ISSN: 0976-3031

Available Online at http://www.recentscientific.com

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 9, Issue, 6(D), pp. 27455-27458, June, 2018

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

Review Article

PREVALENCE IN DEVELOPING RESPIRATORY TRACT DISEASES IN SMALL SCALE TEXTILE INDUSTRIAL WORKERS USING PEAK FLOW METER

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DOI: http://dx.doi.org/10.24327/ijrsr.2018.0906.2261

ARTICLE INFO

Article History:

Received 9th March, 2018
Received in revised form 16th April, 2018
Accepted 26th May, 2018
Published online 28th June, 2018

Key Words:

Occupational respiratory diseases, occupational asthma, Peak expiratory flow rate, COPD, chest tightness, medical aid.

ABSTRACT

Occupational respiratory diseases are the major global public health problem that accounts for up to 30% of all work related diseases and 10-20% of deaths are caused by respiratory problems. Occupational exposures are caused by the pathologic response to the working environment of the patient. There is growing unanimity on the deleterious effects of organic dust on respiratory symptoms and functions of industrial workers. Occupational asthma is a disease characterized by variable airflow limitation and/or hyper-responsiveness, and caused by inhalation of toxic or irritating substances in their working place. Asthma and Chronic obstructive pulmonary disease (COPD) are the major respiratory disorder in worldwide. Approximately 235 million people are thought to suffer from asthma globally, and 65million are affected by moderate-to-severe COPD. Most cases of occupational asthma have an allergic mechanism, where there is sensitive to an agent after an extended period of exposure. With respect to cotton dust exposure, chest tightness was the most common respiratory symptom (20.3%). About 14.2% of cotton processing workers were encountering byssinosis. The workers are unwilling to seek medical aid or workplace solutions for their symptoms. And thereby reducing these to improve workers quality of life, and to reduce the social cost of occupational asthma. The increase in morbidity and mortality attributable to occupational exposure has focused attention on the environmental and host factors that cause associated with the clinical entities included under the rubric of this term with a view to early preventive intervention.

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 1995, more than 1.5 million emergency department visits and 500,000 hospitalizations were attributable to asthma in the United States[1]. In 1998, 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[2].The aim of the study is to analyze the prevalance and risk factors in developing respiratory tract diseases in small scale textile industrial workers due to long term exposure to cotton dust. Occupational dusts induced respiratory system diseases are regulated by the duration of exposure and it has documented in the workers exposed to various dusts in small and large scale industries that generates from the production process[3].

Etiology of developing respiratory tract diseases

Occupational diseases are caused from the pathologic responses to the working environment[4]. Occupational dust induced respiratory health effects can be determined by the type and the duration of dust that the workers exposed[5]. Workers in the textile industry are in the risk of developing obstructive respiratory conditions due to the extended exposure to the cotton dust. In 1986, WHO published that the workers in the textile industry are at more risk of developing obstructive respiratory conditions due to the prolonged exposure to the inhaled dust particles[6]. Affected persons may be put on lifelong treatment for asthma when in actual fact they do not have asthma, and all that may be required are occupational exposure control and safety measures[4].

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Diagnostic tools used for assessing the lung function

Peak expiratory flow rate (PEFR) is the parameter used to measure that indicate the severity of the air flow obstruction and also in the management of bronchial asthma[7]. Peak expiratory flow meters are inexpensive and convenient devices that allow reproducible, 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[8]. 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 for asthma management. Monitoring peak expiratory flow can increase patient awareness of disese control which helps patient detect significant changes in symptoms and make self management decisions, because of these reasons PEF monitoring is included frequentlyin conjunctions with obstruction monitoring[9]. Spirometry is another one of the important diagnostic tools used in occupational respiratory diseases. It is mostly used to measure the effects of respiratory function. It is a safe and convenient process, and it is mainly used for the diagnosis of chronic obstructive pulmonary disease (COPD)[10]. The procedure will be done by a period of quiet breathing in and out from the sensor (tidal volume). The forced vital capacity changes slightly and based on this diagnosis of respiratory problems assessed[11].

