Epidemiology Assessment among Workers: A Case Study of Haroon Textile Industry Gujranwala

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Abstract This study conducted to evaluate and epidemiology assessment among the workers in their work place, the study area selected for study is Haroon textile industry Gujranwala. The epidemiology is different from worker to worker, from department to department and from industry to industry. There are certain factors that can cause different diseases to workers such as corrosiveness of chemical, inappropriate use of chemicals, inadequate availability of personal protective equipment (PPEs). Workers have chances of severe allergy, skin rashes and eyes problems.

Keywords Epidemiology, Textile industry, Corrosive chemicals, Allergy, PPEs

1. Introduction

Pakistan has huge, dynamic and export concerned with textile industries that contribute to the economy of country. Textile industrial sector is the largest sector which produces country's highest export retributions of about 58%. It also generates high number of jobs (39%) to largely underutilized workforce, and contributes with 8.5% to GDP. As Pakistan secure 4th position among largest producers of cotton yarn and cloth in world and ranks 2nd in yarn and 3rd in export of cloth. The country's cotton production reached an all-time high level of 14.81 million bales of cotton on April 31, 2012 by breaking the previous high record of 14.31 million bales in 2004-05. The textile mills also purchased record volumes as they piled up more than 13.44 million bales out of the total of 14.81 million bales. The Environmental epidemiological assessment aims to study a relation between environmental risk factors and also the health effects. At human exposure level exposure assessment is very difficult to study in research related to epidemiological. The exposure assessment is a very important analytical tool to study the potential & actual exposure of receptors at the chemical hazard of the source and important component of health risk assessment in epidemiological study [19]. Epidemiology is the study of the spread of infectious diseases in populations. Infectious diseases are those that can be spread from one host to another. Incidence is the number of individuals with the disease at a given time whereas prevalence is the percentage of individuals with disease [4]. Noscomial infections are hospital learnt infections that affect approximately 5% of patients with a documented infection acquired in a hospital [14]. Diseases and accidents are common in workplace. The incidence of occupational accidents and diseases in Pakistan are very high because of thousands of workers are routinely exposed to hazards. Most workers are illiterate and do not know about machine operating. A large number of workers will be at risk if no future attempts are made to improve the occupational health system [1]. The major capital of an industry is its workers who run the industry from their capabilities in any situation. But the workers of our country are facing much of problems in their working place such as musculoskeletal disorders, salary, supervisor and co-worker relations and other many problems. The workers are main asset of a country there should have compensation and welfare to them [11]. This study is conducted to check the conditions of worker in their working place. This study conducted to elaborate the present status of employment in Pakistan, and worker is satisfied with his working condition? Their workplace environment is suitable and safe for them or not? The study conducted to check the performance and workload of workers in the industries [8]. After this we also monitor the different factors. To study these objects Haroon Textile industry private limited Gujranwala is

selected. We have selected Questionnaire and survey method to elaborate the different aspects of this study such as diseases among the workers their job satisfaction etc. questionnaire develop and fill from the industrial worker, they respond differently. To overcome and reduce the prevalence of diseases among the textile workers there must present personal protective equipment, training of workers and especially compensation for them like medical facility, transport and accommodation facility.

The main objectives of this study:

- To find the musculoskeletal problems among workers
- Monitor the environment
- Check the pollution
- To check diseases among worker

A worker work in any working condition may affect different diseases like lower back pain, head pain, leg and elbow pain due to mechanical stress in muscles, ligaments, tendons and supportive tissues of the spine. Mechanical lower back pain is cause due to precise nature of injuries. We can say that lower back pain may be cause due to tension in muscles, pain, stiffness & pain in legs and feet also burning sensation moving downs to legs. Approximately 85% peoples facing lower back pain during their life working in industry [15]. Dyes which are used in textile industry very commonly have very overwhelming effects on human beings and many other organisms. These dyes used in most of the textile industries are water soluble and their behavior is hydrophobic in nature commonly scatter dyes which is used in dying polyester fabrics. Some of the disperse dyes have the ability to bio-accumulate and their components are remaining liquid [21].

1.1. Study Area

The area selected for the epidemiology assessment is Haroon textile industry Gujranwala. Gujranwala is an industrial city in Punjab Pakistan. It is 226meters above the sea level and is the 7th most populous city. Gujranwala has hot semi-arid climate, during summer temperature reaches the 36-42 °C.

