AND OF Replice

Assessment of Cardiopulmonary Function in Smokers

Arunima Deep	${\it PGResident, DepartmentofPhysiology, SantoshMedicalCollege, DelhiNCR.}$			
Yogesh Tripathi	ProfessorandDean, DepartmentofPhysiology, SantoshMedicalCollege, DelhiNCR.			
Varun Malhotra	ProfessorandHOD, DepartmentofPhysiology, SantoshMedicalCollege, DelhiNCR.			

Physiology

ABSTRACT Introduction Cigarette smoking is the single most cause of the preventable deaths globally. It leads to heart attacks, chronic obstructive pulmonary disease, cancer, peripheral vascular disease and hypertension. It contains nicotine which causes physical and psychological dependencies. Material and Methods We assessed the effect of smoking on respiratory system with the help of following parameters viz. Heart rate, Blood pressure, PEFR and Respiratory Rate, EGG. These were compared with the Age, Sex and BMI matched Non-smokers (Control Group). Results and Discussion The correlation was positive and not significant p>0.05, for systolic BP, diastolic BP, Mean arterial pressure, RR interval and QRS duration. The correlation coefficient was negative and significant p<0.05 among the smokers between age and peak expiratory flow rate. Pulmonary function tests like PEFR are deranged in the smokers than the non-smokers. Given this trend, it is important to undertake prevention and control programs to make young people aware of harmful effects of smoking, particularly initiating smoking at an early age. The usefulness of maintaining healthy BMI and to undertake measures to reduce weight by adopting regular exercise, avoiding sedentary lifestyle and avoiding smoking cannot be over emphasized. Special programs at school and college level need to be started so as to encourage young people to avoid healthy lifestyle and curb smoking and other harmful habits.

KEYWORDS : Smoking Pulmonary Function Test PEFR QT interval

INTRODUCTION-

Tobacco consumption is the single most cause of the preventable deaths globally. Tobacco is consumed in many forms and one such form is cigarette smoking. Its use leads to heart attacks, chronic obstructive pulmonary disease, cancer, peripheral vascular disease, hypertension and the list is endless.^{1,2}It contains nicotine which causes physical and psychological dependencies. Nicotine facilitates a conduction block and a re-entry and it increases the vulnerability to a ventricular fibrillation.³ Nicotine is a potent inhibitor of the cardiac A type potassium channels, which contributes to the changes in the electrophysiology and it also induces arrhythmias. Tobacco smoking is a major risk factor for cardiovascular disease, chronic obstructive pulmonary disease and some cancers and the morbidity and mortality with tobacco use is entirely preventable. India is the second largest consumer of tobacco products and third largest producer of tobacco in the world. Several studies have reported that PEFR was significantly lower in smokers than in non-smokers and some studies found maximum reduction in PEFR was in bidi smokers than cigarette smokers.⁴Smoking causes an acute increase in blood pressure (BP) and heart rate and has been found to be associated with malignant hypertension.⁵Until now, the only electrocardiographic items in which a normal trend with age has been recognized are those which relate to the electrical heart position: QRS axis^{6,7}, heart Index^{8,9}, and the position indicated by the unipolar limb leads¹⁰. But even with these items, the reported age trends are inadequate to establish norms because of lack of definition of other characteristics (for example, body build and relative obesity), as well as the lack of satisfactory statistical analysis. We assessed the effect of smoking on respiratory system with the help of following parameters viz. PEFR and Respiratory Rate and comparing with the Age, Sex and BMI matched Non-smokers (Control Group).

MATERIALS AND METHODOLOGY-

Smokers in the age group of 20-65 years were selected. Group I: Smokers Group II: Non-smokers (Control) Both Groups were Age and BMI Matched

METHODOLOGY-

All the subjects were interviewed and the following parameters were taken and recorded. Heart Rate was measured by standard Pulse

Oxy-meter. Blood Pressure was measured by standard mercury sphygmomanometer [systolic blood pressure, SBP and diastolic blood pressure, DBP]. Respiratory Rate was measured by Inspection/ Palpation of Chest Movements. Peak Expiratory Flow Rate (PEFR) was measured by Spirometer. ECG was measured by automated ECG Machine.

