



Environmental Assessment Cotton Dust in Malegaon City Maharashtra Textile Industries and Its Impact on Human Health

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Abstract

The world's second-largest commerce after agriculture is textiles. India gains foreign commerce appreciations to its textiles sector. The operations involved in spinning, weaving, dying, printing, and finishing other procedures necessary to transform the fiber into a finished fabric or garment comprise the fabric production process. The industry, which employs between eight and one million people, is undoubtedly one of the biggest in our nation. There are few fabric turbines in the northern and southern parts of the nation, but the majority are located in the western part of the country, in places like Ahmedabad and Mumbai. Within the nation's financial system, the textile industry is quite important. An important part of the nation's economy is the fabric sector. 10% of worldwide income comes from it, while 20% of all company labour is directly employed by it. India's textile sector has become more productive as a result of automation and ongoing expansion. As a result, the need for more raw resources damages the ecosystem. This study examines the effects of Malegaon City's textile industry on the environment and public health. It was determined that loud noises and cotton dust production are the main ways textile mechanical processes impact the work environment. This study's aims are to investigate any possible health risks associated with labour in Malegaon City's textile industry to ascertain the impact of occupational health hazards on worker health in Malegaon City's textile industry. Sample: The study includes a total of 230 workers. Research Design: A descriptive research design is used in this study. A worker observation checklist and a structured worker interview questionnaire are the two tools utilized to collect data. Every piece of information was gathered via field visit. Recommendations: The study suggests emphasizing the value and efficacy of personal protective equipment in addition to a series of standardized occupational health and safety assessments in fieldwork to enhance worker performance in terms of occupational health and safety. Conclusion: The textile industry provides employment to lakhs of workers. But due to lack of safety measures at the workplace, it is creating hazards to workers' health by creating awareness among workers and effective management. should be controlled.

Keywords: Workplace Environment, Cotton Dust Pollution, Human Health Effect, Suggestion.

1. Introduction

The world's second-largest commerce after agriculture is textiles. India gains foreign commerce thanks to its textiles sector. The operations involved in spinning, weaving, dying, printing, and finishing other procedures necessary to transform the fiber into a finished fabric or garment comprise the fabric

production process. There are between eight and one million workers in the industry, which is undoubtedly one of the biggest industries in our nation. There are few fabric turbines in the northern and southern parts of the nation, but the majority are located in the western part of the country, in places like Ahmedabad

and Mumbai. Within the nation's financial system, the textile industry is quite important. An important part of the nation's economy is the fabric sector. 10% of worldwide income comes from it, while 20% of all company labour is directly employed by it. Additionally, 20% of garbage is generated by it. The industry is crucial to both the nation's budgetary equilibrium and the provision of basic goods to the whole populace [1-3]. The airborne contaminants that exist throughout any phase of cotton handling or processing are referred to as cotton lint. it could include a variety of substances, including fibre, fungi, bacteria, dirt, insecticides, and non-cotton plant material. The number of plants and any remaining pollutants that could build up with cotton during the growing, harvesting, and storage phases. An essential yet disorganized part of the fabric industry is the energy loom industry. Though widely distributed across the US, the three states of Maharashtra, Gujarat, and Tamil Nadu account for the majority of its population. Lastly, in several states, including Andhra, Karnataka, Punjab, West Bengal, and Uttar Pradesh. There are unique qualities unique to every electric loom center. The three biggest centers for power looms in Maharashtra are Bhiwandi, Ichalkaranji, and Malegaon. Cotton textiles are typically produced through a number of steps, ginning and finishing being the final ones. Every stage includes distinct health and safety risks that are exclusive to it. The Government of India has categorized industries into three groups based on the quantity of environmental pollution each company produces. Orange, green, and red. The most polluting industries are those in the red category, which is followed by those in the orange and green categories. This classification places the cotton spinning and weaving sectors in the orange group, indicating a high risk of producing dangerous pollution levels in the environment.

2. Review of The Literature

1.Hasanuzzaman Chandan Bhar (2016) Indian Textile Industry and Its Impact on the Environment and Health: A Review The Indian textile industry's productivity has increased due to ongoing development and automation. As a result, the environment is suffering due to an increasing

demand for raw materials. This study reviews the consequences of the Indian textile industry on human health and the environment, concluding that the major ways that the textile mechanical process affects the workplace environment are through creating cotton dust and loud noises. While the production of fibers and the use of chemicals have a significant detrimental influence on the environment, polluting the land, water, and air and releasing dangerous byproducts that unintentionally encourage acid rain and global warming.