2. Literature Review

Environmental and occupational chemical exposure characterized differently [15]. Findings from epidemiologic studies of persons occupationally exposed to BD have been the subject of substantial disagreement. To date, three cohort mortality studies and one case control study have been conducted [24].The workers face the different problems such as salary, insecurity, low working conditions and health problems in unintended and un-organized structures [9]. Ghosh [10] studied the occupational problem in work of Goldsmiths in India. The study was filling questionnaire from workers from their work job and stress [2]. It is observed this bad work-live balance was colleague with elevated risk for absence in the base of disease under the work population in Scandinavian [6]. These tasks may request worker accept uncomfortable positions since much the work is fact on cover height, close of the soil or in narrow service areas. By work in these positions increases the quantity by virtue of personal obligation practice to play these tasks. Bladder cancer has excessive risk among the textile workers, many epidemiological studies reported it [7]. There must present safety risks for the industrial workers those having hazardous operations [20]. Mohammad M. [16] studied that there are present corrosive, toxic, explosive, flammable, radioactive and carcinogenic chemicals in different chemical and textile industries, they cause acute to chronic problems. Cotton exposure causes lung cancer [5]. The textile industries sector exposes workers to several respiratory occupational diseases, of which business is the most important. Bureau of statistics suggested that economic losses to individual and to the community caused by work-related musculoskeletal disorders. [27]. Elevated hope for live in the base of improvements in health and reduce in birth the years is letterhead in a progressive age for society. Rana I.M. [22] studied the unhygienic workplace and improper ventilation of stitching units may cause the skin rashes, allergies and other respiratory problems. Awan S. [3] Reported that according to labor force distribution in different geographical areas the highest number is situated in Faisalabad. A heterogeneous group of cancers such as Lymphohematopoietic cancer arise due damage in stem cells during hematopoietic and lymphoid development [12]. Needham [13,17] studied that chemical industrial sector is more critical than textile sector, most common hazards in chemical industries are fire hazard, electrical hazards, falling hazards.

3. Material and Methods

**Material used:** Container (Polyethylene bottle), Preservative HNO_3

Samples of industrial wastewater were collected in plastic bottle of 1 liter volume in such a way that no bubble formation occurs in sample. Sample preserved by HNO_3. Sampling is done by systematic grid method from selected sampling points at 2km distance. Epidemiology assessment is study of distribution and determinants of health related states or events in specific population and the application of the study to control of health problems. We have applied different statistical analysis over the data such as frequency analysis, for the determination of relation between dependent and independent variables we performed correlation tool over data.The chi-square test used for the determination of association between two or more qualitative variables. Chi-square test used to check either a worker having another health problem due to one problem.

The study conducted to check the epidemiology in textile industry is descriptive base. Sources of data are both primary and secondary sources. Primary data collected through the observations, walk through survey.The required secondary data information will be composed from various publications such as journals, books, newspaper and magazines published unpublished tracts and also secondary data collected through closed ended questionnaire. Survey research method with quantitative approach was be used in this study. Quantitative is a technique of data collection in which the data is collected in the form of numbers and figures. Target population is the workers of the Haroon textile industry Gujranwala. In the target population, consist of employees (young and elders) working in theHaroon textile industry Gujranwala. We have selected the 100 number of respondents for the statistical analysis to study the epidemiology in textile industry. Sampling procedures are the methods to draw a sample used for the data collection from the target population. Systematic sampling technique is selected for the sample collection, sample collected at every two kilometer area in the vicinity of the textile industry. A well designed structured questionnaire used for the data collection. We have used survey method as a technique of data collection in this study. Other method of observation could not provide the general capability. So survey method was most appropriate technique of data collection for this study. Data was collected by using a well-structured questionnaire. There were questions related to the environment in industry, health facility given to workers, cleanliness, safety measures and diseases among the workers. After the collection of data the whole group processed the basic information and the sample the characteristics were tabulated and analysis was designed by calculating the frequencies and percentages through SPSS program. Maximum number of the items of questionnaire was close ended and some of them was open ended question included the questionnaire were classified by the recording with the help of SPSS for more appropriate analysis.

