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An Observational Study in Western Rajasthan to Assess the Correlation between Copd Severity and Age

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ABSTRACT: This research study was carried out in Department of Physiology in association with Department of Medicine on 150 chronically stable COPD patients to evaluate the relationship between age and severity of COPD. We perform Pulmonary function test from computerized Spirometer for diagnosis of grades or severity of COPD (as per the guidelines of GOLD).We observed statically significant (Pearson chi square 13.680 ,df 6, p value 0.033 (S)) difference between different groups of age and with different grades of COPD severity.The Spearman's correlation shows statically significant correlation among age and COPD grading.(p value>0.05)

KEYWORDS: Chronic obstructive pulmonary disease(COPD),Pulmonary function test(PFT), Global Initiative for chronic obstructive lung disease (GOLD).

I. INTRODUCTION

According to the **World Health Organisation [WHO]** Chronic Obstructive Pulmonary Disease (COPD) is describedas"a lung disease characterised by chronic blockage of lung air flow that interfere with ordinary respiratory and isn't absolutely reversible (WHO, 2015)." [1]

Report of the World Health Organization states, that the incidence of COPD in Indian people ranges between 4% and 20%. After pulmonary Tuberculosis, the second most prevalent lung condition in our nation "India" is chronic obstructive pulmonary disease. Earlier, COPD occurs more in males but nowadays, disease affects both gender equally.[2,3]

COPD is more common in older persons, although it may also strike people in their forties and fifties. Younger folks are less likely to have it.Acceleration of the natural ageing process is thought to have a role in the aetiology of non-communicable illnesses such as chronic obstructive pulmonary disease (COPD). [4]

As a result of anatomical and physiological alterations to lungs, lung function diminishes with advancing age .[5]

There are just a few studies that have looked at the effects of ageing on COPD patients. There are also few studies on the subject of Indian foundations in this sector. In recent years, no such work or publication has been produced. As a result, the purpose of this study is to determine the relationship between COPD severity and age.

II. MATERIAL AND METHODS

This observational study included 150 patients with chronic obstructive pulmonary disease (COPD) ,in western Rajasthan, in collaboration with the Department of Medicine at Dr. S.N. Medical College, regardless of smoking status, who had spirometer validated COPD Gold group I-IV [3].

Methods of diagnosing COPD:-

Nowadays physicians are using, the GOLD [3] criteria to diagnose grades or severity of COPD. As per the guidelines of GOLD (**Global Initiative for chronic obstructive lung disease**), theForced Expiratory Volume in 1 Second (FEV1) will be used to assess the severity of COPD. The percentage value of $FEV_1 \geq 80\%$ (predicted) related to mild COPD, $FEV_{1\%}$ within range of 50–79% has been categorized as moderate COPD, $FEV_{1\%}$ value 30–49% categorized as severe COPD &FEV_1 of ≤ 29 % corresponds to very severe COPD, respectively

Pulmonary function tests were assessed using computerized Spiro excel Pc/ laptop based Spirometer. [6,7]

SPSS statistical software was used to analyse the results. The chi-square test was used to determine

