"RELATIONSHIP OF OCCUPATIONAL ASTHMA WITH QUALITY OF LIFE AMONG COTTON TEXTILE INDUSTRY WORKERS OF MIRAJ TALUKA."

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ABSTRACT

BACKGROUND: In industrialized countries, occupational asthma (OA) is the most frequent lung condition. Textile workers are more likely to be exposed to cotton dust, which has a variety of systemic and pulmonary consequences. Asthma affects workers' capacity to work, as well as their overall health and well-being, limiting both their work and daily lives. As a result, early detection and diagnosis of Work-Related Asthma is critical for minimizing the burden and morbidity of the disease, as well as improving employees' Quality of Life in the cotton textile industry.

AIM: To screen Occupational Asthma among Cotton textile industry workers and to determinehow it affects their work ability and Quality of life.

METHOD: This study included both male and female cotton textile industry workers who had worked in the spinning and weaving areas of the mill for at least one year and was between theages of 19 and 59. Subjects were screened according to their PEAK EXPIRATORY FLOW METER values. Subjects with score on PEFM, Males <450 lit/min, Females<320 lit/min were determined & further assessed using Asthma Screening Questionnaire (ASQ) and their scores were noted. Subject who scored (>=4) on ASQ (n=101) were determined & were given AQ-20sheets to fill, values obtained from it was used to check Quality Of Life of the workers.

RESULT: Among the 245 workers, 101 workers had risk of having Occupational Asthma and had average difficulty in performing their daily activity. The correlation coefficient r-value of 0.981 for ASQ and AQ20 was statistically significant at the 5% level with linear connection 0.001 is the p value.

CONCLUSION-This study concludes that, there is strong correlation of occupational asthma with quality of life among cotton textile industry workers of Miraj taluka.

KEYWORD: Occupational Asthma (OA), Quality of Life (QOL) , Cotton dust , Peak Expiratory Flow Meter (PEFM), Asthma Screening Questionnaire(ASQ), Airways Questionnaire-20(AQ-20).

INTRODUCTION

India's textile industry is one of the most important industry in the world.[1]Cotton dust is defined as dust generated into the atmosphere as a result of processing the cotton fibers combined with any naturally occurring materials such as stems, leaves, bracts and inorganic matter which may have accumulated on the cotton fibers during growing and harvesting period.[2] The cotton dust is classified according to the size of particle such as : particle –like trash ,dust, micro dust and breathable dust, hence when inhaled , the air containing cotton dust especially the fine particles sediment out in the gas exchange region of the lung, and causes irritation of the lungs and the exposed workers experience a feeling of chest tightness, difficulty in breathing, frequent cough, wheezing and phlegm[3,4]

Those textile workers working in initial area of blowing, carding and spinning sections, where blades are opened and raw cotton is processed to , from thread are exposed to higher levels of cotton dust, as compared to the workers working in weaving ,finishing ,stitching or packaging.[5] The consistent exposure to cotton dust is an important factor in the causation and development of respiratory symptoms ,and has various systemic and pulmonary effects such as cough, phlegm, generalized malaise, rise in body temperature, chronic bronchitis, asthma, byssinosis and emphysema. However majority of patients develop asthma within the first 1 to 2 years of exposure. [4, 6, 7]

Asthma affects 5% to 10% of people worldwide , out of that 2% to 15% of asthma may be occupational in origin.[8] Work-related asthma (WRA) is a term that encompasses two types of asthma: Occupational asthma (OA) which is defined as a condition characterized by reversible obstruction of the airways associated with bronchial hyper responsiveness (BHR) caused by inhalation of dusts, gases, fumes, or vapors that are produced at or incidentally present at the workplace, or work-exacerbated asthma (WEA), also known as work-aggravated asthma (WAA), which describes preexisting or concurrent asthma made worse by workplace exposure.[9,10]

Occupational asthma is divided into two types:1) Allergic (immunological) asthma, characterized by a latency period of months to a year between the onset of symptoms and the development of allergic sensitization to (a) high-molecular-weight (HMW) allergens such as plant and animal proteins and (b) low-molecular-weight (LMW) allergens. 2) Irritant induced asthma (IrIA) or reactive airway dysfunction syndrome (RADS), (non-immunological) asthma is defined by the rapid onset of symptoms after a single or multiple exposures to high concentrations of irritant compounds, with symptoms occurring immediately or within a few hours of the exposure. HMW agents can induce an immunoglobulin E (IgE) response in susceptible individuals and can cause asthma by an IgE-mediated mechanism, which consist of the bridging of IgE molecules by antigen leads to mast-cell degranulation and the initiation of an inflammatory cascade which results in an increase in leukocyte , eosinophil, ESR, and WBCs, count which show characteristic features of respiratory impairment or allergy, that results in airway inflammation and airway hyper responsiveness similar to that seen in a patient with atopic asthma.[7, 8]

