FREQUENCY OF OBSTRUCTIVE PATTERN ON SPIROMETRY IN ASYMPTOMATIC CHRONIC SMOKERS.

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ABSTRACT… Objectives: To know the frequency of obstructive pattern on spirometry in asymptomatic chronic smokers. **Study Design:** Cross-sectional study. **Settings:** Department of Pulmonology, Sahiwal Medical College Sahiwal. **Period:** 1st Nov, 2019 to 1st May 2020. **Materials & Methods:** A total of 205 chronic smokers aged 30-60 years were included. Patients with history of Ischemic heart disease, previously diagnosed cases of COPD and asthma were excluded. Spirometry was done by using portable spirometer by consultant pulmonologist (at least 2 years of post-fellowship experience) and obstructive pattern (COPD) was noted. **Results:** Majority males with ages between 41 to 50 years(mean age 47.78 ± 4.90 years) out of the 205 patients, 137 (66.83%) were male and 68 (33.17%) were females with male to female ratio of 2:1. Mean duration of smoking was 8.81 ± 4.67 years. Mean height was 161.81 ± 9.23 cm. Mean weight was 78.81 ± 5.67 kg. Mean BMI was 26.21 ± 5.39 kg/m2. In this study, frequency of obstructive COPD on spirometry in asymptomatic chronic smokers was found in 29 (14.15%) patients. **Conclusion:** This study established that frequency of obstructive pattern on spirometry in asymptomatic chronic smokers is high.

Key words: Chronic Smoker, Obstructive COPD, Spirometry.

INTRODUCTION

COPD is a severe illness which is described by a steady decrease in respiratory capacity and wellbeing status.[1] Typically patients have side effects of incessant bronchitis and emphysema. The principle manifestations incorporate windedness, cough, and sputum production.[2] Patients with COPD are inclined to worsening, which represent critical dreariness and mortality and are a key determinant of wellbeing related personal satisfaction.[3] Globally, starting at 2010, COPD influenced around 329 million individuals (4.8% of the populace) and is somewhat more typical in men than women.[4,5] Chronic obstructive lung disease is a main and developing reason for dismalness and mortality worldwide[6], representing a gigantic monetary and social weight. Notwithstanding the distribution of rules on COPD avoidance and management[6-8] the weight of the illness is expanding as the total populace ages. In 2001 COPD was the fifth essential driver of death on the planet, and it is anticipated to

be third by 2020.[9] Cigarette smoking is the most asserted hazard factor and stays an across the board habit.[10]

Smoking has unfavourable wellbeing consequences for the whole lung, influencing each part of lung structure and capacity which incorporates disabling lung barriers against contamination and causing the continued lung injury that prompts interminable obstructive aspiratory sickness. Spirometry is generally suggested as a screening technique for every single indicative individual, explicitly in subjects with a long - term hazard exposure.[11] A former study showed COPD prevalence of 21.5% in asymptomatic smokers.[12] A similar study in CMH Rawalpindi Pakistan showed COPD prevalence of 8.5% in asymptomatic smokers.[13] In another study on six hundred and thirty-seven smokers without symptoms, the prevalence of COPD was found 7%.[14] Spirometric indices will be very helpful in detecting obstructive lung diseases at early

stages which will help health care professionals to initiate treatment at early stage and improve the outcome. Spirometry-based characterization of airflow confinement and sickness seriousness as indicated by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) models is picking up acknowledgment and is being utilized in epidemiological examinations since it gives target estimation of lung work.[6]

So, this research was conducted to determine the frequency of obstructive pattern on spirometry in asymptomatic chronic smokers in local population. On the basis of the results of study, early preventive as well as therapeutic measures can be taken in this particular population. Moreover, on the basis of this empirical evidence, our people can be encouraged to give up smoking as well. The chronic smokers were defined as the individuals with the history of at least 1 pack year history of smoking. Furthermore, a pack-year is characterized as: the number of cigarettes smoked every day separated by 20 and increased by the number of years that the member smoked. Obstructive lung design (COPD) was arranged dependent on spirometry as it is known as the Gold spirometry rules for COPD6, we characterized an obstructive example as a post-bronchodilator FEV1/FVC < 70%.