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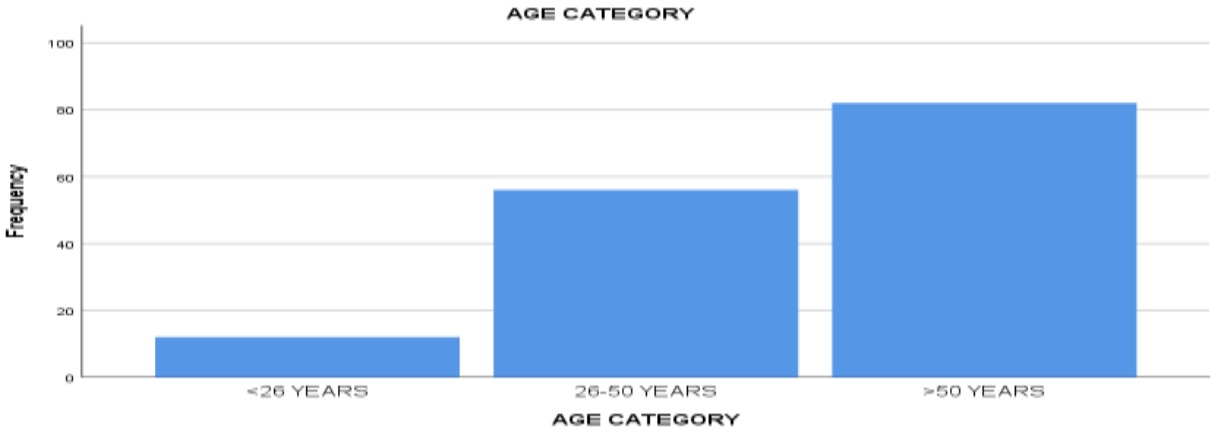
the significant difference in mean. Statistically significant difference was defined as a p-value of less than 0.05. When appropriate, the Spearman's Coefficient and Pearson's Coefficient were computed to explore the degree of link between the variables investigated in this **study.**

III. RESULTS AND OBSERVATION

Table 1: Count of COPD patients in different age groups.

AGE (YRS)	NO. OF COPD PATIENTS	PERCENTAGE
≤25	12	8.0
26-50	56	37.3
>50	82	54.7
Total	150	100.00

Graph 2:Count (frequency) of COPD patients in different age groups.



COPD GRADINGS		AGE CATEGORY			Total
		<26 YEARS	26-50 YEARS	>50 YEARS	
MILD COPD	Count	1	5	5	11
	% within COPD SEVERITY	9.10%	45.50%	45.50%	100.00 %
MODERATE COPD	Count	4	28	21	53
	% within COPD SEVERITY	7.50%	52.80%	39.60%	100.00 %
SEVERE COPD	Count	6	13	28	47
	% within COPD SEVERITY	12.80%	27.70%	59.60%	100.00 %
VERY SEVERE COPD	Count	1	10	28	39
	% within COPD SEVERITY	2.60%	25.60%	71.80%	100.00 %
Total	Count	12	56	82	150
	% within COPD SEVERITY	8.00%	37.30%	54.70%	100.00 %

Table 2: Comparison of COPD Grading with Age

Pearson chi square 13.680[a] **,df 6, p value 0.033 (S)**

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Graph 2: Comparison of COPD grading with Age Category

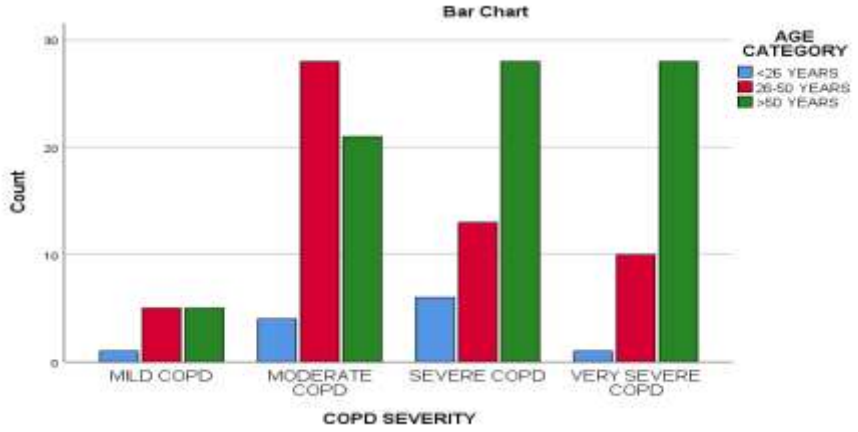

TABLE 3: Pearson's Correlation between Age with other pulmonary function test parameters.