"Quality of Life" is the perceived satisfaction of individuals about living their life in the society. [11]Health related Quality of life is an important aspect in everyday life, those workers who are continuously exposed to WRA triggers are more likely to have significant morbidity, uncontrolled asthma, be unemployed, be temporarily unable to work, have changed work tasks and occupation, may have depression which could affect quality of life because of their illness and symptom. As asthma limits the work, general health and work ability of workers, which leads to a serious consequence of withdrawal from work by retiring or changing career. Since occupational asthma seems to limit both the work and everyday life of cotton textile workers, which leads to early retirement and change of occupation. As a result, early detection and diagnosis of WRA is crucial for effective care, lowering the incidence and morbidity of WRA, and improving the QOL of cotton textile sector workers.[9,12]

PEFM is a handy ,easy -to- use tool ,which can be used in both diagnosing and monitoring of asthma.[13] The normal peak flow is 450-550L/min in adult males and it is 320-470L/min in adult females.

ASQ is a shorter and simpler questionnaire comprising of 4 general symptoms: cough, wheeze, chest tightness and shortness of breath. The questionnaire consists of total 6 questions in a yes/no answer format out of which all questions have an equal weight of 1 point except for the first 2 questions which have 2 points each. A cutoff point of total symptom score equal to or greater than 4 was associated with highest combination of sensitivity (96%) and specificity (100%).[14]

AQ20 is a specific questionnaire validated for patients with asthma or COPD. It includes 20 items with 'yes' responses scored as 1 and 'no' or 'not applicable' scored as 0.The summary score ranges from 0 (best health) to 20(worst health) with a high score indicating poor QOL.[15]

Though OA is the second most common Occupational lung disease among the industrialized countries, still it remains under recognized among the developed countries. There are studies which have found out the prevalence of OA among the cotton textile industry workers. However there are very few studies which have found the Quality Of Life among the cotton textile industry workers. Hence this study finds out the relationship of OA with quality of life among cotton textile industry workers in Miraj taluka, Sangli.

AIM

To screen Occupational Asthma among Cotton textile industry workers and to determine its effect on work ability and Quality of life.

OBJECTIVES

- To screen the workers for Occupational Asthma on basis of the Asthma Screening Questionnaire (ASQ) and Peak Expiratory Flow Meter.
- To study the Quality of life among the screened workers for Occupational asthma with Airway Questionnaire20.
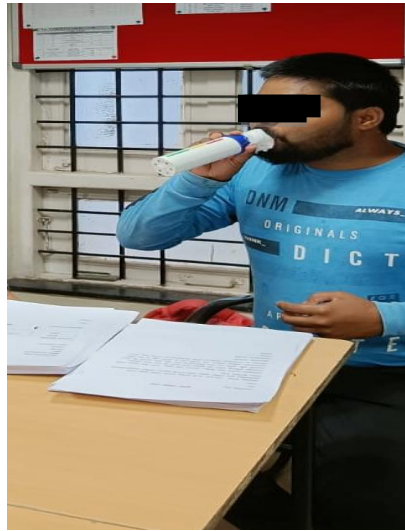
MATERIALS AND METHODOLOGY


Figure 1 PEFR procedure

A cross sectional study was conducted on the cotton textile industry workers of Miraj Taluka, in which 245 both male and female workers working in the spinning and weaving area for at least 1 year duration of age group 19-59 years were included in the study.

The demographic data which included age, gender, occupation and working years of the subject was collected through the data collection sheet. Prior to the study, subjects were given written consent in the vernacular language. Subjects were screened according to their PEAK EXPIRATORY FLOW METER values.Subjects with score on PEFM, Males <450 lit/min, Females<320 lit/min were determined & further assessed using Asthma Screening Questionnaire (ASQ)and their scores were noted.Subject who scored (>=4) on ASQ (n=101) were determined & were given AQ-20 sheets to fill, values obtained from it was used to relate the relationship of Occupational Asthma with Quality of Life among cotton textile industry workers in Miraj taluka.Statistical analysis was performed using Spearman's correlation coefficient test.

