



Occupational Safety and Health Practices in Cotton & Textile Sector in Punjab 2021

Dr. Arshad Mahmood
Project Director

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**Under ADP Scheme Capacity Building of Occupational Safety and Health (OSH)
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Directorate General Labour Welfare Punjab
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List of Abbreviations

OSH	Occupational Safety and Health
PM	Particulate Matter
VOC	Volatile Organic Compound
OSHA	Occupational Safety and Health Administration
DIN	Deutsches Institut für Normung
PPE	Personal Protective Equipment
LOTO	Lockout/Tagout
NIOSH	National Institute of Occupational Safety and Health
NO _x	Nitrogen Oxides
H ₂ S	Hydrogen Sulphide
PEQS	Punjab Environmental Quality Standards
ACGIH	American Conference of Governmental Industrial Hygienists

1. Introduction

The textile sector is the backbone of Pakistan's economy. It is the single largest sector, which contributes 60 % to Pakistan's total exports. It comprises 46% of the total manufacturing sector, provides employment to 40% of the total labour force, and contributes 8.5 % to the country's GDP. Textile industry includes five major sectors such as ginning, spinning, weaving, dyeing and garment. Approximately 60 million workers are employed in the textile industry globally, and the figure for Pakistan is 15 million, drawing nearly 30–35% of the 49 million unskilled workforce. Punjab has the biggest share in the textile sector, and around 70% of the textile industry is based in the province of Punjab in Faisalabad city, which is believed to be the hub. Pakistan is the 8th largest exporter of textile products in Asia. It is the 4th largest producer and 3rd largest consumer of cotton. [1,2,6,7].

Occupational safety and health (OSH) is a cross-disciplinary area concerned with guarding people's safety, health, and welfare in work or employment. Health is associated with the physical conditions of both mind and body, of all people at the workplace, including the workers, contractors and visitors, and their protection from harm in the form of injury or disease. Safety is related to the physical condition at the worksite and applies to a state where the risk of harm and damage has been removed or reduced to a tolerable level [3].

In Pakistan, thousands of workers are routinely exposed to hazards in the textile industry. In textile, these are physical, biological, chemical and ergonomic (personal) factors. In addition, there are some other aspects responsible for creating hazards in the workplace environment, such as shift work, smoking at the workplace, job strained proper use of personal protective equipment, etc. Unfortunately, the country lacks the basic infrastructure and qualified persons for providing occupational health and safety services to the workforce. Thus, a considerable number of workers will be at risk if no future attempts are made to improve OSH [4].

Pakistan lags in enabling legislation in occupational safety and health (OSH), whereas the infrastructure to promote and enforce (OSH) is inadequate. Industrial indoor environmental quality is one of the major concerns for any commercial activity as it has a profound impact on potentially exposed populations and the environment. If not managed, industrial practices become a precursor to many physiological and psychological health issues/ injuries for employers, employees, and others. When specifying the work environment of a textile industry, health elements mainly include elevated noise levels, vibrations, ventilation, illumination, heating, inadequate sanitary facilities, clothing storerooms and safe eating and drinking facilities. Textile workers are faced with several health problems such as headaches, cough, depression, cold, sleep disturbances and skin allergies. These issues can be linked to workers duration of exposure, smoking, alcohol drinking, tobacco chewing and dietary pattern. Primary reasons behind occupational injuries can be traced to inadequate health & safety conditions. While other factors like excessive workload, low social support, high depressive signs and more variance between workload also result in potential occupational injuries. Air pollution is a significant occupational and environmental issue in many textile industries. Health impacts arise

due to exposure to dust particulate matter (PM), high noise levels and numerous chemicals (solvents, VOCs etc.) utilized at various stages of textile production. In Pakistan, working deaths are reported higher than in other developing economies (Hassan, 2012) whereas, the fatality rate and accident rate per 100,000 workers are approximately 20.7 and 16,000, respectively. Around 7444 fatal accidents and 5,680,740 occupational accidents occur annually, keeping workers from work for at least three days. [5,7,8].

2. Objective

- i. To conduct Occupational safety and health risk assessment of the cotton & textile sector in Punjab.
- ii. To formulate an analysis report on occupational diseases and to suggest control measures.

3. Methodology

3.1 General Covid Guidelines by the Provincial Government

1. Clean your hands before you put your mask on or take it off and after you touch it.
2. Make sure it covers your nose, mouth and chin.
3. When you take off a mask, store it in a clean plastic bag, and every day either wash it if it's a fabric mask. In case of a medical mask, dispose of it.
4. Don't use masks with valves.
5. Avoid the 3Cs: spaces that are closed, crowded or involve close contact.
6. Avoid crowded or indoor settings.
7. Regularly and thoroughly clean your hands with an alcohol-based hand rub or wash them with soap and water.
8. Avoid touching your eyes, nose and mouth.
9. Cover your mouth and nose with your bent elbow or tissue when you cough or sneeze.
10. Clean and disinfect surfaces frequently, especially those which are regularly touched.
11. Stay home and self-isolate even if you have minor symptoms such as cough, headache, mild fever.

