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Original Research Article

Prevalence of risk for chronic obstructive pulmonary disease amongst carpenters using lung function questionnaire

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ABSTRACT

Background: An obstructive ventilatory pattern is a hallmark of chronic obstructive pulmonary disease (COPD), a slow-progressing respiratory condition that is frequently linked to cigarette use and can result in chronic respiratory failure. A case-finding tool called the lung function questionnaire (LFQ) is being created to help doctors choose which patients should undergo spirometry testing to confirm the presence of chronic obstructive pulmonary disease (COPD).
Methods: Survey research study of 185 convenient sampling.
Results: The results were obtained using lung function questionnaire. Statistical analysis shows that there is prevalence of risk for COPD amongst the carpenters.
Conclusions: This study concludes that there is a risk of developing chronic obstructive pulmonary disease (COPD) in carpenters who are exposed to saw dust as more than half the samples have scored less than or equal to 18 which indicates the risk for COPD.

Keywords: Carpenters, Chronic obstructive pulmonary disease, Lung function questionnaire

INTRODUCTION

An obstruction in the ventilatory pattern is an early sign of the gradual, chronic respiratory condition referred to as chronic obstructive pulmonary disease (COPD). It often results in smoking and may lead to pervasive respiratory failure.[1] A rising body of evidence points to the complexity of chronic obstructive pulmonary disease (COPD), which may involve causes besides limited airflow. Gas exchange and cardiac function are significantly impacted by airflow obstruction, which has systemic effects. Additionally, because inflammation and/or abnormalities in repair mechanisms are hallmarks of COPD, the "spill-over" of inflammatory mediators into the circulation may cause significant systemic symptoms of the disease, such as cachexia and the wasting of skeletal muscle.[2]

Increased indoor air pollution is generating serious health issues in India, a growing nation, as a result of increased industrialization and a more affluent lifestyle. Chronic exposure to saw dust impairs lung function and triggers allergic reactions in the worker.[3] Cross-sectional studies utilizing cumulative exposure indices or years of employment have revealed a deterioration in lung function in the dry wood industry. In a study of joineries and sawmills, MANDRYK et al discovered that the effect of personal exposure was greatest among joinery workers and that woodworkers had lower lung function than controls.[4] Patients who continued to be exposed had a larger reduction in FEV1 compared to exposed employees without red cedar asthma, according to follow-up research involving 280 male workers with red cedar asthma.[5]

In order to determine which individuals should undergo spirometry testing to confirm the diagnosis of chronic obstructive pulmonary disease (COPD), the lung function questionnaire (LFQ) is being developed. The age, smoking, cough, dyspnoea, and wheeze items on the LFQ have a point value between 5 and 25. A cut point score of 18 or less is regarded as having a higher risk of developing chronic obstructive pulmonary disease (COPD).[6]

The objective of this study was to determine whether carpenters are at risk of developing chronic obstructive pulmonary disease (COPD).

METHODS

Study area

A observational study conducted in the Bangalore, Karnataka. Convenient sampling was used in this study. Total 185 patients were included in this study. The study was approved by the Institutional Ethics Committee.

Study period

Study was conducted from December 2022 to June 2023.

Inclusion criteria

Patients who willingness to participate, productive cough for 2 months and breathlessness in previously accustomed activity were included.

Exclusion criteria

History of interstitial lung disease due to wood dust exposure were excluded from this study.

Outcome measure

Lung Function Questionnaire (LFQ).

Statistical analysis

Data were analysed in Microsoft Excel.

RESULTS

A total of 185 subjects participated in the survey conducted using lung function questionnaire. Statistics were used to find out the frequency of response to the questionnaire.

Table 1 shows the distribution of samples on the basis of number of months they have exposed to saw dust out of which 01-100 months 29, 101-200 months 56, 201-300 months 54, 301-400 months 25, 401-500 months 18, 501-600 months 03.

Table 1: Number of months the participants exposed to saw dust.

Saw dust exposure (In months)	Number of participants
01-100	29
101-200	56
201-300	54
301-400	25
401-500	18
501-600	03
Total	185

Table 2 shows the distribution of samples on the basis of how often they cough up mucus in which 36 answered rarely, 101 answered sometimes, 40 answered often, 08 answered very often.

