ABSTRACT

Aims: To observe the prevalence of cotton dust pollution among textile workers in Tirupur district and medication adherence in COPD patients. Methodology: This is a prospective observational study carried out in textile workers and COPD patients in the department. A total of 170 subjects were selected, in which 120 workers were taken as experimental group and 50 non-textile workers were taken as control group. After period of five months, medication adherence was assessed by Morisky self reported questionnaires. Results: After comparing with the experimental and control group, the 75 percent workers in experimental group reported that, due to the illness their work performance in industry is not normal, they suffering the problems during the work such as breathing difficulty, asthma, cough, respiratory allergy etc. Result revealed that 23 (7.32%) were have cold, 69 (21.97%) were have phlegm, 104 (33.12%) were have shortness of breath, 57 (18.15%) were have chest tightness, 21 (6.68%) were have wheezing, 22 (7.00%) were have throat irritation, 18 (5.73%) were have past history of respiratory disease. The study shows there was statistically more significant increase in medication adherence (P<0.001) from baseline after patient counseling regarding disease and medication. Conclusion: The present study concluded that, there is a high prevalence of respiratory diseases among the textile workers due to the exposure of dust pollution than control group. Overall medication adherence was improved in experimental group compared to control group.
adherence improvement was found to be statistically more significant in COPD patients after counseling.

INTRODUCTION

Tirupur is well known for manufacturing of white banians to Indian market from 1070s. The availability of climatic conditions, quality groundwater, cotton yarn and skilled labour are the few reasons for the development of industries. Out of the total production of cotton knitwear, Tirupur produces 90 percent and exporting to many parts of the globe.

The government policies brought revolutionary changes during 1980s and 1990s resulting which now more 2000 companies producing huge range of products for all age groups. The economic planning and policies are supporting the textile industries due to economic growth, employment, foreign exchange etc, but the environmentalists stating that it is happening at the cost of ecological damage also. The manufacturing process is creating utmost damage to rivers, forming lands, health of ecosystem, ground water and to the health of the staff and to the people living in and around. It is found that, most of the developed countries are importing textiles from Tirupur as unspecified chemicals are forbidden to use in the western countries. Endotoxin is probably a major causative agent in the adverse pulmonary effects associated with organic dust exposure. Endotoxin occurs abundantly in organic dust contaminated with animal feces and plant materials.

Endotoxin is released into the air during cotton processing. Exposure to cotton dust and endotoxin has been implicated in the etiology of a number of diseases, including bys, chronic bronchitis and COPD along with nasal and ocular irritation. Till date in India, only a limited number of studies have been conducted to highlight the occupational hazards in textile industries and there are hardly any studies conducted on the employee’s of textile industries in Tirupur district. Medication adherence is one of the most important factors that determine therapeutic outcomes especially in, patients suffering from chronic illnesses. Whatever the efficacy of a drug, it cannot act unless the patient takes it. Low medication adherence has assumed importance as it seriously undermines the benefits of current medical care and imposes a significant financial burden on individual patients and the healthcare system as a whole.

COPD is currently the fourth leading cause of death worldwide, with an overall prevalence rate between 4% and 10%. A recent worldwide study showed higher prevalence and more
advanced staging of spirometrically confirmed COPD than had typically been reported.\textsuperscript{[39]} Furthermore, the prevalence of COPD is increasing and it is estimated that by the year 2020, COPD will be the third leading cause of death worldwide. The debilitating nature of this highly prevalent disease results in substantial social and economic burdens, including direct and indirect medical as well as other costs.

MATERIALS AND METHODS

Study design
This is a prospective observational study.

Study setting
This study was conducted in the textile industries in Tirupur district and also in the medical ward of Government Headquarters Hospital Tirupur over a period of six months in 2016-2017.

Ethical approval
Research protocol, data collection and informed consent form (Tamil, English) were approved by ethical committee.

Inclusion criteria
1. Peoples working in textile industry.
2. Either of the genders.
3. Patient who are suffering from COPD in medical ward in Tirupur government hospital.
4. Patient who are the above age of 19 years.

Exclusion criteria
1. Patients with other co morbidities diseases.
2. Pregnancy patients.
3. Mentally challenged patients.

Data collection: this study was conducted on total of 170 subjects and compared the prevalence of cotton dust pollution between control and experimental group by using the self-administered questionnaires.