RESULTS

Table 1. Demographic Data

| Gender	Frequency	Percent
Male	163	66.5
Female	82	33.5
Total	245	100
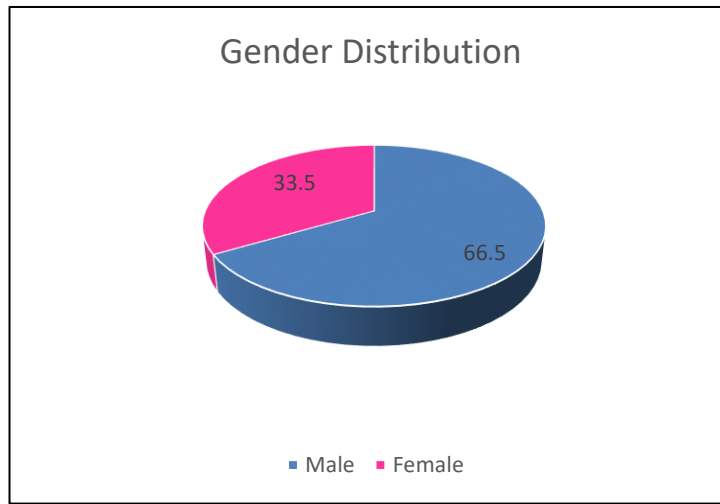
Graph 1. Gender distribution of the cotton mill industries workers

Interpretation: There were 163 (66.5%) male subjects and 82 (33.5%) female subjects amongcotton milltextile industries workers. Proportion of male subjects were more than female.

Table 2. PEFR Score Distribution

Gender	Low PEFR	High PEFR	Total
Male	67	96	163
Female	34	48	82
Total	101	144	245
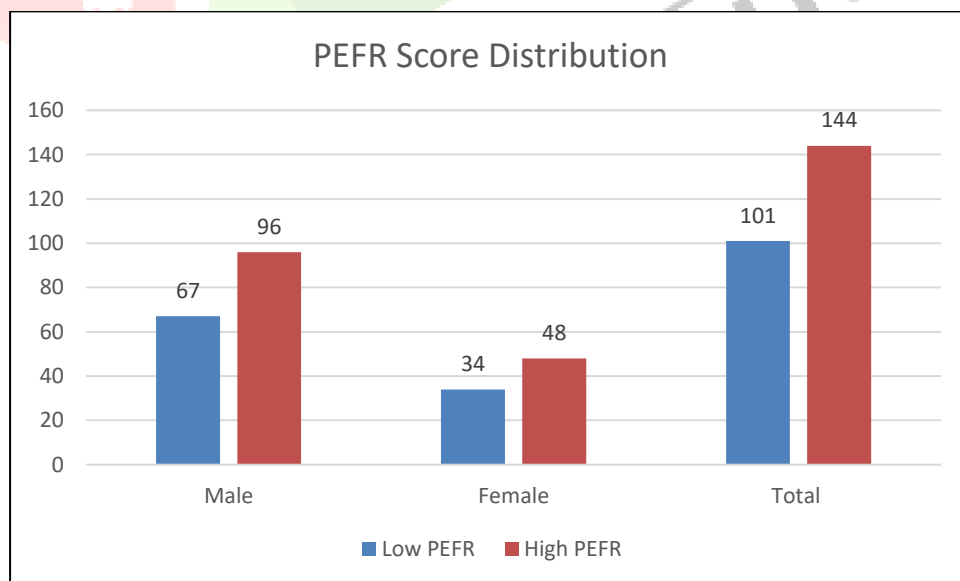
Graph 2. PEFR Score Distribution

Interpretation: Out of the total 245 cotton textile industry workers 101 workers showed Low PEFR values while 144 showed High PEFR values. Amongst the 163 male workers 67 workers showed low