Table 2: Distribution of samples based on how often they cough up mucus.

How often do you cough up mucus?	Number of participants
Never	0
Rarely	36
Sometimes	101
Often	40
Very often	08
Total	185

Table 3 shows the distribution of samples on the basis of how often their chest sound noisy when they breathe in which 20 answered never, 81 answered rarely, 58 answered sometimes, 20 answered often, 06 answered very often.

Table 3: Distribution of samples based on how often their chest sound noisy when they breathe.

How often does your chest sound noisy when you breathe?	Number of participants
Never	20
Rarely	81
Sometimes	58
Often	20
Very often	06
Total	185

Table 4 shows the distribution of samples on the basis of how often they experience shortness of breath during their physical activity in which 19 answered never, 74 answered rarely, 59 answered sometimes, 28 answered often, 05 answered very often.

Table 5 shows the distribution of samples on the basis of number of years they have smoked in which 82 answered never, 49 answered 10 years or less, 34 answered 11-20

years, 14 answered 21-30 years, 06 answered more than 30 years.

Table 4: Distribution of samples based on how often they experience shortness of breath during physical activity.

How often do you experience shortness of breath during physical activity?	Number of participants
Never	19
Rarely	74
Sometimes	59
Often	28
Very often	05
Total	185

Table 5: Distribution of samples based on how many years they have smoked.

How many years have you smoked?	Number of participants
Never	82
10 years or less	49
11-20 years	34
21-30 years	14
more than 30 years	06
Total	185

Table 6 shows the distribution of samples on the basis of age as less than 40 years 101, 40-49 years 49, 50-59 years 25, 60-69 years 10.

Table 6: Distribution of samples based on their age.

What is your age?	Number of participants
Less than 40	101
40-49 years	49
50-59 years	25
60-69 years	10
70 years or older	0
Total	185

Table 7 shows the distribution of samples on the basis of their lung function questionnaire score in which 98 (52.9%) have a score between 5-18 and 87 (47.1%) have a score between 19-25.

Table 7: Distribution of samples based on their lung function questionnaire score.

Lung function questionnaire score	Number of participants	Percentage
5-18	98	52.9
19-25	87	47.1
Total	185	100

DISCUSSION

The aim of the study is to find out the prevalence of risk for chronic obstructive pulmonary disease (COPD) amongst carpenters. This study was conducted among 185 participants through survey using lung function questionnaire.

Since, more than half of the samples (52.9%) have a lung function questionnaire score between 5-18, the interference of data shows that there is prevalence of risk for COPD amongst most of the carpenters.

A study conducted by Bolund et al inferred that increased exposure to wood dust and smoking caused adverse pulmonary health effects. Smoking seems to be the most significant risk factor for COPD and accelerated lung function decline in the subjects, which also emphasizes the importance of smoking reduction and abstention.[7]

A study by Kargar-Shouroki et al states that changes in pulmonary function parameters and oxidative stress biomarkers can be attributed to exposure to wood dust. Antioxidant capacities may fluctuate due to many changes, such as inflammation, stress, diet, and genetics. The correlation between FVC and FEV1 with SOD and TAC supports the theory that oxidative stress was more likely a mechanism of impaired lung function.[8]

Also the study undertaken by Mintz et al states that the LFQ may be effective and appropriate in identifying patients who should undergo spirometry testing.[6]

The study does have some limitations to consider. Firstly, the accuracy of the tool's results may be affected by the extent to which study participants adhere to the questionnaire and provide truthful responses. Secondly, the population used for the study does not reflect the entire population and its important to acknowledge that LFQ tool like any diagnostic instrument may not provide 100% accuracy.

CONCLUSION

This study concludes that there is a risk of developing chronic obstructive pulmonary disease (COPD) in carpenters who are exposed to saw dust as more than half the samples have scored less than or equal to 18 which indicates the risk for COPD. Prolonged exposure to saw dust in addition with cigarette smoke results in increased risk for COPD while compared to saw dust exposure alone.

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