OBSERVATIONS AND RESULTS-

The following observations were made by the end of this study-

Table1- Correlation of systolic blood pressure between smokers and non smokers

GROUP	NUMBER OF	MEAN	STD.DEVIAT	STD.ERROR
	PERSONS		ION	MEAN
Smokers	50	124.9800	11.15474	1.57752
Non smokers	50	124.0800	14.25689	2.01623

Figure 1-



Table 2- Correlation of diastolic blood pressure among smokers and non-smokers

Group	Number of persons	Mean	Std. deviation	Std. error mean
Smokers	50	78.6600	7.07571	1.00066
Non smokers	50	77.8400	6.98792	0.98824

Figure 2-



 Table 3- Correlation of Mean Arterial Pressure among smokers

 and Non smokers

Group	Number of	Mean	Std. Mean	Std. Error
	persons		deviation	Mean
Smokers	50	93.88	7.76870	1.09866
Non smokers	50	93.2000	8.88475	1.25649

Figure 3-



Table 4- Correlation of PR interval [sec] among smokers and Non smokers

Group	Number of	Mean	Std.	Std. Error
	persons		Deviation	Mean
Smokers	50	0.7904	0.15991	0.02261
Non smokers	50	0.8072	0.15601	0.02206

Figure 4-



Table 5- Correlation of QT interval among smokers and Non smokers

Group	Number of	Mean	Std.	Std. Error
	persons		Deviation	Mean
Smokers	50	0.3656	0.03615	0.00511
Non smokers	50	0.3704	0.03003	0.00425

Figure 5-



Table 6- Correlation of ST segment among smokers and Non smokers

Group	Number of persons	Mean	Std. Deviation	Std. Error Mean
Smokers	50	0.1128	0.02792	0.00395
Non smokers	50	0.1096	0.02688	0.00380

Figure 6-



Table 7- Correlation of QRS duration [sec] among smokers and Non smokers

Group	Number of	Mean	Std.	Std. Error
	persons		Deviation	Mean
Smokers	50	0.0862	0.00805	0.00114
Non smokers	50	0.0858	0.00810	0.00115

Figure 7-



Table 8- Correlation of Peak Expiratory Flow Rate [L/sec] among smokers and Non smokers

Group	Number of	Mean	Std.	Std. Error
	persons		Deviation	Mean
Smokers	50	365.8000	98.39715	13.91546
Non smokers	50	388.5000	113.03896	15.98612

Figure 8-

Peak Expiratory Flow Rate [L/sec]



DISCUSSION-

Our study correlation of SBP, DBP and other parameters were similar to findings reported by Gillman M^{11} suggesting to reported hypertension. Also that abnormal BP is found to be associated with increased cardiovascular risk. Our findings are also in consonance

2

with Ravishanker P 12 who also found higher BP in smokers and least in non-smokers. In contrast to our study where SBP and DBP were positively correlated but statistically not significant, they found only difference in DBP only as statistically significant. Violet Kankane Moselakgomo 13 evaluated the association between smoking and cardiovascular parameters in South African population and reported higher SBP, DBP and MAP for smokers as compared to non-smokers. Similar results were found in our study where higher mean SBP, DBP and MAP were observed in smokers. Our study findings of higher PEFR amongst non smokers and young people was also in conformity with findings reported by Sunitha P and Satanarayana N14 as they also showed a statistically significant positive correlation with PEFR through multiple linear regression analysis. A quarter of smokers develops chronic obstructive pulmonary disease and is the fourth commonest cause of death worldwide. COPD is characterized by airflow limitation that is not fully reversible. Air flow limitation may be due to inflammation or due to increase in the thickness of the wall.