PEFR while 96 male workers showed High PEFR out of the total 82 female workers 34 showed low PEFR while 48 showed High PEFR value.
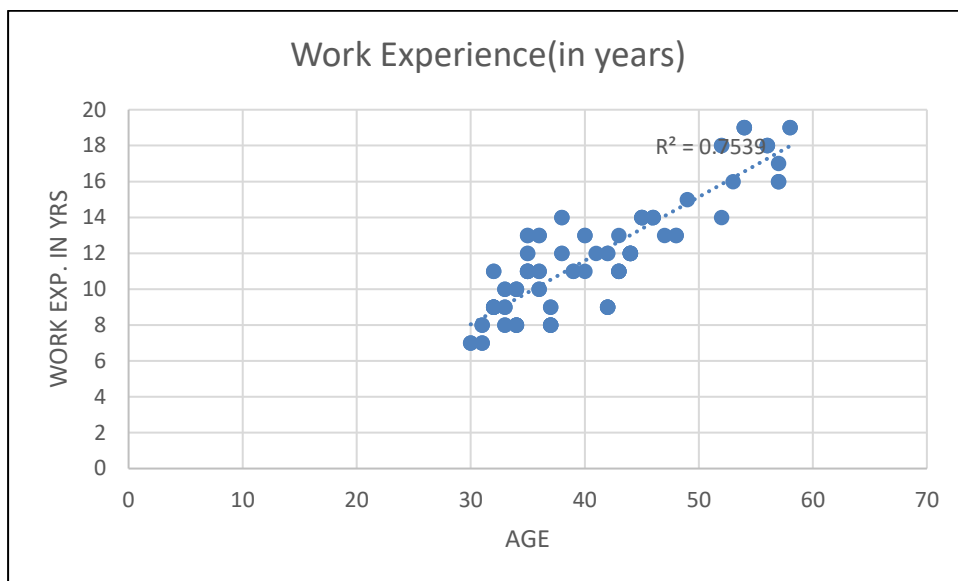
Graph 3.Correlation coefficient r-value for AGE and Working Years
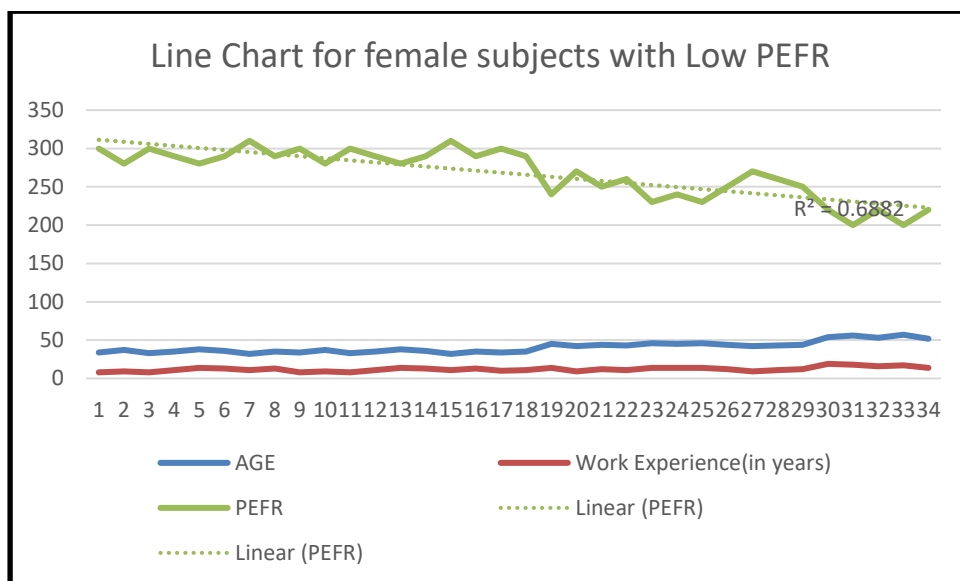
Interpretation: Correlation coefficient r-value for AGE and Working Years has been recorded as 0.7539 which is statistically significant at 5% level with linear association. It means both the variables are moving in the same directions at the time association with each other. It is also called as direct relationship between the variables. The association is strong as r value is more than 0.7.
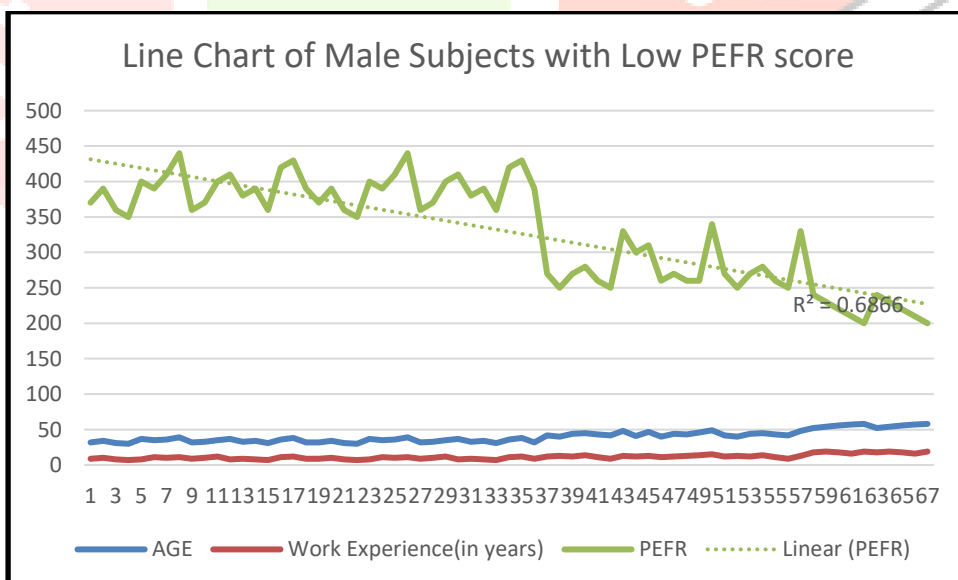
**Graph 4.Line Chart of Male Subjects with Low PEFR score**

