RESEARCH ARTICLE

Assessment of Cardiovascular Risks of Tobacco Chewers by Comparing it with Normal Human Beings

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ABSTRACT

Background: Tobacco smoking in any form (cigarette, bidi etc.) has long been established as a risk factor for CAD (coronary artery disease) but a very little research has been done on tobacco chewing, which is restricted to South Asia (India, Pakistan, Nepal, Bangladesh, Sri Lanka) whether it increases risk for cardiovascular morbidity or not.

Aims & Objective: To assess the cardiovascular risks in tobacco chewers as compared to normal population of Aligarh a city of Western Uttar Pradesh.

Materials and Methods: The study was conducted in Department of Physiology, Department of TB Chest and Department of Medicine JNMCH, AMU Aligarh. The study consisted of 30 tobacco chewers (in any form) and 30 subjects without any history of tobacco consumption in any form. The age group varied from 20-60years. Anthropometric measurement age, weight, height, BMI, Pulse, SBP (systolic BP), DBP (Diastolic BP) and Lipid Profile estimation from blood sample.

Results: Anthropometric measurements did not show any significant change when compared in two groups ($p > 0.05$). Cardiovascular Parameters like, Systolic pressure (117.46 ± 11.07); diastolic pressure (83.37 ± 8.74); mean arterial pressures (93.40 ± 6.33) and pulse rate (84.29 ± 5.70), were significantly increased in chewers as compared to normal population ($p < 0.05$). Lipid Profile Parameters like, Total cholesterol (237.04 ± 82.6); HDL (45.54 ± 5.46); LDL (161.16 ± 76.7) were increased in chewers as compared to control ($p < 0.05$). Atherogenic index T Choles./HDL (5.22 ± 1.90); LDL/HDL (3.57±1.35); Non-HDL/HDL (4.3 ± 1.0), were also showed a significant increase ($p < 0.05$).

Conclusion: All these findings are suggestive that tobacco chewers are at increased risk of cardiovascular diseases as compared to non-tobacco consuming population.

INTRODUCTION

According to World Health Report (2002) tobacco is the most preventable cause of overall mortality as well as cardiovascular mortality worldwide. The consumption of nicotine is the single biggest avoidable cause of death and disability. Consumption of nicotine is now increasing rapidly throughout the developing world and is one of the biggest threats to current and future world health.[1] Because of vigorous efforts toward increase awareness of adverse effects of tobacco, smoking has declined consistently over the last 30- years, paradoxically the use of smokeless tobacco and snuff has greatly increased. Smokers are found worldwide while tobacco chewers are restricted to certain geographic including India and Central Asia Chewing is used, either by placing a plug of tobacco in the gingival buccal-mucosa or by chewing it. Gupta et al.[2] found a significant increase in resting heart rate, SBP (systolic blood pressure) DBP (diastolic blood pressure) in tobacco chewers as compared to controls. The acute effects of smokeless tobacco have been documented by increases of up to 21 mm Hg in S.B.P and 14 mm Hg in DBP and an average increase of 19 beats/ min in Pulse Rate.[2] Gupta et al.[3] found mean levels of total cholesterol, LDL-cholesterol and triglycerides were raised in significant amount in chewers. HDL-cholesterol was lower in tobacco-chewers as compared to normal. Nanda et al.[4] found statistically significant increments in HR (Heart Rate) and BP in tobacco chewers (paan with tobacco) as compared to (Paan without tobacco). Khurana et al.[5] found highly significant decrease in HDL (p < 0.001) component with simultaneous increase in total cholesterol and LDL component in tobacco chewers.

In the past most of foreign researchers have focused on cardiovascular morbidity due to cigarette smoking and a very little work has been done on tobacco chewers, so present work aims at measuring statistically significant cardio-vascular risk in tobacco chewers in Aligarh a city of Western Uttar Pradesh. The objective of the study is to compare the cardiovascular risks in tobacco chewers with that of normal population.

MATERIALS AND METHODS

The present study was conducted in Jawaharlal Nehru Medical College Hospital and Campus Aligarh from a period of March 2010 to June 2012 with due permission of ethical committee on general population residing in and around campus. The subjects are working as ward boys-girls, sweepers, peons, hostel attendants, patient attendants and patients attending T.B and Respiratory Medicine and dental OPDs. The subjects were of both sexes and were of age group 20-60 years with at least 5 years of tobacco chewing history only .The mean age of subjects for study was 40 yrs. The subjects were included in the study after proper consent .The subjects were divided in two groups each containing 30 human subjects. The groups were,

Group A: No H/O of tobacco use in any form

Group B: Exclusive tobacco chewers from > 5 years i.e. only chewed

The subjects having both the habits i.e. smoking and chewing and any present or past h/o cardiovascular illness, renal disease, diabetes, obstructive or restrictive lung disease were excluded from study.

After taking a proper consent all the subjects were made to undergo a proper history, clinical examinations, cardiovascular examination and blood samples were collected in fasting (> 8 hrs fast). Following parameters were recorded for study purpose

- Anthropometric measurement Age, weight , Height, BMI was calculated
- Pulse
- SBP and DBP by sphygmomanometer
- Lipid Profile estimation from blood sample collected, (i)Estimation of Triglycerides by G.P.O. P.A.P. method; (ii) Estimation of Cholesterol by one step Method of Wybenga and Pollegi (iii)Estimation of HDL cholesterol by spectrophotometer (iv) VLDL-C and LDL-C were calculated by the formulas –

VLDL-C = (TG estimated by GPO PAP method)/5

LDL = TC – (HDL +VLDL)

Statistical Analysis: It was done by software SPSS 17.0 and Microsoft excel Result was expressed as Mean ± Standard Deviation. Unpaired T test was used for comparison between the groups and p value < 0.05 was taken as significant.

