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Study On Prevalence Of Incidence Of Respiratory Disorders In Small Scale Textile Industrial Workers.

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ABSTRACT

The prospective observational study was to assess the prevalence on developing respiratory tract diseases in the textile industry workers in and around Komarapalayam, Tamil Nadu and to evaluate the air flow through the lungs using Spirometer. The study carried out for 6 months with 752 sample size. A standard questionnaire was designed to get the demographic details, working period and their difficulties faced during their working period within the age from 20 to 65years. Out of 752 workers, the majority were females (463) when compared with males (289). The more risk was assessed in males within 51-65years of age group (11.76%) and less risk within 20-35years (3.11%). In our study, it is found that males were more likely to develop chronic respiratory symptoms than in females because of their unhygienic mode of lifestyles and smoking. From 752 workers, 167 were affected with asthma, 230 with cough and 59 having the difficulty of wheezing. Age, gender, working department, smoking, work experience, and training were the factors included in the exposure on respiratory systems. Workers with long duration of working experience were more prone to develop respiratory diseases.

Keywords: Spirometer, Respiratory Tract Diseases, Pulmonary Function, Chronic Respiratory Symptom

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INTRODUCTION

The prevalence of respiratory tract diseases in textile industrial workers who had regularly exposed to cotton dust was found to be more than 4% of the adult population in India, and its prevalence is rising day by day. In 2005, more than 1.5 million emergency department visits and 500,000 hospitalizations were attributable to asthma in the United States. (Driscoll et al., 2005). In2008, hospitalizations alone accounted for approximately 48% of the estimated indirect costs for asthma in India available medical therapies can prevent or reduce the complications of asthma, including asthma-related emergency department visits and hospitalizations (Altin et al., 2002). The aim of the study is to analyze the prevalence and risk factors in developing respiratory tract diseases in small scale textile industrial workers due to long term exposure on cotton dust (Hamdy et al.,2013). Workers in the textile industry are in the risk of developing obstructive respiratory conditions due to the extended exposure to the cotton dust. In 2002, WHO published that the workers in the textile industry are in more risk of developing obstructive respiratory conditions due to the prolonged exposure to the inhaled dust particles (World Health Organisation, 1986).

Peak expiratory flow rate (PEFR) is the parameter used to measure that indicate the severity of the airflow obstruction and also in the management of bronchial asthma (Miller et al., 2003). Peak expiratory flow meters are inexpensive and convenient devices that allow reproducibly, the objective for the measurement of lung function. While current asthma guidelines recommend routine assessments of peak expiratory flow rate (PEFR) and symptoms for outpatient management of patients with asthma the ability of these measures to predict asthma exacerbations is unknown (Powell and Gibson, 2003). Thus, decreasing peak flow indicates more air trapping and diminished air exchange. Usually, peak flow values will drop before symptoms of wheezing and cough occur, making a peak flow meter a valuable tool to asthma management (Cartier and Malo, 1998).

The ginning, spinning and weaving process of textile industry caused a large amount of cotton dust. The dust consists of various size and type of particles, such as ground matter, cotton dust, bacteria, fungi, soil, non-cotton matter, and other contaminants which may leads to respiratory hazards such as cough, phlegm, wheezing, shortness of breath, chest tightness, chronic bronchitis, and asthma (McDonough et al.., 2011). The type and concentration of dust, duration of exposure and genetic factors are the major factors in the development of the diseases of the respiratory system caused by cotton dust (Tirthankar et al., 2014).

MATERIALS AND METHODS

The prospective observational study was carried out at the textile industry in Komarapalayam. The study was conducted within 6 months and the sample size was 752 participants. Questionnaire forms which carrying the question that asked the workers within the age group from 20years to 65years. And asking them the questions on their work history, respiratory symptoms, and smoking status. The working history of adults was assessed through questions on previous and current job and their working condition. Respiratory symptoms include cough, wheezing and asthma was gone to be enquired. The volume of air flow was assessed by using a Spirometer. Subjects who were already diagnosed with respiratory tract infections and who were not willing to participate were excluded. Workers in the spinning, weaving were selected for the study. All the information collected from the workers was treated as confidential. The spirometer was used to confirm their lung capacity.