- 2.Sintayehu Daba Wami, Daniel Haile Chercos, Awrajaw Dessie, ZemichaelGizaw, Atalay Getachew, Tesfaye Hambisa, Tadesse Guadu, Dawit Getachew & Bikes Destaw (2018) Cotton dust exposure and self-reported respiratory symptoms among textile factory workers in Northwest Ethiopia: a comparative cross-sectional study Worldwide, there is a sharp rise in the prevalence of respiratory illnesses brought on by cotton dust, with emerging nations experiencing particularly severe cases. Cotton dust exposure is known to cause respiratory symptoms in workers, including cough, phlegm, wheezing, shortness of breath, chest tightness, and byssinosis. But in Ethiopia, there is little knowledge about the risk factors and little understanding of the scope of the issue. The purpose of this study was to evaluate the frequency of respiratory symptoms and their contributing factors.
- 3.Port Said Scientific Journal of Nursing Vol.4, No. 2, December 2017Workers' Occupational Hazards at Textile Factory in Damietta City Ateya Megahed Ibrahim 1Prof. Effat Mohamed El-Karmalawy 2 Ass. Prof.Mona AbdElSabour Hassan 3 Dr. Fatma El-Emam Hafez4. The health of textile manufacturing workers is severely and negatively impacted by occupational hazards. This study's objective is to evaluate the occupational health risks for Damietta City's textile factory workers. Sample: 108 workers participate in the study. Research design: The study employs a descriptive research design. Two instruments are used to collect data: the workers' Observational Checklist and the workers' Structured Interview

Questionnaire.

4. Antoine Vikkey Hinson, Virgil K Lokossou, Vivi Schlunssen, Gildas Agodokpessi, Torben Sigsgaard, Benjamin Fayomi (2016). In Benin's economy, the textile industry sector holds a significant position. It puts employees at risk for a number of workplace hazards, such as cotton dust exposure. This study was started and carried out in a cotton industry company in Benin in order to evaluate the impact that working with cotton dust had on the health of the workers. The cross-sectional study included 656 subjects who had been exposed to cotton dust and 113 subjects who had not; the study's goal was to assess the respiratory illnesses among textile workers exposed to cotton dust.

3. Objective

1. To identify potential health risks during work in the textile sector in Malegaon City.
2. To determine how workers' health in Malegaon City's textile sector is affected by working health hazards.
3. To determine the safety Recommendation that the textile industry workers in Malegaon City are using.

4. Data Base and Methodology

The power loom industry is quite well-known in Malegaon, the city in the Nashik district of Maharashtra state. Knitting workers are exposed to a lot of dust during harvesting, weaving, and pressing cotton. Most people who work in weaving and ginning only have 8 to 12-hour shift every day, and they spend eight to twelve hours a day in a dusty environment. In this study, 230 employees of power loom factories participated, which is situated in the Maharashtra state district of Nashik, Malegaon city. A survey on health was carried out in power loom plants using a questionnaire. In a number of disease research, questionnaires are employed to gauge participants' perceptions of health. A standardized investigation of respiratory disorders and other illnesses in connection to working conditions and the local language is being conducted in this project. Interviewers with training were able to gather data on the kind of employment, age, hours worked, and history of exposure to high dust levels, as well as

respiratory symptoms like tightness in the chest and difficulties breathing. a strong cough, chest tightness, and pain. The comprehensive data gathering questions also asked about habits including smoking, family history of asthma, and general health [4-8].

5. Selection of Study Area

The researcher selected Malegaon City, situated in the Nashik district of Maharashtra, India, as the study region. The distinct Malegaon city warrants attention as a research region due to the following features. Located in Maharashtra, India's Nashik District, lies the city and municipal corporation known as Malegaon. Malegaon is 438 meters (1437 feet) high and is situated at 18.42°N 77.53°E, close to the confluence of the Girna and Mausam rivers. Mumbai, the state capital, is 280 kilometers northeast of it. Adjacent cities with good connectivity are Nashik, Manmad, Mumbai, and Dhule. Maharashtra's Textile Hub is Malegaon. For the weaving of textiles on power looms from the early 20th century, Malegaon is an important hub. The year 1935 saw the city conductor in a new era of dominance. A traditional hub for handloom weaving in Maharashtra was Malegaon.