For this study purpose the socioeconomic status was taken as follows:
1. Poor are those with family income less than 12000/-- having family income extending from Rs. 12001 to 35000 rupees.
2. Rich were those with family earnings further than Rs. 35000.

MATERIAL & METHODS
Descriptive, cross-sectional study was piloted at department of Pulmonology, Sahiwal Medical College Sahiwal from 1st Nov, 2019 to 1st May 2020.
Sample size was calculated by the formula.
$n = Z^2 P (1-P) / d^2$
Z= Standard normal variate whose value is 1.96
P= 7.0% which is the prevalence of obstructive pattern (COPD) in asymptomatic chronic smokers[14].

d= 3.5% which is absolute error or precision
n = 205.

Non-probability, consecutive sampling technique was used.

A. Inclusion Criteria
• Chronic smokers 1 pack year or more
• Ex-Smokers who quit smoking less than 6 months ago
• Age 30-60
• Both genders.

B. Exclusion Criteria
• History of ischemic heart disease.
• Previously diagnosed cases of COPD and Asthma.
• Patients already on bronchodilators.
• Contraindications to spirometry.

Total 205 asymptomatic smokers were chosen from medical clinic staff, patients and sound volunteers. Informed consent was gotten from every member and endorsement of ethical review board was acquired. Spirometry was performed by using portable spirometer by consultant pulmonologist (at least 2 years of post-fellowship experience) and obstructive pattern (COPD) was noted as per -operational definition. All this data including the demographic data was noted on proforma (annex I).

Data was analysed through SPSS-20. We expressed quantitative variables as mean and SD, and categorical variables such as gende, education status (illiterate/primary/middle/matric/graduate) as frequency and percentages.

Effect modifiers like age, gender, duration of smoking, BMI, place of living, socioeconomic status and education status were stratified. Post-stratification chi square was applied to see the effect of these on COPD and p-value ≤ 0.05 was taken as significant.

RESULTS
Age limit in this research was from 30 to 60 years with mean of 47.78 ± 4.90 years. Bulk 86 (41.95%) were between 41 to 50 years (Table-I).

Out of the 205 patients, 137 (66.83%) were male and 68 (33.17%) were females (Figure-I). Mean period of symptoms was 8.81 ± 4.67 years as shown in Table-II. Mean height was 161.81 ± 9.23 cm. Mean weight was 78.81 ± 5.67 kg. Mean BMI was 26.21 ± 5.39 kg/m2 (Figure-II). As far as socioeconomic status of the patients is concerned, place of living and education level is shown in Table-III, IV & V respectively.

In this study, frequency of obstructive pattern on spirometry in asymptomatic chronic smokers was found in 29 (14.15%) patients as shown in Table-III.

Prevalence of obstructive pattern by means of age and gender are shown in Table-VI & VII respectively. Table-VIII & IX have shown the Prevalence of obstructive pattern with duration of disease and BMI respectively. Prevalence of obstructive pattern with respect to place of living was established to be statistically significant (P=0.029) (Table-X). Similarly prevalence of obstructive pattern in relation to socioeconomic status was also set up to be highly significant (P=0.001) (Table-XI). Education level in relation to obstructive pattern was statistically significant too (P=0.021) (Table-XII).

Age (in years)	No. of Patients	%age
30-40	39	19.02
41-50	86	41.95
51-60	80	39.02
Total	162	100.0

Table-I. Age frequency of patients (n=205).

Mean ± SD = 47.78 ± 4.90 years

Duration of Smoking	No. of Patients	%age
≤5 years	71	34.63
>5 years	134	65.37
Mean ± SD	8.81 ± 4.67 years	

Table-II. Frequency of patients according to duration of smoking (n=205).

Socioeconomic Status	No. of Patients	%age
Poor	89	43.41
Middle	58	28.29
Upper	58	28.29

Table-III. Distribution of patients according to socioeconomic status (n=205).

Place of Living	No. of Patients	%age
Rural	129	62.93
Urban	76	37.07

Table-IV. Distribution of patients according to place of living (n=205).