Interpretation: This graph shows male subjects with low PEFR score. X-axis consists of age and work experience in years, while y-axis consists of PEFR values. According to the values of this graph, as age and working years of the male workers increases the PEFR values decreases. Correlation coefficient r-value for AGE and PEFR has been recorded as 0.6866 which is statistically significant at 5% level with non-linear association. It means both the variables are moving in the opposite directions at the time

association with each other. It is also called as indirect relationship between the variables. The association is moderate as r value is between 0.6 & 0.7.

Graph 5.Line Chart of Female Subjects with Low PEFR score

Interpretation: This graph shows the low PEFR score of female subjects. X-axis consists of age and work experience in years, while y-axis consists of PEFR values. According to the values of this graph, as the age and working years of the female workers increases the PEFR values decreases. Correlation coefficient r-value for AGE and PEFR has been recorded as 0.6882 which is statistically significant at 5% level with non-linear association. It means both the variables are moving in the opposite directions at the time association with each other. It is also called as indirect relationship between the variables. The association is moderate as r value is between 0.6 & 0.7.
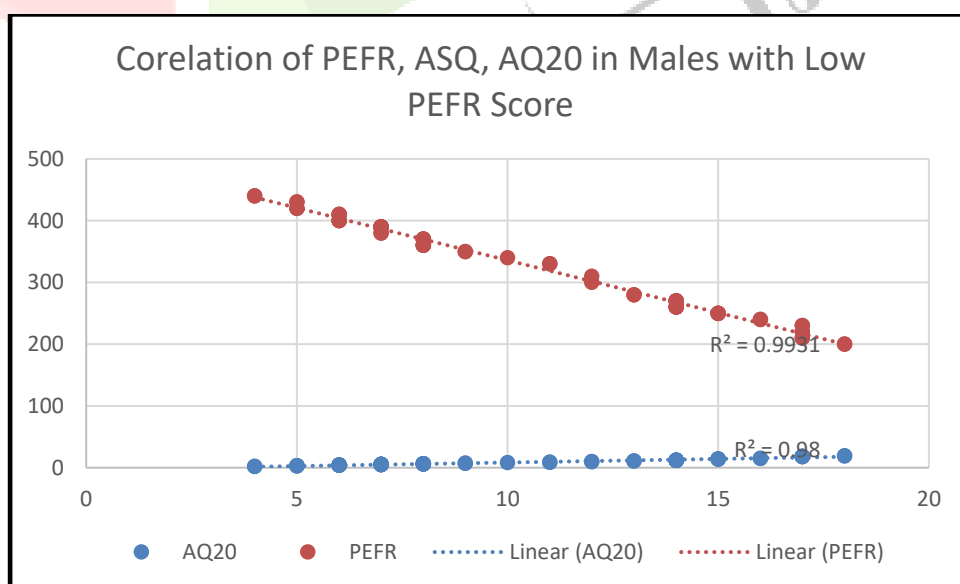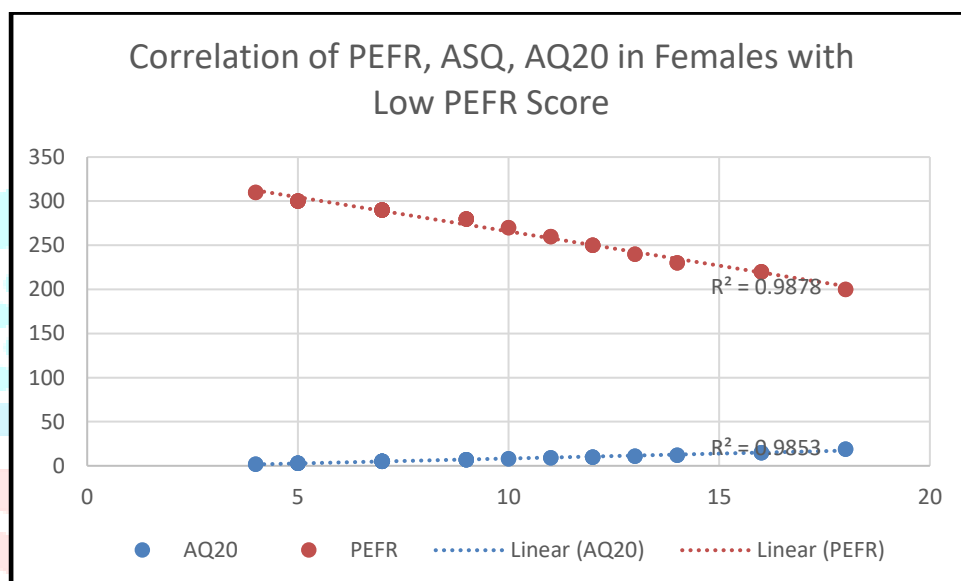