Variables	Age (years)	
	r value	p value
FEV1% (% of Forced expiratory volume in one second)	-0.126	0.126(NS)
FEV1(Forced expiratory volume in one second)	-.392**	0.000(HS)
FVC(Forced vital capacity)	-.402**	0.000(HS)
FEV1/FVC Ratio	-0.058	0.478(NS)
flow PEF (Peak expiratory rate)	-.332**	0.000(HS)
FEF25-75%(Forced expiratory flow at 25-75%)	-.349**	0.000(HS)

TABLE 4: Spearman's Correlation between COPD gradings with other variables.

Variables	Age(years)	
	r value	p value
COPD grading	.236	.004(S)

IV. DISCUSSION

In our research study mainly elderly COPD patients were enrolled. All anthropometric data were collected. Mean **age of patients** was 50.79 ± 16.08 years. Some previous studies were also in line with our finding and they observed that the most of COPD patients belongs to age above 50 years with an average of 55.48 ± 10.32 year age. The lung functions deteriorate in healthy old individuals but condition will be more impaired in old COPD patients. [8]

In our study out of total 150 COPD subjects 8% patients were included in age ≤25 years,37.30% patients falls in age of 26-50 years and 54.7% subjects were having age group of >51years. (Table no. 2).

In age group of age ≤25 years 9.10% cases were Mild, 7.50 % cases were Moderate,12.80% cases were Severe and 2.60% cases were Very Severe cases of COPD.In age group of age 26-50 years 45.50% cases were Mild, 52.80 % cases were Moderate,27.70% cases were Severe and 25.60 % cases were Very Severe cases of COPD. In age group of age >50 years 45.50% cases were Mild ,39.60 % cases were Moderate,59.60% cases were Severe and 71.80 % cases were Very Severe cases of COPD .So from our study we observed that most of the elderly (age group>50 years) patients are having very severe stage of COPD disease.

We observed statistically significant difference between different groups of age and

different grades of COPD severity (**P value 0.033 (S)).**

In our study most of pulmonary function test parameters decreases with increase in age.

Table no.3, validated Pearson's correlation among age and pulmonary characteristic parameters. Result from table suggests that there may be statistically highly significant negative correlation among age and FEV1(Forced expiratory volume in one second), FVC(Forced vital capacity) and FEV1/FVC,PEF (Peak expiratory rate),FEF 25-75%(Forced expiratory flow at 25-75%) with p value <0.0001and statistically non-significant (p value >0.005) positive Pearson's correlation was observed among age and COPD grading & FEV1%,FEV1/FVC.

Also table no. 4 shows statically significant Spearman's correlation between age and COPD grading.(p value>0.05)

From a previous study by Eun-Jung Kimet.al[9] results of data was similar with our study, they observed that with advancement in age , COPD severity progresses. Also in a study, Laxmi Narayan et.al[10], observed that age was not associated with stages of COPD. Results of current study were not identical with study by Mohammad A. Zamzamet.al[11] they observed no large discrepancy amongst COPD stages and age (P > 0.05). Fletcher and Petoet. al[12] also observed advance rate of reduction in FEV1 with ageing. Muscle strength deteriorates with age in general. The diaphragm, the most essential respiration muscle, reflects this reduction in muscular strength, and so changes breathing rhythm [13].

The rise in the size of the alveolar gap without any inflammation or alveolar wall breakdown, referred to as "senile emphysema," is primarily responsible for the alterations in lung structure. In non-smokers, this microscopic emphysema grows linearly with age, whereas in smokers, a more gradual rise in alveolar gap size may only be seen in select (sensitive) people [14,15]. Senile emphysema might be caused by the loss of the lung parenchyma's supporting structure [16]. Furthermore, it has been discovered that as one gets older, the lung's elastic recoil decreases. This phenomenon is thought to be produced more by lower surface tension from the alveoli due to increased individual average diameter than by changes in surface tension forces from the alveoli.

So these structural alterations with ageing in lungs, will alter several lung function and physiological parameters.

V. CONCLUSION

So result from above mention table concluded that with increase in age, sleep quality, anxiety severity, worsening of quality of life and depression severity increases and sleep quality decrease**.**

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