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RESULTS

Table 1: Gender and Age group wise categorization of Participants

Sl. No.	Parameters	Number of Participants (n = 752)	Percentage (%)
1.	**Gender**		
	Male	289	38.43
	Female	463	61.57
2.	**Age Group (in years)**		
	20-35	246	32.7
	36-50	348	46.3
	51-65	158	21.0

Table 2: Age Group categorization among Genders

Sl. No.	Age Group (in years)	Number of males (n=289)	Percentage (%)	Number of females (n=463)	Percentage (%)
1.	20-35	89	30.79	157	33.90
2.	36-50	138	47.75	210	45.35
3.	51-65	62	21.45	96	20.73

Table 3: Distribution of Male Participants based on Smoking Habits

Smoking Habits	Number of Male Participants (n=289)	Percentage (%)
Smokers	114	39.45
Non-smokers	175	60.55

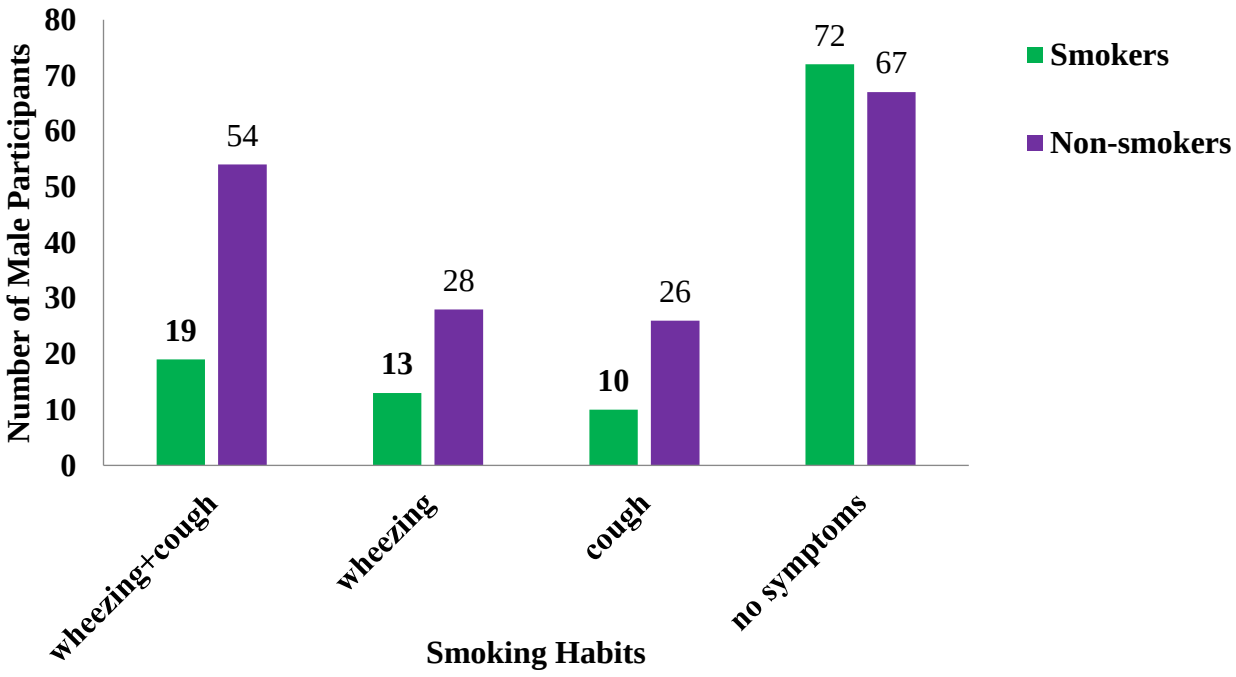

Figure 1: Respiratory problems in male participants based on smoking habits

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Table 4: Risk assessed in males based on age group using Spirometer