Graph 6. Correlation of PEFR, ASQ & AQ20 in Males with Low PEFR

Interpretation: Correlation coefficient r-value for PEFR and ASQ in males has been recorded as 0.9931 which is statistically significant at 5% level with non-linear association. It means both the variables are

moving in the opposite directions at the time of association with each other. It is also called as indirect relationship between the variables. The association is strong as r value is more than 0.7.

Correlation coefficient r-value for ASQ and AQ20 in males has been recorded as 0.98 which is statistically significant at 5% level with linear association. It means both the variables are moving in the same directions at the time of association with each other. It is also called as direct relationship between the variables. The association is strong as r value is more than 0.7.

Graph 7. Correlation of PEFR, ASQ & AQ20 in Females with Low PEFR

Interpretation: Correlation coefficient r-value for PEFR and ASQ in females has been recorded as 0.9878 which is statistically significant at 5% level with non-linear association. It means both the variables are moving in the opposite directions at the time of association with each other. It is also called as indirect relationship between the variables. The association is strong as r value is more than 0.7

Correlation coefficient r-value for ASQ and AQ20 in females has been recorded as 0.9853 which is statistically significant at 5% level with linear association. It means both the variables are moving in the same directions at the time of association with each other. It is also called as direct relationship between the variables. The association is strong as r value is more than 0.7.
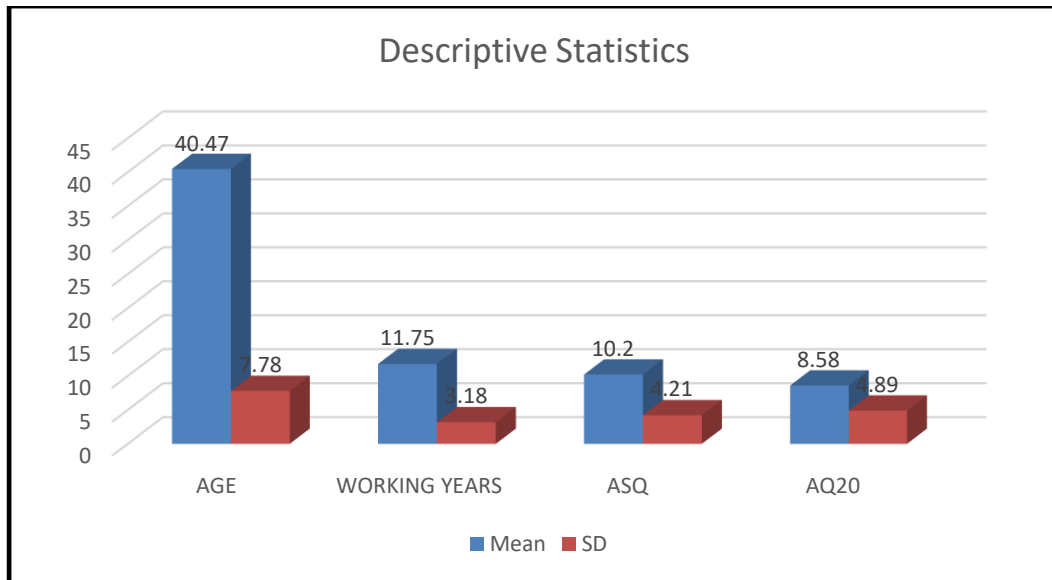
Graph 8. Descriptive statistics of Age, Years, ASQ score and AQ20 score of Cotton Textile Industry Workers Miraj Taluka.