Prevalence of developing respiratory problems in textile industrial workers

The ginning, spinning and weaving process of textile industry causeda large amount of cotton dust. The dust consists of various size and type of particles, such as ground matter, fiber, bacteria, fungi, soil, pesticides, non-cotton matter, and other contaminants. Exposure to the cotton dust leads to respiratory hazards, such as cough, phlegm, wheezing, shortness of breath, chest tightness, chronic bronchitis, and asthma[12]. Exposure to cotton dust has a major effect on pulmonary function. Byssinosis is a chronic respiratory problem that occurs among who exposed to cotton dust regularly[13]. 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 dusts. Moreover, working in the various other departments with high exposure to dust such as spinning and weaving and being aged were found to be the risk of developing respiratory hazards[14]. The textile industry is one of the major manufacturing industry, among the developing and developed countries including Africa[13]. In developing countries, notably in Africa, the cotton industry plays an important role. In Ethiopia, textile industry or cotton sector is the main economic motor that attracts numerous work forces. However, the workers are at risk of cotton dust related respiratory problems[15]. But the degree of the problem is not well known and there is a scarcity of data showing these kinds of health issues and its risk factors in Ethiopia[16].

MATERIALS AND METHODS

A search on pubmed data based for articles published between 1999-2016 on prevalence in developing respiratory tract diseases in small scale textile industrial workers using a peak flow meter. English language articles were selected for inclusion along with selected cross-references.

RESULTS AND DISCUSSION

Assessment of biomarkers in skin and blood samples

The sensitizations to allergens are determined by the skin and serum-specific immunoglobulin E (IgE) antibodies. But commercially available standard tests are done only for a few occupational allergens[18,19]. Detection of serum IgE has the highest specificity of 79% in diagnosing OA induced by HMW-A and confirmed by SIC[20]. In general, sIgE detection by skin prick tests is considered to be more specific and less sensitive than serum assays in sensitized patients with airway occupational allergy[21], however, a different phenomenon has been observed in subjects with hypersensitivity to latex[22,23]. Although, the robust advantage of serum sIgE assays is the possibility to determine in patients with high risk of anaphylaxis or with disseminated skin lesions[24]. Moreover, the presence of serum sIgE has been suggested to play a role of exposure indicator to diisocyanates in 20-50% of asthmatic subjects[25-28]. However, positive result of sIgE assay in minority of workers with isocyanate-induced asthma allowed the researchers to highlight that evaluation of sIgE has high specificity and low sensitivity in diagnosing occupational respiratory allergy[29,30]. Detection of antigen-specific IgG (sIgG) antibodies is helpful in searching the causative agents of occupational hypersensitivity pneumonitis (OHP) [31,32], but it is not objective "gold standard" method in diagnosing OHP[33-35]. Determination of serum sIgG may be useful in predicting development of OHP[36], however, the quantitative assessment requires different cutoff values for various agents[37]. What is more, interpretation of the result may be difficult due to possible cross-reactivity among many fungal or bird species[38,39]. Increased levels of serum IgG to tissue transglutaminase and serum MMP-9 have been observed in workers with toluene-di-isocyanate-induced OA[40]. Airborne iron may be responsible for siderosis and lung cancer among welders[41,42], and periodical quantitative assessment of serum ferritin (SF) has been proposed as a reasonable exposure biomarker in welders using high-emission technologies of respirable iron[43]. Evaluation of SF and serum transferrin levels has been also successfully applied in diagnosing methylene-di-isocyanate OA witha specificity of 85.7% [44] but not in toluene-di-isocyanate OA[45].

CONCLUSION

Occupational respiratory symptoms were highly prevalent among the workers in the textile industries. Age, gender, education level, working department, smoking, work experience, and training were the factors included in the exposure on respiratory systems. Pre employment and in service training, smoking cessation programs, improving hygienic practices are important tasks in order to maintain the health and safety of workers. The prevalence of definite obstructive respiratory conditions at the textile manufacturing company was found to be high, with workers in the blowing and waste recovery sections having the highest risk.

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How to cite this article:

Kameswaran R *et al*.2018, Prevalence In Developing Respiratory Tract Diseases In Small Scale Textile Industrial Workers Using Peak Flow Meter. *Int J Recent Sci Res.* 9(6), pp. 27455-27458. DOI: http://dx.doi.org/10.24327/ijrsr.2018.0906.2261

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