CONCLUSION AND SUMMARY-

In our present study, the correlation was positive and not significant p>0.05, for systolic BP, diastolic BP, Mean arterial pressure, RR interval and QRS duration.

In our present study, the correlation coefficient was negative and significant p<0.05 among the smokers between age and peak expiratory flow rate. It was clear from the present study that pulmonary function tests like PEFR are deranged in the smokers than the non-smokers. In our present study, the correlation coefficient was negative and significant p<0.05 among the smokers between age and peak expiratory flow rate. It was clear from the present study that Pulmonary function tests like PEFR are deranged in the smokers than the non-smokers. Given this trend, it is important to undertake prevention and control programs to make young people aware of harmful effects of smoking, particularly initiating smoking at an early age. The usefulness of maintaining healthy BMI and to undertake measures to reduce weight by adopting regular exercise, avoiding sedentary lifestyle and avoiding smoking cannot be over emphasized. Special programs at school and college level need to be started so as to encourage young people to avoid healthy lifestyle and curb smoking and other harmful habits.

REFERENCES-

- Ockene IS, Miller NH. Cigarette Smoking, CVS disease and Stroke. A Statement for healthcare professionals from the American Heart Association. Circulation. 1997; 96(9):3243-47.
- TRAVELL, J., KARP, D., AND RINZLER, S. H.: Nicotine effects on normal and atherosclerotie rabbit hearts (abstr.). Fed. Proe.1957;16:341
- 3) Yashima M, Ohara T, Cao JM, Kim YH, Fishbein MC, Mandel WJ, et al. Nicotine increases ventricular vulnerability to fibrillation in hearts with healed myocardial infarction. Am. J Physiol Heart Circ Physiol. 2000 Jun; 278(6): H2124-33
- K M Padmavathi. Comparative study of pulmonary function variables in relation to type of smoking. Indian J Physiol Pharmacol. 2008; 52 (2): 193–96
- Tuomilehto J, Elo J, Nissmen A. Smoking among patients with malignant hypertension. BMJ. 1982;1:1086
 COHN, A.: Cardiovascular System and Blood. In COWDRY, E. V., ed.: Problems of
- COHN, A.: Cardiovascular System and Blood. In COWDRY, E. V., ed.: Problems of Ageing. Baltimore, Williams & Wilkins, 1939. 38: 133
 GRANT, R. P., AND ESTES, E. H., IR.: Spatial Vector Electrocardiography. Philadelphia,
- Blakiston, 1951. 38: 149.
- SCHLOMKA, G.: Das Verhalten des Ekg-Typs bei der Fettleibigkeit und bei der Schwangerschaft. Ztschr.ges. Inn. Med. 1948, 38:675.
- Ueber die Beziehungen zwischen Muskelmassenverhaltnis der Herzkammern und Ekg Typ. Deutsches Arch. klin. Med. 1948; 193:555.
- SOKOLOW, M., AND FRIEDLANDER, R. D.: The normal unipolar precordial and limb electrocardiogram. Am. Heart J., 1949;38:665
- Gillman m, Cook N, Rosner B. Prediction of PEFR values(Abstract). Am J Epidemiol 1999; 134:730
- 12) Ravisankar P, Madanmohan, Udupa K, Prakash ES: Correlation between Age, group 18-55 years, Indian Journal of Physiology Pharmacology, Oct-Dec; 49(4):455-461, 2005
- 13) Violet Kankane Moselakgomo, Abel Lamina Toriola, Brandon Stuwart Shaw, Daniel ter Goon, Oluwadare Akinyemi: Body Mass Index, Blood Pressure and PEFR among young adults in Limpopo province, South Africa: Rev Paul Pediatr 2012; 30(4): 562-9.
- Sunita P, Satyanarayan N: Corelation of Anthropometric parametrs on blood pressure in normotensive males: IOSR Journal of Pharmacy Vol. 2, Issue 3, May-June, 2012, PP. 593-598.