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ORIGINAL RESEARCH ARTICLE

PEAK EXPIRATORY FLOW RATE AMONG SMOKERS AND NON-SMOKERS WORKING IN KATHMANDU MEDICAL COLLEGE

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ABSTRACT

Background: Cigarette smoking has remained a popular habit since ages. Most people are well aware of the deleterious effects of cigarette smoking yet continue to give a blind eye which deteriorates overall public health. The purpose of the present study was to assess Peak Expiratory Flow Rate among smoking and nonsmoking staffs who work in Kathmandu Medical College.

Methods: In this comparative cross-sectional study Peak Expiratory Flow Rate was obtained using Mini Wright's Peak Flow Meter of 108 smokers and 108 nonsmokers in the age group ranging from 25-45 years. Those who never smoked or who have quit smoking for the past 2 years were grouped as nonsmokers and the smokers with history of smoking at least five or more cigarettes per day for at least two years were included in the study for measuring their Peak Expiratory Flow Rate. Data was collected, compiled and analyzed by using Statistical Package of Social Science (SPSS) software version16. Student 't' test was used for group comparison.

Results: The Peak Expiratory Flow Rate value was significantly reduced in the smokers (p value< 0.05). Mean Peak Expiratory Flow Rate was reduced with increasing age of the smokers. However, no significant difference was observed in Peak Expiratory Flow Rate with increase in the number of cigarettes smoked (p value> 0.05).

Conclusions: In the study Peak Expiratory Flow Rate among smokers (367.13 ± 74.182) was lower than nonsmokers (471.39±60.842), which was statistically significant proving that cigarette smoking reduced peak expiratory flow rate.

INTRODUCTION

There are currently 1.1 billion smokers in the world today and 80% reside in low- and middle-income countries. By 2030, if current trends continue, smoking will kill ten million people annually.[1] Tobacco smoking is a major leading cause of death and essential public health challenge worldwide.[2] Smoking is the main causative factor of diseases such as chronic obstructive pulmonary disease, heart attack, cancer.[3] COPD is recognized as the leading cause of death in countries with varied economic developments all over the world.[4]

According to smoking behavior survey 2000, 72% of all households in Nepal have at least one smoker -74% of rural households and 56% of urban households.[5] Tobacco smoke contains between 2000 to 4000 agents that may exert toxic effects at different levels within the respiratory system, at varying levels down the bronchial tree. Tobacco smoke exerts a wide spectrum of biological effects on lung and cells of the lung airways, including DNA damage, bronchoconstriction associated with increased thromboxane level, development of emphysema and COPD. [5]

A variety of noninvasive lung function tests are performed to assess lung volume, capacity, rate of flow and gas exchange.[6] A simple but important test to measure how quickly air can be forced out an accepted index of pulmonary function and is widely used in respiratory medicine.[7] The present study was done to compare PEFR among smokers and nonsmokers.

METHODS

A cross-sectional study was conducted from February 2019 to July 2019 at Kathmandu Medical College, Kathmandu. The research proposal was approved by Institutional review committee of Kathmandu Medical College and Teaching Hospital. (Ref: 2311201811)
Sample size was calculated using the formula n=4pq/E2 where,

n= number of samples; p= 84% [8]

q= (1-p%) = 1-84% and E (allowable error) = 5%

n=4pq/E2= 4*.0084*.0016/ .0025=215.04

The subjects were informed that their participation was entirely voluntary. The procedure and purpose of the study were explained to them and written consent was taken. Pre-designed

structured questionnaire was used for data collection. Questions related to education, age at which the smokers started smoking, number of cigarettes per day, total duration of smoking in years were noted. Height in centimeters and weight in kilograms were recorded among 216 staffs of Kathmandu Medical College aged between 25-45 years. 108 smokers who had been smoking at least 5 cigarettes per day for more than 2 years were selected and 108 age matched non-smokers were taken as controls. Individuals with acute illness and those who were under medication for respiratory/cardiac diseases were excluded from the study.

