8 (25)	6.8 (22)

Values are represented as % (n). SES- Socio-economic status; SLT- Smokeless tobacco.

Table 4: Prevalence of obesity and hypertension among SLT users and non users

Variables	Non User of SLT (n= 891)	SLT User (n= 325)
Overweight	27.38 (244)	20.92 (68)
Obesity	29.18 (260)	28.31 (92)
Abdominal obesity	54.21 (483)	53.83 (175)
Truncal Obesity	89.34 (796)	89.85 (292)
WHtR	76.43 (681)	73.54 (239)
Systolic hypertension*	18.07 (161)	27.38 (89)
Diastolic hypertension*	11.11 (99)	16.92 (55)
Hypertension*	29.29 (261)	37.23 (121)

Values are n (%); *denotes statistical significance ($p<0.05$). SLT- Smokeless tobacco; WHtR- Waist-to-height ratio.

Table 5: Predictors of SLT consumption of urban individuals

Predictive factors	Univariate Analysis			Multivariate Analysis		
	OR	95% CI	p value	$_{a}OR^{\dagger}$	95% CI	p value
Age Group						
20-30 years	Ref.			–	–	–
30-40 years	1.34	0.84 – 2.12	0.22	–	–	–
40-50 years	0.95	0.60 – 1.5	0.83	–	–	–
> 50 years	1.43	0.91 – 2.26	0.13	–	–	–
Education Status						
Lower	1.48	0.89 – 2.46	0.12	–	–	–
Moderate	1.44	0.96 – 2.16	0.08	–	–	–
Higher	Ref.			–	–	–
SES						
Lower	15.20	6.82 – 33.86	0.0001*	10.09	3.99 – 25.51	0.0001*
Middle	9.05	4.14 – 19.81	0.0001*	5.81	2.94 – 13.52	0.0001*
Upper	Ref.			Ref.		
Physical activity	0.54	0.38 – 0.76	0.001*	0.61	0.43 – 0.88	0.007*

Predictive factors	Univariate Analysis			Multivariate Analysis		
	OR	95% CI	p value	aOR†	95% CI	p value
Smoking						
Non Smoker	Ref.			Ref.		
Light Smoker	0.46	0.32 – 0.68	0.0001*	0.45	0.31 – 0.65	0.0001*
Moderate Smoker	0.19	0.10 – 0.35	0.0001*	0.17	0.09 – 0.32	0.0001*
Heavy Smoker	0.30	0.18 – 0.51	0.0001*	0.28	0.16 – 0.48	0.0001*
Ex-smoker	1.19	0.74 – 1.91	0.46	1.12	0.69 – 1.81	0.65
Alcohol Consumption						
Non-drinker	Ref.					
Light drinker	2.44	1.76 – 3.40	0.0001*	2.40	1.73 – 3.32	0.0001*
Moderate drinker	2.73	1.21 – 6.16	0.01*	2.54	1.13 – 5.67	0.02*
Heavy drinker	1.94	0.88 – 4.27	0.05*	1.80	0.82 – 3.92	0.05*
Ex- drinker	2.60	1.36 – 4.97	0.004*	2.58	1.37 – 4.87	0.003*

*denotes statistical significance ($p<0.05$). †: Adjusted for non-significant variables of univariate analysis. aOR- Adjusted odds ratio; CI- Confidence Interval; OR-Odds Ratio; Ref.- Reference; SES- Socio-economic status; SLT- Smokeless tobacco.

Table 6: Association of SLT use with obesity and hypertension

Characteristics	aOR†	95% CI	P value
Obesity	0.96	0.67-1.35	0.82
Abdominal obesity	1.13	0.79-1.64	0.50
Truncal Obesity	1.31	0.79-2.17	0.30
Waist to Height Ratio	0.71	0.46-1.08	0.11
Systolic hypertension	1.71	1.27-2.30	0.0001*
Diastolic hypertension	1.63	1.14-2.33	0.007*
Hypertension	1.43	1.10-1.87	0.008*

*denotes statistical significance ($p<0.05$). aOR- Adjusted Odds Ratio (Adjusted for the socio-demographic and lifestyle variables); CI- Confidence Interval; SLT- Smokeless tobacco.