Theoretical framework

Presentation of produced data is used in the form of tables, maps and diagrams whenever need to use. Graphs are used to show appropriate portion of workers replied. Data also presented into tables and these tables were interpreted. After analysis and interpretation of data and then drawn conclusions and recommendation.
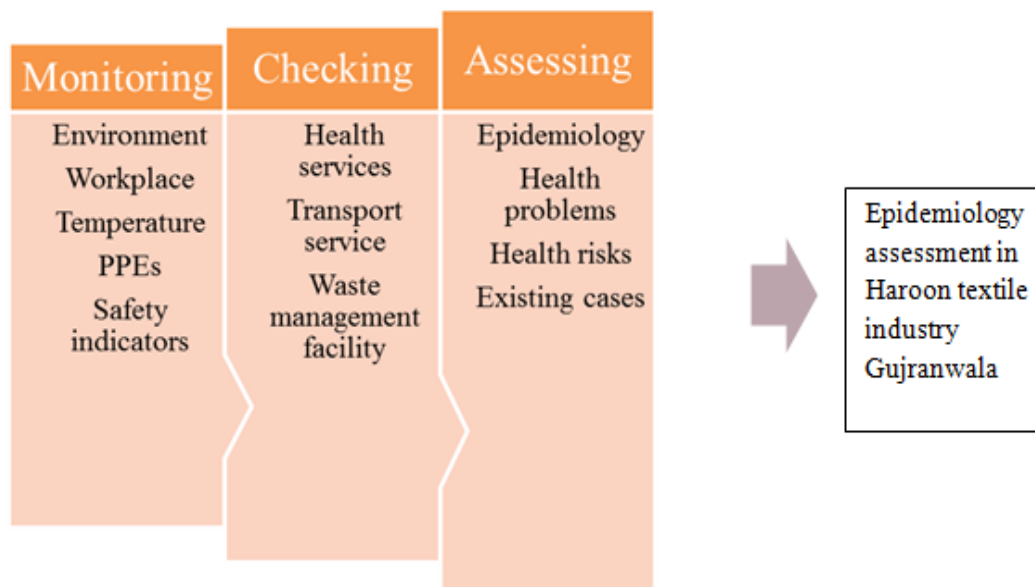
4. Result and Discussion

4.1. Frequency Analysis

Table 1: The highest numbers of respondents lie in 25-34 age categories

Age				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid 15-19	4	4.0	4.0	4.0
20-24	29	29.0	29.0	33.0
25-34	34	34.0	34.0	67.0
35 & above	33	33.0	33.0	100.0
Total	100	100.0	100.0	

**Table 2:** The highest numbers of respondents lie in under matric category

Education				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid under matric	53	53.0	53.0	53.0
matric	40	40.0	40.0	93.0
intermediate	7	7.0	7.0	100.0
Total	100	100.0	100.0	

Table 3: shows that most of the workers have service between 2-5 year

Service				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid 2-5	42	42.0	42.0	42.0
5-10	31	31.0	31.0	73.0
10-15	19	19.0	19.0	92.0
15-20	3	3.0	3.0	95.0
20 & above	5	5.0	5.0	100.0
Total	100	100.0	100.0	

4.2. Descriptive Statistics

4.2.1. Demographic information
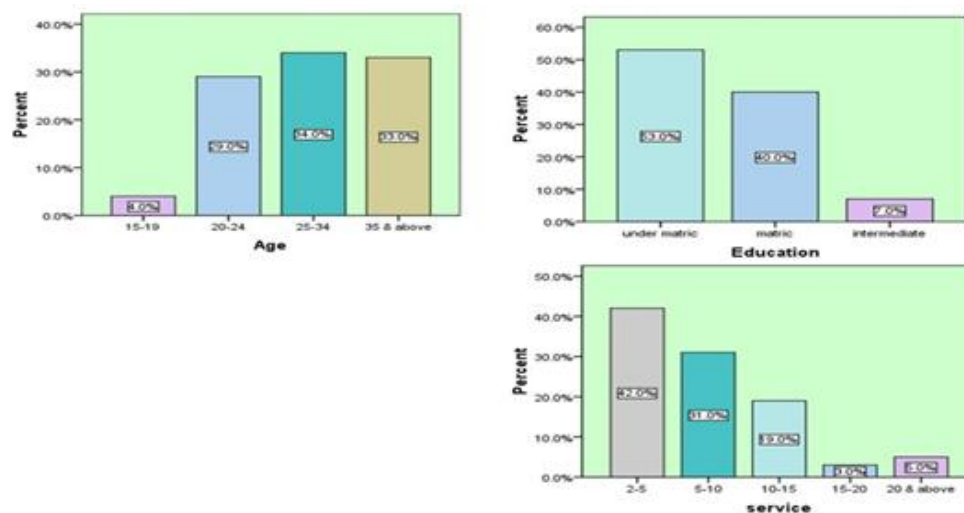
Figure 1: Demographic Information

Figure 1: shows age level of respondents, most of workers lie in 25-34 year age category and also shows the service of most of the workers lies in 2-5 year category.