6. Result and Discussion

Table 1 Workplace Environment

S. No	Variables	Response	Percentage
1	Ventilation	67	29.14 %
2	Ventilation satisfaction	31	13.48 %
3	Light satisfaction	34	14.78 %
4	Washroom availability	48	20.87 %
5	Availability of first aid	24	10.43 %
6	Head and nose cover	18	7.83 %
7	Use of protective components	8	3.47 %
Total		230	100%

The Textile Workplace Environment Area Ventilation Table 1 above indicates that 29.14% of the available ventilation is satisfactory. 13.48 % Workplace Lighting: 14.78% was recorded. The

Washroom availability is 20.87%. First Aid Resources Available 10.43 Percent Head and Nose Cover 7.83 Use of Protective Equipment 3.47 Survey data recorded.

Table 2 Textile Department

S.No	Department	No of Response	Percentage
1	Blow room	31	13.48%
2	Carding	39	16.95%
3	winding	46	20%
4	Weaving	88	38.27%
5	Packing	26	11.30%
	Total	230	100

The textile business is divided into several departments, with 13.48% of employees working in the blow room. 20% are Winding Machine Workers and 16.95% are Carding Department. 11.30% of workers are engaged in the packing area, whilst 38.30% work in the weaving department, shown in Table 2.

Table 3 Types of Products Manufactured

S. No	Products	Number	Percentage
1	Grey Cotton	165	71.73 %
2	Colour Saree	37	16.01 %
3	Lungi	28	12.17 %
	Total	230	100 %

Malegaon Power looms are mostly focusing on Gray cloth cotton and synthetic 71.73%, other manufactured items are lungi 12.17%and sarees

fabrics 16.01%. All these productions are Power loom Productions, shown in Table 3.

Table 4 Working Experience

S. No	Year of Experience	No of Respondents	Percentage
1	05 to 10	21	9.13%
2	10 to 15	44	19.13%
3	15 to 20	75	32.61%
4	20 to 30	90	39.13%
	Total	230	100%

Regarding the number of years expended knitting, 9.13% of weavers have experience 5 to10 years; 19.13% have experience from 10 to 15 years; 32.61% have experience from 15 to 20 years; and 39.13% have experience from more than 30 years, shown in Table 4.

Table 5 Working Hours

S. No	Working Hours	No of Respondents	Percentage
1	6 to 8	44	19.13%
2	8 to10	88	38.26%
3	10 to 12	98	42.61%
	Total	230	100%

It is evident from Table 5 that 42.61% of workers put in a 10 to 12-hour shift per day. 38.26 of the workforces puts in 8 to 10 hours every shift. Only 19.13% of the workforce works an6 to 8-hour shift. Alternate. In addition, the survey found that power loom weavers employed by a plant in Malegaon City work without a set weekly holiday, shown in Table 5

Table 6 Habit

S. No	Habit	No of Respondents Yes	Percentage	No of Respondents No	Percentage	Total
1	Smoking	175	76.08	55	23.2	100 %
2	Tabacco /Gutkha	132	57.39	98	42.60	100%
3	Alcohol	-	-	-	-	00%

A table survey reveals that approximately 76.08% of textile industry workers smoke regularly, while 55% do not. 57.39 workers use gutka and tobacco. 42.60% of employees do not make use of. More diseases are caused by liver problems than by smoking or ingesting gutkha, shown in Table 6.

Table 7 Cotton Dust Issues

Types	Size of Particles (μm)
Trash	(> 500/lm),
dust	(50- 500/lm)
micro dust	(15-50/lm)
respirable dust	($\ll$ 15/-lm)