Interpretation: Shows that minimum age was 30 years and maximum was 58 years, minimum years of working experience was 7 year and maximum was 19 years, minimum ASQ score was 4 whereas maximum score was 18. The minimum AQ20 score was 2 whereas maximum score was 19 .The mean age of workers was 40.47 years with 7.78 standard deviation, mean working years was 11.75 and standard deviation was 3.18, mean ASQ score was 10.20 and standard deviation was 4.21. The mean AQ20 score was 8.58 and standard deviation was 4.89.

Table 3 : Spearman's rank Correlation Analysis

Variable X	Variable Y	r-value	p-value	Result
ASQ	AQ 20	0.991	0.001*	Significant at 5% Linear association
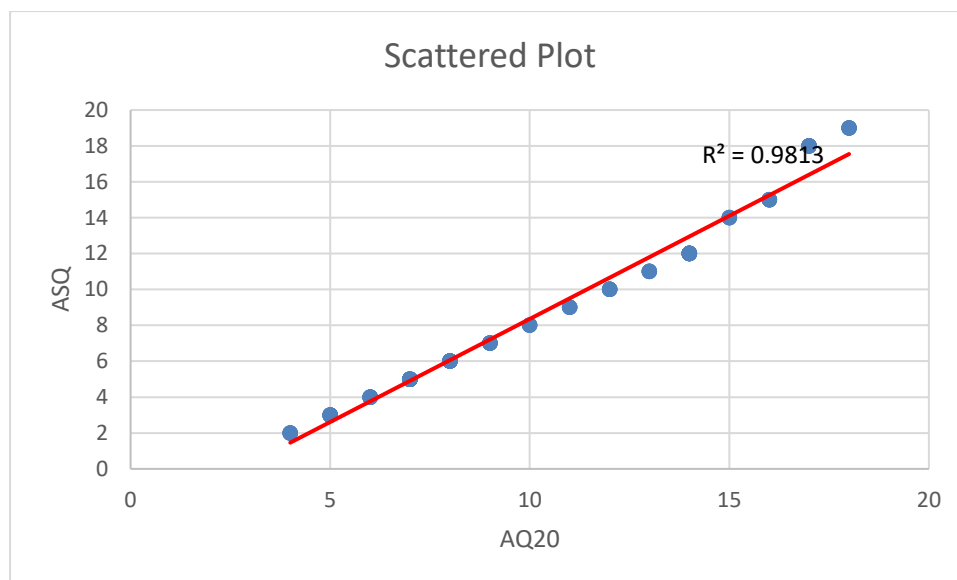
Graph9: shows Correlation coefficient r-value for ASQ and ASQ20.

Interpretation: Correlation coefficient r-value for ASQ and ASQ20 has been recorded as 0.9813 which is statistically significant at 5% level with linear association. It means both the variables are moving in the same directions at the time of association with each other. It is also called as direct relationship between the variables. The association is strong as r value is 0.7.

DISCUSSION

The purpose of this study was to screen Occupational Asthma among cotton textile workers and to determine how asthma affects their work ability and quality of life. The task in the cotton textile industry that caused asthma symptoms was exposure of sensitization to high molecular weight allergens like plant and animal protein. Additionally, as a result of inhaling cotton dust, particularly the fine particles, which settle out in the gas exchange region of the lung and irritate the lungs, exposed workers experience symptoms mostly of chest tightness, difficulty in breathing and frequent cough. This ongoing exposure to the cotton dust contributes to an increase in the employees' asthma symptoms which may affect workers' quality of life.

.A study by Tanzil S etal states that those textile workers working in initial area of blowing, carding and spinning sections, where blades are opened and raw cotton is processed to , from thread are exposed to higher levels of cotton dust, as compared to the workers working in weaving , finishing ,stitching or packaging areas[5], similarly in our study we found out that those workers screened for Occupational Asthma working in the blowing, carding and spinning section showed more symptoms of cough, shortness of breath, wheeze, and chest tightness as they were exposed to higher levels of cotton dust and had more trouble with their everyday chores. Cough was the most prevalent symptom followed by shortness of breath during strenuous activity seen among the workers.