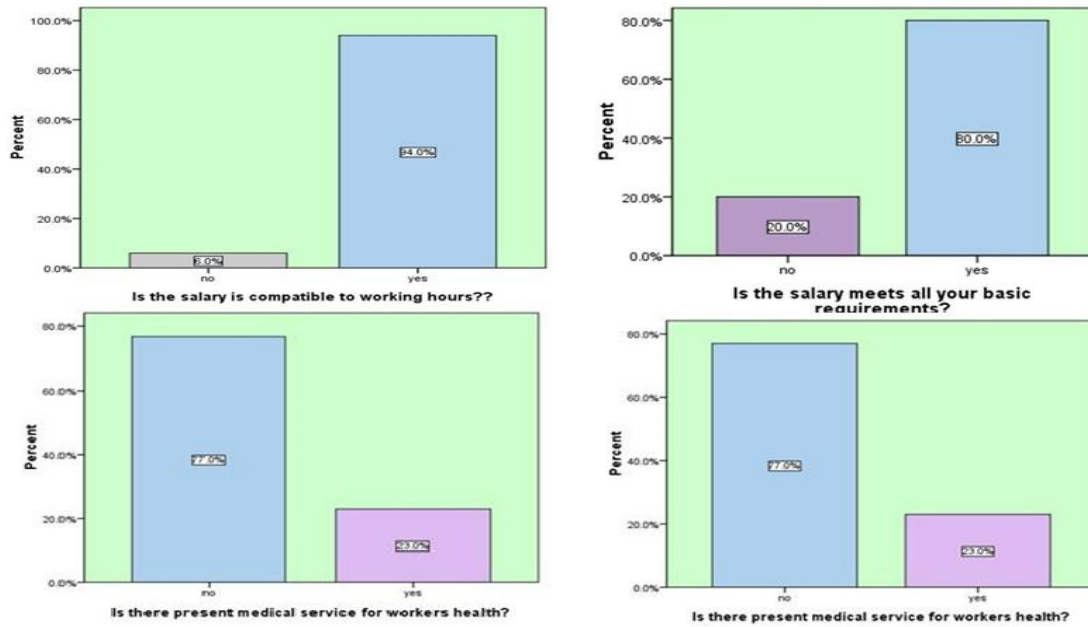### 4.2.2. The questions related graphs

Figure 2: Questions related graphs

Figure 2 shows that most of the workers agreed to their job and salary. Also shows 80% of the workers respond that salary meets their basic requirements. 23% of the workers get facilitated by medical care service. 59% workers are working in noisy environment.
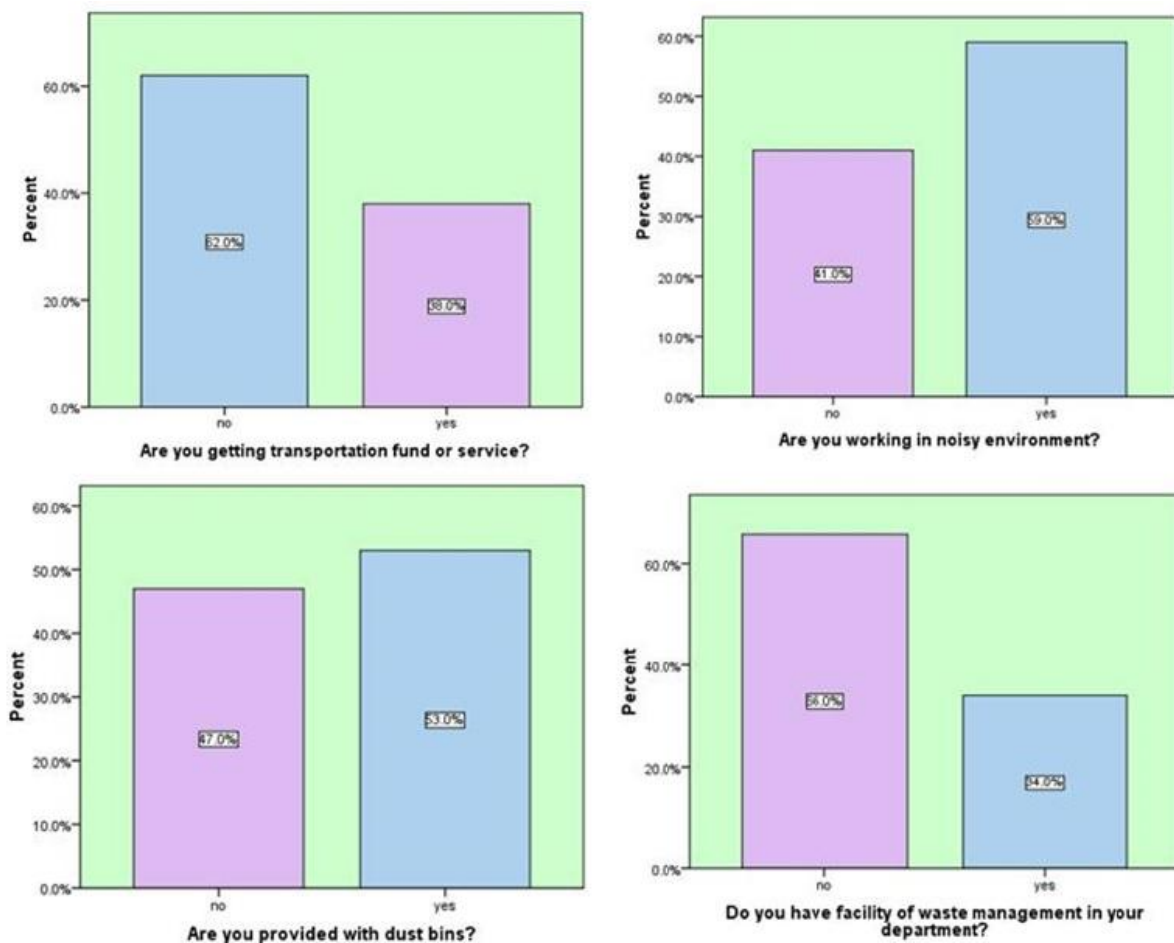