Education status	No. of Patients	%age
Illiterate	24	11.71
Primary	29	14.15
Middle	45	21.95
Matric	51	24.88
Graduate	56	27.32

Table-V. Distribution of patients according to educations status (n=205).

	Obstructive COPD		P-Value
Age (years)	Yes	No	
30-40	03 (7.69%)	36 (92.31%)	
41-50	12 (13.95%)	74 (86.05%)	0.353
51-60	14 (17.50%)	66 (82.50%)	

Table-VI. Prevalence of obstructive COPD according to age groups.

	Obstructive COPD		P-Value
Gender	Yes	No	
Male	22 (16.06%)	115 (83.94%)	0.265
Female	07 (10.29%)	61 (89.71%)	

Table-VII. Prevalence of obstructive COPD according to gender.

Duration of Disease	Obstructive COPD		P-Value
(years)	Yes	No	
≤5 years	06 (8.45%)	65 (91.55%)	0.089
>5 years	23 (17.16%)	111 (82.84%)	

Table-VIII. Prevalence of obstructive COPD with respect to duration of smoking.

	Obstructive COPD		P-Value
BMI (kg/m²)	Yes	No	
≤27	17 (11.49%)	131 (88.51%)	0.078
>27	12 (21.05%)	45 (78.95%)	

Table-IX. Prevalence of obstructive COPD with respect to BMI.

| Place of living | Obstructive COPD | | P-Value |
	Yes	No	
Rural	13 (10.08%)	116 (89.92%)	0.029
Urban	16 (21.05%)	60 (78.95%)	

Table-X. Prevalence of obstructive COPD with respect to place of living.

| Socioeconomic status | Obstructive COPD | | P-Value |
	Yes	No	
Poor	21 (23.60%)	68 (76.40%)	
Middle	07 (12.07%)	51 (87.93%)	0.001
Upper	01 (1.72%)	57 (98.28%)	

Table-XI. Prevalence of obstructive COPD with respect to socioeconomic status.

| Education Status | Obstructive COPD | | P-Value |
	Yes	No	
Illiterate	08 (33.33%)	16 (66.67%)	
Primary	05 (17.24%)	24 (82.76%)	
Middle	05 (11.11%)	40 (88.89%)	0.021
Matric	08 (15.69%)	43 (84.31%)	
Graduate	03 (5.36%)	53 (94.64%)	

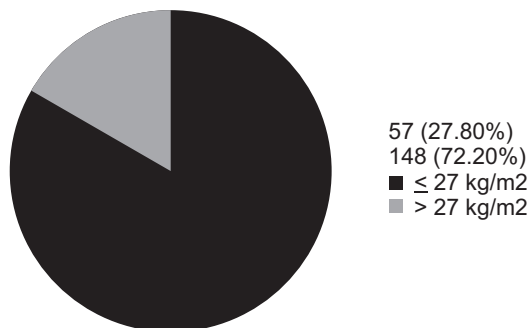**Table-XII. Prevalence of obstructive COPD with respect to education status.**

Pie Charts

57 (27.80%)
148 (72.20%)
■ $\leq$ 27 kg/m2
■ > 27 kg/m2

Figure-1. Gender frequency distribution (n=205).

57 (27.80%)
148 (72.20%)
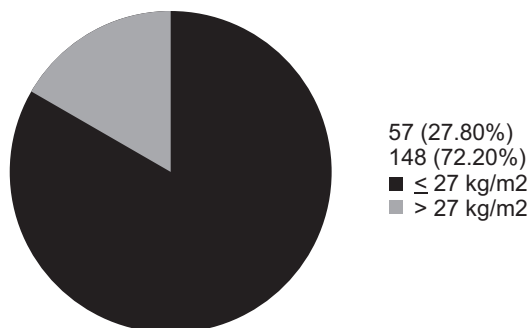■ $\leq$ 27 kg/m2
■ > 27 kg/m2

Figure-2. BMI frequency distribution (n=205).