RESULTS

Table-1: Anthropometric Measurements

Parameter	Control (Group A)	Chewer (Group B)
Age	42.75 ± 10.06	46.97 ± 9.57
Weight	61.86 ± 3.53	56.82 ± 8.04
Height	169.60 ± 4.71	167.44 ± 5.7
BMI	21.35 ± 1.86	19.66 ± 2.15

No statistically significant decrease in weight or BMI found although both are decreased in habitual chewers.

Table-2: Cardiovascular Parameters

Cardiovascular Parameter	Control (Group A)	Chewer (Group B)
Pulse Rate	75.24 ± 13.43	84.29 ± 5.70 ***
Systolic Blood Pressure	108.36 ± 3.75	117.46 ± 11.07 *
Diastolic Blood Pressure	77.05 ± 3.61	83.37 ± 8.74 **
Pulse Pressure	31.30 ± 5.42	34.50 ± 16.50

* $p < 0.05$ signifiacant; ** $p < 0.01$ very significant; *** $p < 0.001$ highly significant. All readings are in mm hg. Pulse pressure = SBP-DBP. MAP=DBP + 1/3 Pulse Pressure

Table-3: Lipid Profile of the Groups

Parameter	Control (Group A)	Chewer (Group B)
Total Cholesterol	184.97 ± 40.43	237.04 ± 82.6 *
Serum Triglycerides	115.91 ± 28.2	146.17 ± 49.33
HDL	56.52 ± 6.0	45.54 ± 5.46 ***
LDL	123.39 ± 28.17	161.16 ± 76.7 **
VLDL	23.73 ± 5.88	31.52 ± 11.96
T Choles./HDL	3.3 ± 0.80	5.22 ± 1.90 ***
LDL/HDL	1.80 ± .55	3.57 ± 1.35 ***
Non-HDL/HDL	2.3 ± 0.8	4.3 ± 1.0 ***

* $p < 0.05$ signifiacant; ** $p < 0.01$ very significant; *** $p < 0.001$ highly significant. All readings in mg / dl except the ratios.

DISCUSSION

Weight and BMI of chewers are not significantly decreased as compared to control subjects. This is in accordance with study done by Gupta BK et al.[3] This can be explained that chewing tobacco does not interfere with eating habits as much as smoking. The present study shows pulse rate, systolic B.P., diastolic B.P. and MAP is increased significantly in chewers as as compared to control subjects. These results are consistent with previous studies done by Gupta et al.[2], Benowitz et al.[6], Asplund et al.[7], Wolk et al.[8],

Nanda et al.[4] The rise of pulse rate, systolic BP, diastolic BP, MAP in tobacco chewers in our study is due to presence of nicotine as the major component in smokeless tobacco. Djordjevic MV et al.[9] also proved nicotine to be major component in all forms of consumed tobacco smoked or chewed. Other minor alkaloids include nornicotine, anatabine, and anabasine.

Nicotine causes sympathetic neural stimulation and acute cardiovascular effects. This is further supported by study from Asplund et al.[7] because they found similar results in nicotine replacement therapy patients. Blood –Pressure readings in tobacco chewers are also affected by high Na + content of smokeless tobacco.[7] Active ingredient Licorice in chewed tobacco increased BP by inhibiting metabolism of mineralocorticoids and causes Na + retention.[7] In present study Total Cholesterol (TC) is significantly increased in chewers as compared to control subjects. LDL- Cholesterol increase is highly significant chewers. No significant change is present in VLDL-Cholesterol and triglycerides. These results are in accordance with studies by Gupta BK et al.[3], Gupta et al.[2], Yusuf P et al.[10], Khurana et al.[5] Present study shows that HDL-C is significantly decreased in chewers as compared to control subjects. This is in accordance with studies from Gupta B K et al.[3] who observed similar results. Our study is also consistent with Gupta R et al.[2] who pointed that smokeless tobacco-users had lower HDL-C levels as compared to non-users. Khurana et al.[5] also found that HDL-C was lower in chewers compared to control.

In present study atherogenic index (TC / HDL, LDL-C/HDL-C, Non-HDL/HDL) is significantly increased in chewers as compared to control.

The basis of change in lipid profile in tobacco chewer is the sympathomimetic effect of nicotine. The release of adrenaline leads to lipolysis by increasing the activity of lipolytic –lipase enzyme in adipose tissues. This leads to increase in serum concentration of free fatty acids, triglycerides, LDL –C and VLDL-C. This explanation can be supported by study of Quensel M et al.[11] in

which administration of nicotine orally to non-smokers lead to change in lipid profile. Animal model experiments by Cluette-Brown et al.[12] also support the fact that nicotine is the major component responsible for lipid profile derangement, where administration of nicotine lead to increased LDL level and reduced HDL level.

CONCLUSION

All these findings are suggestive that tobacco chewers are at increased risk of cardiovascular diseases as compared to non-tobacco consuming population.

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