Figure 3: Questions related graphs

Figure 3 shows 65% of all respondents are working in clean environment shows only 21% workers are working in suitable temperature while rest of workers, in unsuitable environment. 53% workers said that they are provided with dustbins. 34% workers are having waste management system in their departments while others have no.
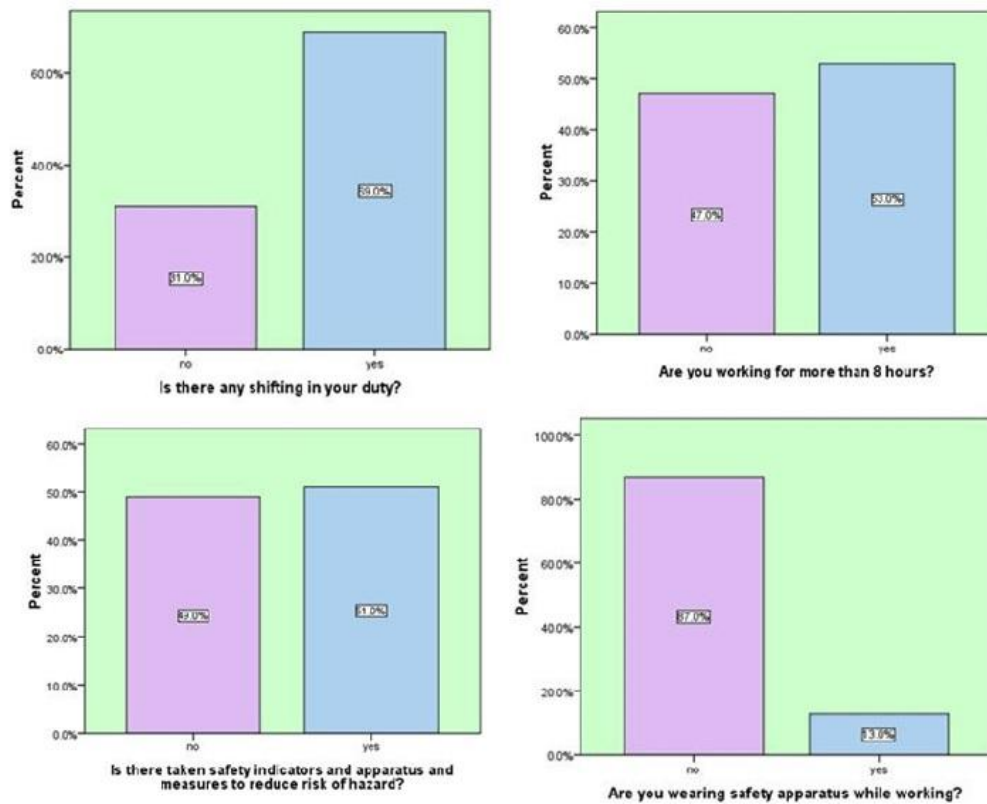