Table 7 One of the biggest issues facing the cotton textile business is cotton dust in the workplace. This issue is more prevalent in each part. Small and microscopic particles of different substances exist in the air as dust, and they sink gradually to allow for long-distance airborne transportation. The International Committee for Cotton Testing Methods established a classification system that allows the particles in cotton dust to be categorized based on their size. Technical dust, which consists of fiber fragments on the fiber's surface, and organic and inorganic natural dust are the two types of dust found in cotton spinning mills. 50–80% fiber fragments, leaf and husk fragments, 10–25% sand, and 10–25% water soluble components make up micro and fine dust. A high percentage of fiber fragments suggests that during processing and weaving, a significant amount of micro and fine dust is produced. 40% of micro and fine dust has been found to be free between flocks and fibers, 20%–30% to be loosely bound, and

the remaining 20%–30% to be securely bonded to the fibers. Processing allows a combination of dust to be released. Working cycles, adopted machine inventories, and room air conditions are the primary causes of this. Typically, organic elements are derived from the cotton plant's leaves, stalks, or seed pods. Sandstorms and harvesting processes produce inorganic natural dust of mineral origin that sticks to the fibers. The three main factors that determine the amount of natural dust in raw cotton purchased are

- the cultivation area,
- the fiber's maturity, and
- the harvesting technique.

Particles of dust fall more slowly. As a result, they have the ability to stay in the air for extended periods of time and travel great distances on wind. The following is a list of the issues that dust causes are the staff is under further stress as a result. It's unpleasant to breathe in dust. Similar to the nose and eyes, it can trigger allergies. Respiratory illnesses like byssinosis may result from it. Dust deposits are an environmental concern. Dust buildup that can get inside of machinery. Loading the air conditioning apparatus. Impact on goods Pressurization of machines can lead to a direct or indirect quality defect. Operational disturbance is caused by dust buildup. Blocking and exhausting the truth. Roughness of yarn has increased. Wear on machine parts (such as rotors) occurring more quickly. The working conditions in conventional spinning mills are typically dusty and unclean in places like the mixing room, blow room, carding, Weaving and Packing combing department. In typical mills, cotton dust in these locations ranges from 40 mg/m³ to 50 mg/m³. Other departments do include cotton dust; however, the concentrations range from 1 to 8 mg/m³. the problem of health diseases as.

Table 8 Human Health Problems

S. No	Health Problems	No of Respondents	Percentage
1	Eye side	30	13.00%
2	Byssinosis	55	23.91%
3	Lung Disease	46	20%
4	Dry Cough	39	16.97%
5	Toxic Liver Disease	12	5.22%
6	Skin Problem	05	2.17%
7	Heart Problem	08	3.49%
8	Hearing Problem	35	15.24%
	Total	230	100 %

According to the numbers above, the most prevalent health issue among textile industry workers. 13 % have eye problems. 23.91% of the illnesses caused by byssinosis are present. 20% of workers have lung disease. 16.97% Other workers are being bothered by a dry cough and cold. In addition to 2.17 workers' skin issues, 5.22 workers are impacted by toxic liver illness. 3. 49 People suffer from cardiac issues. 15.24% of workers have hearing impairments. Byssinosis may result by breathing in dust from raw cotton. The majority of those who work in the textile business have it. Individuals who are sensitive to dust may experience symptoms similar to asthma after being exposed. Byssinosis is still widespread in underdeveloped nations. This disease is more likely to occur among smokers. Long-term (chronic) lung illness can be brought on by frequent dust exposure, shown in Table 8.

7. Recommendation

1. Improving occupational health through performing safety performance evaluations and health and safety assessment series for field employees.
2. Keep an eye on employees' health and wellness at regular checkups. This will help identify occupational hazards early on.
3. Stressing the value and efficiency of personal protective equipment in order to encourage fitness and provide first aid with accuracy. Workers via initiatives to promote health.

4. Professionals should create and implement health education initiatives. to educate employees about the negative consequences of health nurses.
5. The risks to one's health at work, the value of training courses, and the usage of the proper personal protective equipment.

Conclusion

Workers were exposed to cotton dust in the overall working conditions and environment that were noted. As a result, it was found that the working environment had low indoor air quality. There was no formal housekeeping program in place, and the workplace was extremely dusty. Additionally, the majority of the data collectors noticed that the workers' eyes, eyebrows, hair, nostrils, and clothing were covered in dust particles when they suddenly sneezed upon entering the textile businesses. The inadequate design and placement of the working units resulted in air flow restriction to the various working units even though there were natural ventilation systems (doors, windows, and other openings). The mechanical ventilation systems in the working units were not operational. The operating units were dimly lighted as well. We saw that every working unit lacked safety teaching procedures and warning indicators. It was also discovered that not every worker wore face shields, respirators, or other personal protective equipment (PPE) to reduce exposure to cotton dust.

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