Age Group (in years)	Number of balls raised in Spirometer(n=289)			
	0 ball	1 ball	2 balls	3 balls
20-35	9(3.11%)	11(3.80%)	21(7.26%)	48(16.60%)
36-50	15(5.19%)	27(9.34%)	61(21.10%)	35 (12.11%)
51-65	34(11.76%)	18(6.22%)	7(2.42%)	3(1.03%)

Table 5: Risk assessed in females based on age group using Spirometer

Age Group (in years)	Number of balls raised in Spirometer (n=463)			
	0 ball	1 ball	2 balls	3 balls
20-35	9(1.94%)	11(2.37%)	46(9.93%)	91(19.65%)
36-50	9(1.94%)	21(4.53%)	99(21.38%)	81(17.49%)
51-65	47(10.15%)	29(6.26%)	11(2.37%)	9(1.94%)

Table 6: Assessment of respiratory problems in males based on the working period

Working period (in years)	Number of male participants (n=289)			
	0 ball	1 ball	2 balls	3 balls
1-10	4(1.38%)	5(1.73%)	11(3.80%)	24(8.30%)
11-20	9(3.11%)	14(4.84%)	29(10.03%)	34(11.76%)
21-30	5(1.73%)	9(3.11%)	21(7.26%)	13(4.49%)
31-40	21(7.26%)	17(5.88%)	22(7.61%)	10(3.46%)
41-50	19(6.57%)	11(3.80%)	6(2.07%)	5(1.73%)

Table 7: Assessment of respiratory problems in females based on the working period

Working period (in years)	Number of balls raised in spirometer (n=463)			
	0 ball	1 ball	2 balls	3 balls
1-10	5(1.07%)	6(1.29%)	23(4.96%)	46(9.93%)
11-20	7(1.51%)	12(2.59%)	62(13.39%)	72(15.55%)
21-30	3(0.64%)	7(1.51%)	31(6.69%)	27(5.83%)
31-40	21(4.53%)	16(3.45%)	34(7.73%)	31(6.69%)
41-50	29(6.26%)	20(4.31%)	6(1.29%)	5(1.07%)

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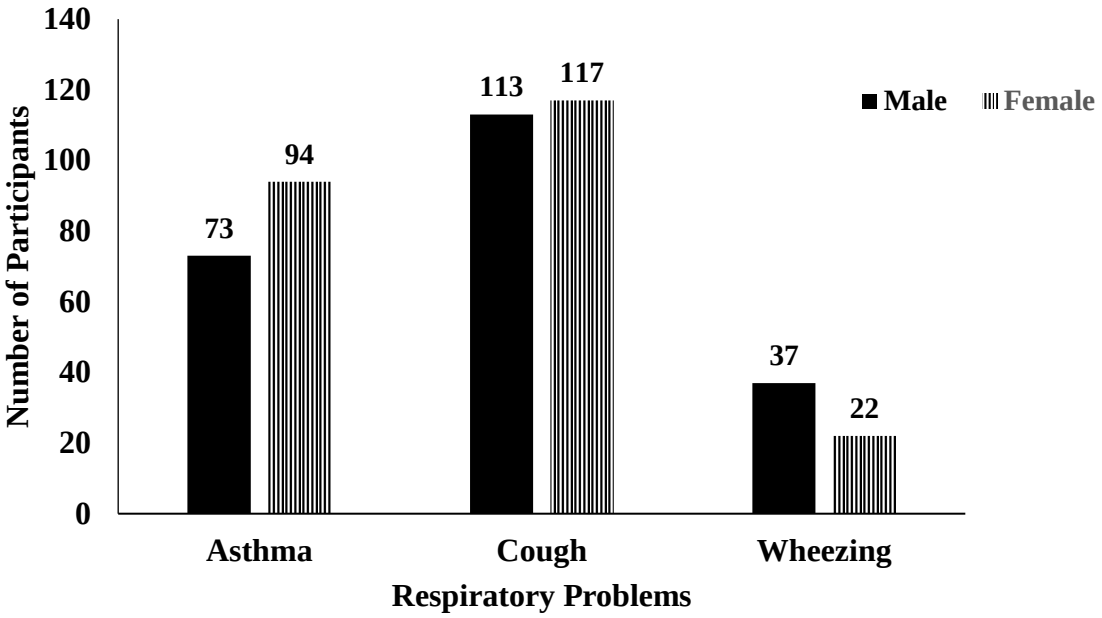