Figure 4: Questions related information

Figure 4 shows 69% workers are facilitating by shift in their duties. 53% workers work for more than 8hrs. 51% workers said they have safety indication in their department. Only 13% workers are provided with PPEs.
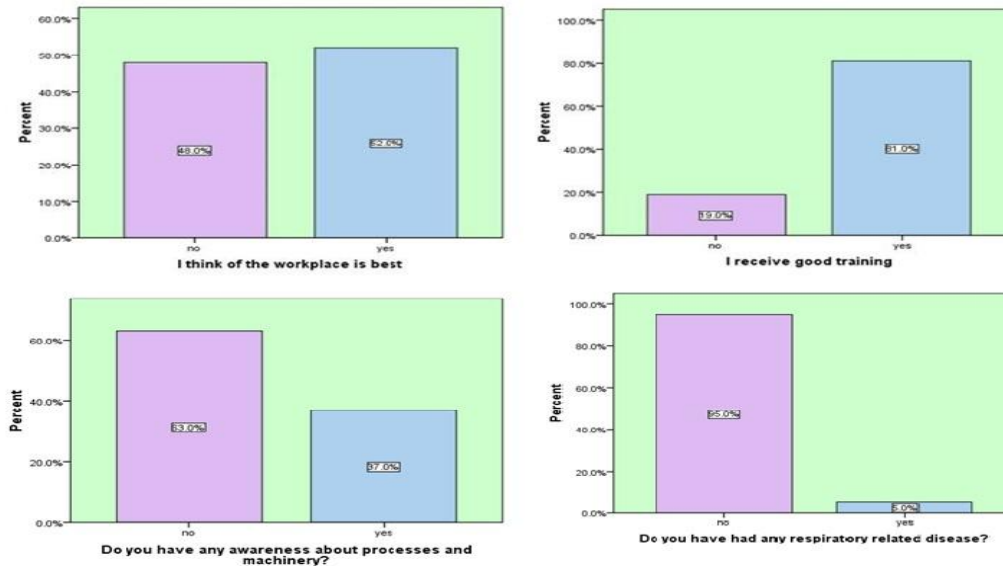

Figure 5: Graphs related to questions

Figure 5: 52% people satisfied with their workplace environment. 81% workers get received training of their job. 37% workers have awareness about processes and machinery. Only 5% people having respiratory related diseases and they have get reported.
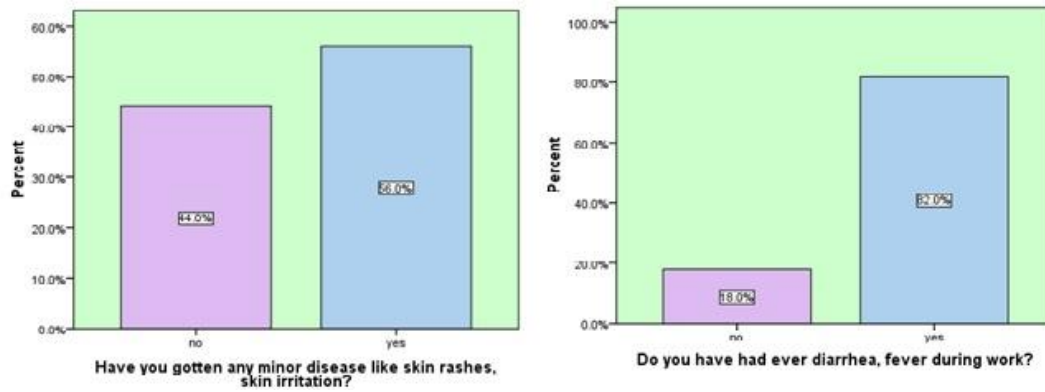
Figure 6: Questions related graphs