- From the above population 120 cases were taken as experimental group and 50 cases were taken as control group.
A total of 50 COPD patients were selected to observe the medication adherence. Counseling was given to patient regarding disease and medication. Medication adherence was observed using Morisky medication adherence scale. The records of age, sex, smoking habits, and the risk factors were also noted. The time period from initial visit to first follow up were five months.

Statistical analysis: The information was collected by self administered questionnaires and Morisky medication adherence questionnaires. Data analysis is done with help of Graph pad prism 6 and Morisky medication adherence scale.

Using this software range, frequency, percentages, mean, standard deviation, chi square and ‘p’ value were calculated. Student t test (paired, two tailed) and chi-square test was used to test the significant difference between quantitative variables. ‘P’ value less than 0.05 is taken to denote significant relationship.

RESULTS AND DISCUSSION
The work entitled “A prospective study of prevalence of cotton dust pollution among textile workers in Tirupur district and medication adherence in COPD patients” was carried out in the textile industry around Tirupur district and in medical ward in Government Headquarters Hospital Tirupur.

A total of 170 subjects, were randomized and include in study of prevalence of cotton dust pollution among textile workers. Out of these subjects 120 textile workers were selected in the experimental group (Group A) and 50 non textile workers were selected in the control group (Group B). For the study of Medication adherence, 50 COPD patients were selected. All the subjects, baseline parameters were recorded. All the values of parameters were recorded and compared. Statistical tools were included at the end of materials and method. The result of the study shows that non-textile workers had minimal prevalence of respiratory symptoms than textile workers and improved medication adherence from baseline to follow up in COPD patients.

From our study, it was observed that, the mean age of group A was 44 ±15.44 years and Group B was 41.50±14.00 years. Out of 120 textile workers in Group A; 92 workers (76.66%) were males and 28 workers (23.33%) were females. Out of 50 non textile workers in Group B; 32(64%) were male and 18(36%) were females. Males are less prone of
respiratory diseases than women. In our study most of the experimental and control population are male, so gender is not playing important role in the respiratory symptoms.\[60\] In present study, it was observed that A total of 120 workers in group A; 48(40%) were working in weaving, 17(14.16%) were working in maintenance, 19(15.83%) were working in warehousing, and 36(30%) were working in warping section.

Out of 120 workers in group A; 36 (24.16) were in overcrowding site, 113(75.83) were in dusty site. It was observed in present study, Out of 120 textile workers in Group A; 22 workers (18.33%) were current smoker, 23 workers (19.16%) were ex-smoker, 14 workers (11.66%) were passive smokers, and 61 workers (50.83%) were non smokers. The average smokers in Group A were 30 and standard deviation was 21.06.

Out of 50 non textile workers in Group B; 2(4%) were current smoker and 3(6%) were ex-smokers, 5 (10%) were passive smokers and 40(80%) were Non smokers. The average smokers of non textile workers in Group B were 12.50 and standard deviation was 18.38. Cigarette smoking and prevalence of respiratory symptoms are significant.\[61\] But in our study most of the population in experimental group and control group are non-smokers. These indicates that the experimental group of our study has less possibility to acquire respiratory symptoms by means of smoking.\[62\] In present study, it was observed that, Out of 120 textile workers in Group A; 22 workers (18.33%) were current alcoholic, 14 workers (11.66%) were ex-alcoholic, and 84 workers (70%) were non alcoholic. The average drinking habits in Group A were 40 and standard deviation was 38.31.

Out of 50 non textile workers in Group B; 11(22%) were current alcoholic and 7(14%) were ex-alcoholic, 32(64%) were Non alcoholic. The average alcoholic habits of non textile workers in Group B were 13.33 and standard deviation was 16.44. It was observed in this study that, Out of 120 textile workers in Group A; 13 workers (10.8%) were using kerosene for cooking, 16 workers (13.3%) were using wood and kerosene, and 91 workers (75.8%) were using Gas. Out of 50 non textile workers in Group B; 5 workers (10%) were using kerosene for cooking, 11 workers (22%) were using wood and kerosene, and 34 workers (68%) were using Gas. In some past studies shows that, wood and gas while used as fuel could increase the the possibility to acquire respiratory symptoms than other fuels and has significant risk of phlegm, wheezing, breathlessness.\[63,64\] It was observed in this study that, Out of 120 workers in Group A; 23 (7.32%) were have cold, 69 (21.97%) were have phlegm, 104 (33.12%) were have shortness of breath, 57(18.15%) were have chest tightness, 21
(6.68%) were have wheezing, 22 (7.00%) were have throat irritation, 18 (5.73%) were have past history of respiratory disease. Out of 50 non textile workers in Group B; 7(14%) were have cold, 14 (28%) were have phlegm, 7 (4%) were have shortness of breath, 3(14%) were have chest tightness, 9(6%) were have wheezing, 8 (18%) were have throat irritation, 8(16%) were have past history of respiratory disease. The mean respiratory symptoms of Group A was 44.86± 32.96 and that of Group B was 7.413 ± 3.976. Subjects considered under control group had minimal prevalence of respiratory symptoms than experimental group\[^{49}\], as well as high prevalence of the respiratory diseases and symptoms among the textile workers.\[^{50}\]