A study by Jeebhay MF etal reviewed occupational asthma in the developing and industrialised world. This study says that the majority of patients however develop asthma within the first 1-2 years of exposure.[7] Thus, in present study workers with work experience of more than one year were included.

Present study shows that amongst those workers assessed for the risk of having Occupational Asthma, as the age and working years of patients increases the PEFR reduces which coincides with the previous study. The age of both male and female workers ranged from 19 to 59 years in this study which roughly matches the age range of 21 to 58 years that Ajeet S. et al. studied among spinning mill workers in a prior study.[1]

According to this study amongst the 245 workers 58% of the workers were at no risk of having Occupational Asthma, whereas 42% of the workers screened with PEFR score showed risk of having Occupational Asthma. According to their PEFR values, male subjects with score<450 lit/min and female subjects with score <320 lit/min were determined & further assessed using Asthma Screening Questionnaire (ASQ) who scored (>=4) on ASQ and their scores were noted. Out of the 245 subjects (n=101) were determined & were given AQ-20 sheets to fill, values obtained from it was used to relate the relationship of Occupational Asthma with Quality of Life among those cotton textile industry workers .

In a systematic review by Moore VC states that serial PEF measurements are a useful objective confirmatory test for a diagnosis of occupational asthma, with an overall sensitivity of 82% and specificity of 88%.[17] Therefore in our study we have used PEFR values to screen workers with the risk of having Occupational Asthma.

A study by Shin B provides evidence that Asthma Screening Questionnaire is a simple, inexpensive, reliable and efficient pre-interview screening tool for diagnosing asthma in adults. The best combination of sensitivity (96%) and specificity (100%) was associated with a total score cut off point of≥4.Theself-administeredandphysician-administeredquestionnaireswereshowntohaveahighlevelof agreement (statistic, 0.56-1.00; P<.0001).[14] In this study after screening workers with Peak Expiratory Flow Rate values , Asthma Screening Questionnaire is used as outcome measures to detect the workers having risk of OA.

A study by Win T etal describes the usefulness of the Airway Questionnaire 20 (AQ20) – a short version of the St George"s Respiratory Questionnaire (SGRQ) – to assess the quality of life (QOL) of asthmatic patients . According to this study the AQ20 can be used instead of the more complicated SGRQ to assess QOL in patients admitted to the hospital for an asthma exacerbation. This questionnaire has previously been tested and found to have excellent reliability, with an interclass correlation ratio for total score of 0.90 (intra-observer variability) , 0.93 (inter- observer variability) (significant p<0.05 forboth).[16]Hence in this study AQ20 questionnaire is used to assess the Quality Of Life of those workers who are at the risk for having Occupational Asthma.

Sauni R, etal found out that asthma limits both the work and everyday life of construction workers and it is a cause of early retirement and change of occupation.[12] This study concludes that, there is strong correlation of occupational asthma with quality of life among cotton textile industry workers of miraj taluka. Cotton textile industry workers are continuously exposed to Work Related Asthma triggers, they are more likely to be unemployed, be temporarily unable to work, may change work tasks and occupation, retrain for a new job ,or retire early, may have frequent absenteeism and have a poorer quality of life because of their illness and symptoms.

Since occupational asthma seems to limit both the work and everyday life of cotton textile workers, early detection and diagnosis of Work Related Asthma is crucial for effective care, lowering the incidence and improving the Quality Of Life of cotton textile sector workers. Therefore, in order to protect the cotton textile industry workers from the risk of Occupational Asthma more effective use of personal respiratory protection , safety controls such as ventilation and frequent health checks are essential as well as curative and preventive measures should be taken.

CONCLUSION

This study concludes that, there is strong correlation of occupational asthma with quality of life among cotton textile industry workers of Miraj taluka.

LIMITATIONAND SUGGESTIONS

Limitation:

Quality of life in workers with Occupational asthma in different age groups could have been compared.

Suggestions:

- Quality of Life in workers with Occupational Asthma can be assessed in other industries.
- Quality of Life in workers with Occupational Asthma can be assessed pre and post Chest Physiotherapy
- Quality of Life in workers with Occupational Asthma can be assessed age group wise

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