Figure 6 shows 56% workers get minor diseases such as skin rashes, irritation.
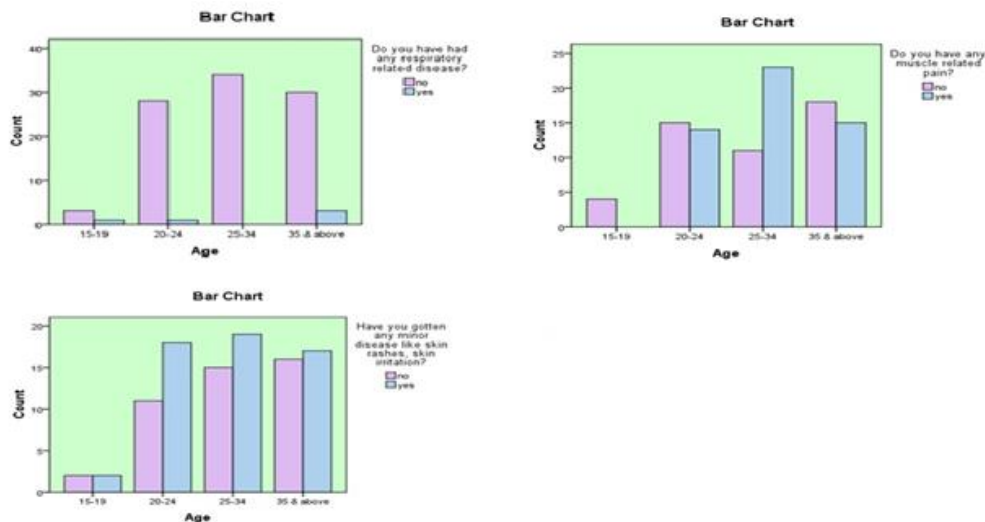
Figure 7: Bar chart related to Age-wise health impacts

Figure 7 shows the age wise distribution of respiratory related diseases, most high in 35 and above year age workers and distribution of minor diseases like skin irritation, skin rashes etc.

Figure 8: Service-wise distribution of workers with health problem

Figure 8: showing the distribution of age wise workers muscle related problems. Service wise distribution of workers having the respiratory related disease, most of workers are elders. Service wise distribution of workers having muscle related pain.

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4.3. Correlation
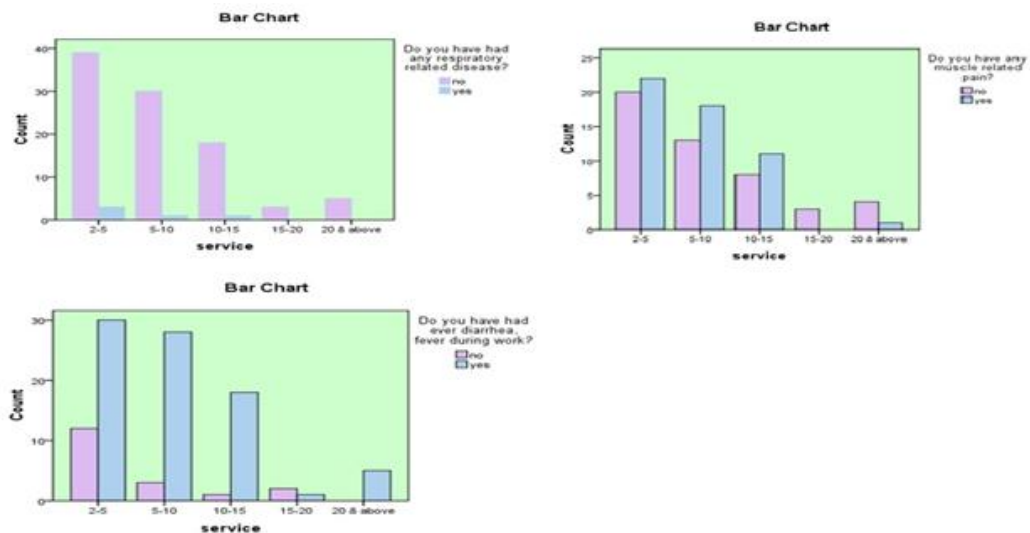#### 4.3.1. Correlation between age and respiratory disease in industry

Correlations		Age	Do you have had any respiratory related disease?
Age	Pearson Correlation	1	0.010
	Sig. (2-tailed)		0.918
	N	100	100
Do you have had any respiratory related disease?	Pearson Correlation	0.010	1
	Sig. (2-tailed)	0.918	
	N	100	100

Table 4 shows the value of correlation between the age and respiratory related disease is 1(one). This shows that there strong positive relationship between them, more the age, there are much chance of getting respiratory diseases.