**Table 1. Clinical History Group A And Group B.**

<table>
<thead>
<tr>
<th>Respiratory Symptoms</th>
<th>Group a</th>
<th>Group b</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Cold</td>
<td>23</td>
<td>7.32</td>
</tr>
<tr>
<td>Phlegm</td>
<td>69</td>
<td>21.97</td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>104</td>
<td>33.12</td>
</tr>
<tr>
<td>Chest tightness</td>
<td>57</td>
<td>18.15</td>
</tr>
<tr>
<td>Wheezing</td>
<td>21</td>
<td>6.68</td>
</tr>
<tr>
<td>Throat irritation</td>
<td>22</td>
<td>7.00</td>
</tr>
<tr>
<td>Past history of RD</td>
<td>18</td>
<td>5.73</td>
</tr>
<tr>
<td>Total</td>
<td>314</td>
<td>100</td>
</tr>
<tr>
<td>Mean</td>
<td>44.86</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>32.96</td>
<td></td>
</tr>
<tr>
<td>Chi-square</td>
<td>28.52</td>
<td></td>
</tr>
<tr>
<td>p-value</td>
<td>0.0253</td>
<td></td>
</tr>
</tbody>
</table>

From our study, it was observed that the average age of COPD patients was 16.67± 11.06 years. Out of 50 COPD patients; 36 patients (72%) were males, 14 patients (28%) were females. From our study, it was observed that Out of 50 COPD patients; 9 patients (18%) were between < 1 years, 30 patients (30%) were between 1-10, 11 patients (11%) were
between ≥ 11. The average duration of disease patients was 16.67 ± 11.59 years. Out of 50 COPD patients, 6 patients (12%) were using oral corticosteroids, 21 patients (42%) were using oral beta 2 agonist, 8 patients (16%) were using nebulisation with salbutamol as a single or combination therapy. 12 (24%) were using methyl xanthines, 3 (6%) were using oral antibiotics. It was observed that, in COPD patients baseline medication adherence score was decreased from 5.360 ± 1.699 to 1.480 ± 0.5047 after follow up (After the counselling to the patients). The results of our study indicates the increase in medication adherence after patient counselling regarding disease and medication.

<table>
<thead>
<tr>
<th>Data analysis</th>
<th>Baseline value</th>
<th>Follow up</th>
<th>Mean difference at 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>5.360</td>
<td>1.480</td>
<td>3.88</td>
</tr>
<tr>
<td>SD</td>
<td>1.699</td>
<td>0.5047</td>
<td>-</td>
</tr>
<tr>
<td>SEM</td>
<td>0.2403</td>
<td>0.07137</td>
<td>-</td>
</tr>
</tbody>
</table>

Evidence from the present study suggested that, textile workers had maximal prevalence of respiratory symptoms than non-textile workers and improved medication adherence in COPD patients after counselling.

CONCLUSION

In our study most of the population in experimental group and control group had male gender than female and most of the population are non-smokers and using gas as the cooking fuel. In non-textile workers cold, cough and respiratory symptoms might be due to seasonal changes. This indicates that, textile micro dust present in the textile industry and atmosphere is the reason for the development of respiratory symptoms among our study groups than other factors like smoking, gender or cooking fuel.
Overall medication adherence improvement was found to be statistically significant in COPD patients after counselling by pharmacist. Patients counselling may be effective to resolve problems associated with medication non-adherence. Moreover counselling made more adherences in the COPD patient of Tirupur district headquarters hospital.

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REFERENCES

BIBLIOGRAPHY