Wright's peak expiratory flow meter was used for measuring ventilatory function. It is a small portable device with a mouth piece and a calibrated scale in liters per minute. Before the procedure proper instructions were given to the subjects for using Wright's peak expiratory flow meter. Nose clip was placed on each subject but if they found nose clip to be uncomfortable they were asked to tightly pinch their nostrils with their other hand and then they were asked to maximally inspire and blow out as fast as they can into the mouthpiece of flow meter. The procedure was repeated three times and the best of three readings was recorded as the PEFR. Data was collected, compiled and analyzed by using Statistical Package of Social Science (SPSS) software version 16. The results were obtained as mean ± SD. Students t test was used for group comparisons. p-value of < 0.05 was considered to be statistically significant.

RESULTS

Total 216 subjects took part in this study (108 smokers and 108 nonsmokers). The mean PEFR value was less in smokers PEFR mean ± SD367.13 ± 74.182 liters/min compared to PEFR 471.39±60.84 of nonsmokers which was statistically significant (Table 1).

Table 1: Comparison of PEFR among smokers and nonsmokers

Subjects	Number of subjects	PEFR Mean ±SD (liters/min)	p-value
Smokers	108	367.13 ± 74.182	p<0.05
Nonsmokers	108	471.39±60.842	

In addition, the mean PEFR value of both groups decreased with increasing age. There was statistically significant higher PEFR value among lower age group smokers (Table 2).

Table 2: Comparison of mean ± SD PEFR among smokers and nonsmokers according to age group

Age Group	Number of subjects	PEFR Mean ±SD	p-value
25-35	103	431.26±82.37	p<0.05
36-45	113	408.32±87.18	

However the study showed that mean PEFR value did not significantly decrease with increased number of cigarettes smoked/day. The smokers who smoked less than 10 cigarettes/day PEFR was found to be 373± 72.91 litres/min compared to those smoking > 10 cigarettes/day which was 340 ±82.82. The p-value obtained was >0.05 (Table 3).

Table 3: Comparison of mean ±SD PEFR among smokers in relation to number of cigarettes/day

Number of cigarettes/day	Number of Smokers	PEFR Mean±SD	p-value
1-10	87	373.68±72.91	p>0.05
>10	21	340±82.82	

DISCUSSION

Cigarette smoking is a popular break during work amongst many working people. It is also consumed as a stress buster but the hazards brought by a minute or two of puffing the cigarette stick cannot be ignored. The deleterious effects of smoking on respiratory tract is a well-known fact. The present study was done to further correlate effects of cigarette smoking on PEFR.

PEFR value was lower among smokers compared to the non-smokers. The difference was statistically significant. This result was in accordance with the previous studies done by Sangeetha et al[9] and Satyanarayana et al[10]. In lower age group subjects (25 -35 years) the PEFR value was recorded to be higher than the older age group subjects. The result obtained from this study was similar to the study done by Satyanarayana et al.[10]

The PEFR reduction in smokers may be due to the wide spectrum of biological effects on lung and cells of the lung airways, including DNA damage, bronchoconstriction associated with increased thromboxane level, development of emphysema and COPD.[3]

The PEFR of smokers was not significantly changed with increase in the number of cigarettes which was similar to the study done by Sangeetha et al.[9]It may be due to small number of subjects who smoked more than 10 cigarettes (only 21 subjects) amongst the 108 smokers who had participated in the study.

People working in medical college even though they are well aware of the hazards of smoking are habituated with this unhealthy habit. Alternative to smoking such as chewing gums, taking tea/coffee breaks rather than cigarette breaks should be encouraged, nicotine patch, if need be should be easily available to those who want to quit. Cigarette packets with pictures of diseased lungs is a great initiative by the government. In addition to this tax payment for cigarette factories should be increased so that consumers rethink on buying expensive cigarette packets and these eventually become less accessible by all. Quitting any habit is not an easy task, the willpower to give up on such hideous and addictive habit of smoking should be encouraged by family and friends as well. The limitations of the study are that the research was only limited to Kathmandu Medical College and thus cannot be generalized. The result

would be more accurate if a larger group of study from various sectors was done.

CONCLUSION

In conclusion this study showed smokers have significant reduction in PEFR than the nonsmokers. Detection of any airflow obstruction and eventual smoking cessation can significantly improve health of the smokers. They should not just be educated but they should be alarmed about their fatal habit.

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CONFLICT OF INTEREST: None

FINANCIAL DISCLOSURE: None

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