4.3.2. Correlation between service and respiratory disease
Table 5: The correlation value between the service and respiratory disease is one, which shows that the workers of longer service gotten the respiratory diseases in textile industry

Correlations		Age	Do you have had any respiratory related disease?
Age	Pearson Correlation	1	0.010
	Sig. (2-tailed)		0.918
	N	100	100
Do you have had any respiratory related disease?	Pearson Correlation	0.010	1
	Sig. (2-tailed)	0.918	
	N	100	100

4.4. Chi-Square Test Results
4.4.1. Age* Do you have any respiratory disease?
Table 6: Cross tabs between age and respiratory diseases

Count		Cross Tabulation		Total
		Do you have had any respiratory related disease?		
		No	Yes	
Age	15-19	3	1	4
	20-24	28	1	29
	25-34	34	0	34
	35 & above	30	3	33
Total		95	5	100

Table 7: Chi-Square Tests

Chi-Square Tests	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	$6.468E0^a$	3	0.091
Likelihood Ratio	6.399	3	0.094
Linear-by-Linear Association	0.011	1	0.918
N of Valid Cases	100		

a. 5 cells (62.5%) have expected count less than 5. The minimum expected count is 0.20.

Table 7 shows the value of chi-square test is 0.091 to 0.91, means there is association between age and respiratory diseases. The standard value for the strong association is 0.5.

4.4.2. Service * Do you have any respiratory disease?

Table 8: Cross tab between service and respiratory disease

Count		Cross tabulation		
		Do you have had any respiratory related disease?		Total
		No	Yes	
service	2-5	39	3	42
	5-10	30	1	31
	10-15	18	1	19
	15-20	3	0	3
	20 & above	5	0	5
Total		95	5	100

Table 9: Chi-Square Tests

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.035E0[a]	4	0.904
Likelihood Ratio	1.418	4	0.841
Linear-by-Linear Association	0.638	1	0.424
N of Valid Cases	100		

a. 7 cells (70.0%) have expected count less than 5. The minimum expected count is 0.15.

Table 9 shows strong association between service and respiratory diseases.

4.4.3. Are you provided with dustbins* Have you gotten any minor diseases like skin rashes skin irritation?

Table 10: Cross tab between dustbin facility and minor diseases

Count		Crosstab		
		Do you have had ever diarrhea, fever during work?		Total
		No	Yes	
Are you provided with dust bins?	no	9	38	47
	yes	9	44	53
Total		18	82	100

Table 11: Chi-Square Tests

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.079[a]	1	0.778		
Continuity Correction[b]	0.000	1	0.983		
Likelihood Ratio	0.079	1	0.778		
Fisher's Exact Test				0.800	0.490
Linear-by-Linear Association	0.079	1	0.779		
N of Valid Cases[b]	100				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.46.

b. Computed only for a 2x2 table

4.4.4. Are you wearing safety apparatus while working* have you gotten minor diseases?

Table 12: Cross tab between wearing safety apparatus and minor diseases

Count		Cross Tabulation		
		Have you gotten any minor disease like skin rashes, skin irritation?		
		No	Yes	Total
Are you wearing safety apparatus while working?	no	35	52	87
	yes	9	4	13
Total		44	56	100

Table 13: Chi-Square Tests

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.861E0[a]	1	0.049		
Continuity Correction[b]	2.773	1	0.096		
Likelihood Ratio	3.873	1	0.049		
Fisher's Exact Test				0.072	0.048
Linear-by-Linear Association	3.822	1	0.051		
N of Valid Cases[b]	100				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.72.

b. Computed only for a 2x2 table

Table 13: Strong association between wearing PPEs vs skin diseases

4.4.5. Is there any shift in your duty* Do you have any muscle disease

Table 14: Cross tab between the shift in duty and muscle disease**?**

Count		Crosstab		
		Do you have any muscle related pain?		
		No	Yes	Total
Is there any shifting in your duty?	no	15	16	31
	yes	33	36	69
Total		48	52	100

Table 15: Chi-Square Tests

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	0.003[a]	1	0.959		
Continuity Correction[b]	0.000	1	1.000		
Likelihood Ratio	0.003	1	0.959		
Fisher's Exact Test				1.000	0.565
Linear-by-Linear Association	0.003	1	0.959		
N of Valid Cases[b]	100				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.88.

b. Computed only for a 2x2 table

Table15. Association between the work shift and muscle disease, value is o.5, means the strong association between them.

5. Conclusions

This study concluded that there are some diseases like skin rashes, skin allergy, fever and diarrhea are common among the Haroon textile industry due to lack of clean environment, no shift in duty, lack of medical services, more worktime, and lack of safety apparatus in industry. There are some workers showed the prevalence of respiratory diseases. And more of the workers showed the incidence of diseases among the textile workers. We have found many of workers who aren't satisfied from their job due to less salary and incompatible job. Therefore we suggested to employer to provide the PPEs, and hire the safety officer in his industry to enhance the performance of industry and workers.

Acknowledgement

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