Figure 2: Respiratory problems developed among participants

DISCUSSION

In our study, we had collected data from 752 workers and among them 289 (38.43%) males and 463 (61.57%) females. When compared to (Hinson et al., 2014), conducted the study with 769 participants and among them 745 (96.87%) female and 24 (3.12%) males. According to age group, the population was classified as 20-35years, 36-50years, and 51-65years respectively. The number of participants was in the age group of 36-50 years (46.27%). Among them 289 male participants, more workers were within the range of 36-50years (47.75%). Females of 463 participants, more workers are in the age group of 36-50years (45.35%). When compared with the study conducted by (Pramchoo et al., 2017) found that the age of workers is greater than 35 years. The study revealed that 289 males, 114 (39%) smokers and 175 (61%) non-smokers participated. Non-smokers were having more respiratory problems than smokers. The non-smokers with no symptoms were about 38.28% and smokers with no symptoms about 63.15%. A similar study conducted by (Niven and Pickering, 1996) among 769 workers 12 (1.56%) were smokers and 757 (98.43%) non-smokers. The risk assessed in males within the age group had found that the more risk was within 51-65years (11.76%) and less risk in the participants was within 20-35years (3.11%). It was because within 20-35years were had less working period in the textile industry. Similarly, (Akpinar-ElciM et al., 2006) conducted the study. Here the risk assessed among 463 female workers based upon their age group had found to be less risk was found within 20-35years (1.94%) and more risk in workers within the age group of 51-65 years (10.15%). Similarly, (Akpinar-ElciM, et al., 2006) conducted the study. In our findings, we had found that the female employees in the textile industry between 41-50years (6.26%) were shown more risk to respiratory-related problems and workers with 1-10years (1.07%) of experience were less affected by any of the respiratory problems. (Christiani et al., 1994) in his longitudinal study with 445 cotton workers observed over 25years showed more risk to develop respiratory problems. On risk assessment of respiratory problems in males based upon the working period, the subjects with both 21-30years and 31-40years were more prone to develop respiratory problems. Followed by working experience with 11-20years are less affected. Then with 1-10 years of experience are not affected with any respiratory problems. (Christiani et al., 1994) in his longitudinal study with 445 cotton workers observed over 25 years showed more risk to develop respiratory problems. In our study, it is found that males were more likely to develop chronic respiratory symptoms than females. Out 752 workers 167 of them are affected with asthma, 230 of them are affected with cough and 59 having the difficulty of wheezing. Similar results were seen in (Enarson et al., 2001) out of 404 workers 187 male workers developed respiratory problems and only 67 females developed respiratory symptoms. This is due to the fact that females were more prone to hygienic principles than males. Among female post work bathing, post work changing of clothes, washing of hands and face were common.

Limitations

- The duration of our study was short to identify all diseases that developed among the textile workers.
- The number of samples size was less.
- Most of the workers were not- cooperative to answer our questionnaire.

CONCLUSION

Occupational respiratory symptoms were highly prevalent among the workers in the textile industries. Age, gender, working department, smoking, work experience, and training were the factors included in the exposure on respiratory systems.

Out of total study population majority of them were females, but prevalence in developing respiratory diseases was found to be more in males because of their unhygienic mode of lifestyles. Another important risk factor which is seen among males was smoking, which may lead to an increase in the chance of developing a cough. And also, workers with long duration of working experience were more prone to develop respiratory diseases.

The prevalence of definite obstructive respiratory conditions at the textile manufacturing company was found to be high. Pre-employment on service training, smoking cessation programs, improving hygienic practices like using masks, using separate hygienic clothes and daily bathing immediately after the working time are important tasks in order to maintain the health and safety of workers.

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