Mean ± SD = 26.21 ± 5.39 kg/m^2

DISCUSSION

The ultimate proof which can be standardized in case of COPD is lacking in numerous previous researches. Important information from screening concentrates with the aim to apply spirometry to all smokers without considering the nearness of side effects is scant. Zielinski et al[15] worked on more than 100,000 smokers, out of which the predominant cases of COPD were 20.03%. Out of these, 64% of subjects had indications of cough mostly. Afterwards, a screening study showed that, amongst 13.3% of smokers who had COPD, 56% had symptoms.[16] These two researches demonstrate various smokers without side effects (WOS) having COPD. This information is significant in expanding the COPD sub diagnosis.[17]

Mean age of 47.78 ± 4.90 years was calculated between 30 to 60 age group ranges. Majority (86-41.95%) belong to 41 to 50 years of age. Among 205 patients, majority (137-66.83%) were males and rest (68-33.17%) were females. Frequency of obstructive pattern on spirometry was found in 29 (14.15%) patients in asymptomatic chronic smokers. A former study showed COPD incidence of 21.5% in asymptomatic smokers.[12] Another study in CMH Rawalpindi Pakistan demonstrated COPD prevalence of 8.5%.[13]

Another study[21] showed that if smokers are treated with bronchodilators, advances are perceived in air route function and lung volume. It was found in a former research that out of nearly 1300 smokers with COPD, 14.3% had no symptoms. Similar to this, data from another earlier study[22] showed that the lack of respiratory symptoms enhanced the possibility of undiagnosed COPD. Consequently, our results demonstrated that the increased level of FEV1 anticipated COPD in asymptomatic smokers.[23]

A previous study shows the association between smoking habits and lung function changes.[13] Thus, this study concluded that cigarette smoking is undoubtedly associated with a decrease in pulmonary function.[24] This research promotes

the premature practice of PFTs in asymptomatic smokers.

On the off chance that smoking causes recognizable changes in little respiration route bore at such an younger age, it will likewise cause intense variations in little respiration routes. It is recommended that more than 14% of overwhelming smokers create respiration route impediment because of variations from the norm in respiration routes with under 2mm inside measurement. Respiration route check is related with a constant provocative procedure in the bronchioles, as appeared by past examinations. Respiration route choking in COPD and decrease in PFTs are believed to be permanent.[20]

An examination on nearly 6000 subjects was done to inspect the impact of smoking on FEV1 with spirometry. Subjects were observed with a background marked by smoking for a long time persistently, 38% of smokers had a FEV1 under 60% of the anticipated ordinary worth contrasted and 10% of supported weaklings. These discoveries fortify our perspective on the advantages of leading PFTs prompt.

Clennell S et al, in 2008 led a partner concentrate on 3286 subjects, to examine the lung work in non-smokers, smokers and previous smokers. The examination presumed that the pace of lung work decrease of the smokers was quicker than others. The examination established no critical distinction in pace of decrease in lung work in previous smokers once contrasted with the individuals who had never smoked.[25]

An on-going report directed to discover a distinction in PFT values. It demonstrated a decline in lung function proportion with an expansion in the quantity of long stretches of smoking. At each age gathering, smokers bunch had decreased PFTs.

Nighute N et al[26] inferred that a huge decrease was observed in the mean qualities of lung functions in smokers. Another study in 2014 demonstrated that smokers utilizing spirometry help distinguish few patients with respiration route block who are at high hazard for COPD.

In an on-going report, the general weight of COPD is probably going to diminish by early identification of COPD utilizing spirometry with smoking record of more than 200.

CONCLUSION
It was concluded that there is increased frequency of obstructive COPD on spirometry in asymptomatic chronic smokers. Hence we recommend that there should be some education programs with efforts both from personal and national levels to avoid smoking and also early preventive measures can be taken in this particular population.
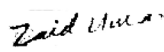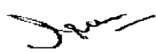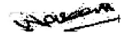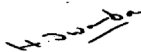**Copyright© 15 Sep, 2020.**

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2	Irum Hayat	Write-up of the article.	
3	Muhammad Waseem	Supervision and revising it critically for important intellectual content.	
4	Nauman Aziz	Final approval of the version to be published.	
5	Hafiza Swaiba Afzal	Help in biostatics and data analysis.	
6	Zahid Kamal	Analysis and interpretation	