

Observational Study

Effect of 2-5 years of tobacco chewing on pulmonary function tests

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The present work is undertaken to study the effect of 2-5 years of tobacco chewing on pulmonary functions. The study group consisted of 30 male, young, healthy subjects, free from cardiopulmonary diseases and with history of tobacco chewing of 2-5 years duration, on an average of 5 packets of Gutkha per day. The control group consisted of 30 age and sex matched healthy individuals who had never chewed tobacco. The pulmonary function tests were carried out using electronic spirometry. There was a significant lowering of the following parameters in tobacco chewers, forced vital capacity (FVC), forced expiratory volume at the end of first second (FEV1), maximum midexpiratory flow (MMEF), peak expiratory flow rate (PEFR). This study shows that 2-5 years of tobacco chewing leads to a definite tendency to narrowing of large airway.

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Key words : Tobacco chewing, pulmonary function tests.

Tobacco use is a public health concern worldwide as well as in India. The tobacco use without burning is referred to as smokeless tobacco use.

Smokeless tobacco use has been increased rapidly throughout the world especially among adolescent boys and young men by considering it as safe alternative of smoking¹.

'Gutkha' is one of the widely used smokeless tobacco in India. Cigarette smoking has extensive effects on respiratory function². Like cigarette the most important constituent of 'Gutkha' is tobacco. This study attempts to find out whether 'Gutkha' causes any unfavourable effects for the lungs by using PFTs.

MATERIAL AND METHOD

The present study was conducted in the department of Physiology, Karnataka Institute of Medical Sciences, Hubli on two groups (study and control) comparable in age and sex. All the subjects who participated in the study gave informed consent after the procedure of the non-invasive investigation to be carried out was explained to them. They were subjected to detailed clinical examination to rule out the presence of any underlined diseases.

Criteria for the Study Group :

(1) **Inclusion Criteria :** includes healthy young adult

males (20 to 30 years) with chewing (Gutkha) history of 2-5 years on an average of 5 packets per day.

(2) **Exclusion Criteria :** includes presence of acute or chronic respiratory illness, diabetic mellitus, hypertension, smoking or any other systemic illness. The controlled (non-tobacco chewers) group comprises of age and sex matched healthy individuals who had never chewed tobacco even once in their life time. The details of the anthropometric data of the two groups are shown in Table 1. Lung Volumes, Capacities and Flow rates recorded by using electronic spirometer, spirometry model SPL-100. The subjects were made familiar with the working of the instrument and the test protocol was explained in brief. All the tests were conducted by the subjects were sitting comfortably in a chair and after the subjects had rested sufficiently for a period of 15 minutes and during the same time of the day (10 to 12am) under similar atmospheric conditions. Following abbreviations have been used throughout the study. C- control S-study group.

Statistical analysis was done by using unpaired student 't' test.

OBSERVATIONS AND DISCUSSION

The Observations are shown in Table 2. The present study protocol includes both dynamic and static ventilatory function tests. There are many studies in the literature showing the chronic effect of tobacco chewing on various pulmonary function tests concentrating on dynamic lung function tests. This study emphasises the effect of 2-5 years of tobacco chewing on pulmonary function tests. In the present study a statistically significant decline in pulmonary function values between controls and tobacco

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Table 1 — Anthropometric and Vital data of study group and controls (Mean ± SD)

Group	Age In years	Height in cms	Weight in kgs	BMI	Body surface area in sqm	Pulse rate / minute	Respiratory rate / minute	BP: Systolic (SP) diastolic (DP) in mmHg
Controls (n=30)	23.20 ±1.75	166.26 ±4.33	62.70 ±3.39	22.74 ±1.40	1.71 ±0.06	78.06 ±3.76	17.86 ±1.47	SP : 116.80 ±4.35 DP : 76.60 ±4.67
Study group (n=30)	22.63 ±1.73	163.90 ±2.82	61.66 ±3.68	22.86 ±1.45	1.67 ±0.05	77.06 ±3.62	17.60 ±1.42	SP : 118.00 ±3.48 DP : 75.93 ±5.93

Table 2 — Showing Comparison of Pulmonary function tests in controls and study group

Parameters	Control group(c) (mean ± SD)	Study group(S) (mean ± SD)	P-value
FVC	3.02 ± 0.31	2.80 ± 0.22	< 0.05
FEV1	2.82 ± 0.36	2.61 ± 0.28	< 0.05
MMEF	3.72 ± 0.89	3.64 ± 0.88	> 0.05
PEFR	5.40 ± 2.00	4.32 ± 1.97	< 0.05

P <0.05 – Significant
P >0.05 – Non-Significant
FVC : Forced Vital Capacity, FEV1: Forced Expiratory Volume in one second, MMEF : Maximum Mid Expiratory Flow rate, PEFR: Peak Expiratory Flow Rate

chewers has been observed. The following ventilatory function tests showed a decline in the values FVC, FEV1, MMEF, PEFR.

FEV1, PEFR are sensitive indicators of large airway resistance and MMEF is sensitive indicator of small air-

way resistance. FVC being sensitive indicator of generalised airway resistance.

Statistical analysis showed a definite tendency towards narrowing of large airways in tobacco chewers as compared to controls.

Smokeless tobacco produces oxidative stress resulting from and imbalance between formation of reactive oxygen species and antioxidants contribute chronic airway limitation⁴.

Thus Gutkha induced low pulmonary function indices may be due to increased oxidative stress. This study is done on a small group and hence the results might be more conclusive on a large sample.

REFERENCES

- 1 Purushottam pramanik*, Manas Ghosh, Archana Choudhary, "Effect of Khaini:- a form of smokeless chewing tobacco on pulmonary functions" IJPP: 2013; 57(1).
- 2 Gupta R. Gurm H, Bartholomew JR — Smokeless tobacco and cardiovascular risk. *Arch Intern Med* 2004; **164**: 1845-9.
- 3 WHO — World tobacco epidemic, WHO Publications. 1993, 2nd edition. P47.
- 4 Schunemann J, Freudenheim JL, Grant BJB — Epidemiologic evidence linking antioxidant vitamins to pulmonary function and airway obstruction. *Epidemiol Rev* 2001; **23**: 248-261.