3.2 Study Area

A total of 6 cotton & textile industries were taken as a sample throughout the Punjab. Different tests have been performed in all five industries.

3.3 Sampling and Testing Instrument

To check the occupational health of workers, audiometry and spirometry tests were conducted. Audiometry testing of randomly selected workers of the industries was carried out using a Sibelmed Audiometer. Spirometry testing of randomly selected employees from various industries was performed using MIR Spirodoc Spirometer to diagnose respiratory ailments among them. The noise level monitoring was carried out to find the noise levels in the workplace and noise exposure to employees. Noise level measurements were carried out with a Casella Precision Sound Level Meter Type 2100. The light intensity monitoring was carried out to determine the illumination status in different sections/areas and the impacts of light intensity on the performance of employees. The measurement was carried out by Lux Meter (EXTECH, Color LED Light Meter LT-45).

3.4 Data Collection

Data collection was carried out from individual units with the collaboration of employers by the technical OSH team of SAACIWCE Labour & Human Resource Government of the Punjab, Lahore. Different tests conducted at each facility include audiometry, spirometry, stack emission monitoring, noise level monitoring, illumination level testing, heat exposure monitoring and personal dust exposure level.

4. Result and Discussion

4.1 Sociodemographic Status of Workers

4.1.1 Community Details

Figure 1 shows 92% were Punjabi, 5% Saraiki, 2% Kashmiri, while 1% were Pathan employees working in the textile sector of Punjab.

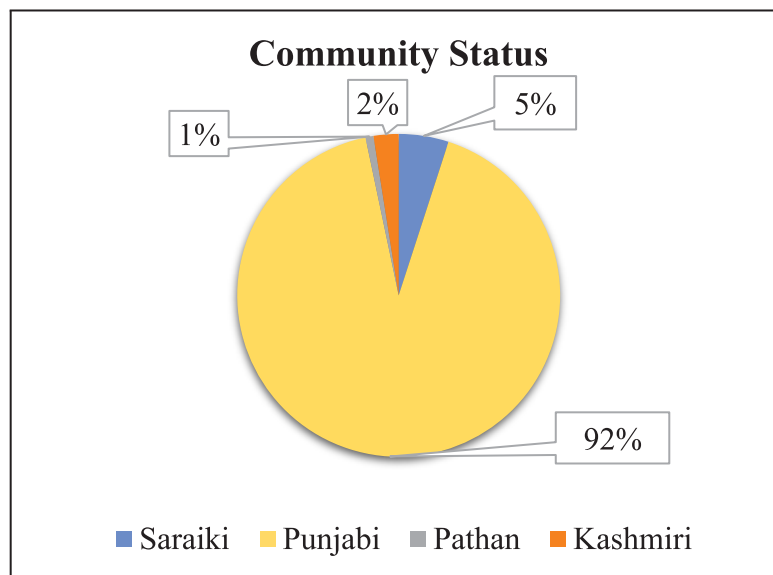


Figure 1: - Community details of the workers

4.1.2 Religious Status of Workers

The religious status of workers shows 98% of workers were Muslim, while 2% were Christian workers, as shown in Figure 2.

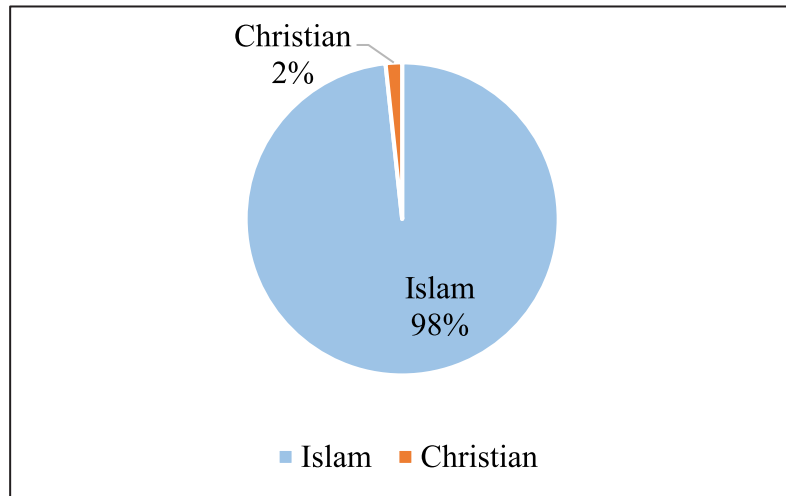


Figure 2: - Religious status of the workers

4.1.3 Educational Status of the Workers

The educational status of workers indicated 31% of workers were matric, 20% middle and primary, 12% graduate, 11% intermediate, 2% had masters qualification, while 4% were illiterate.

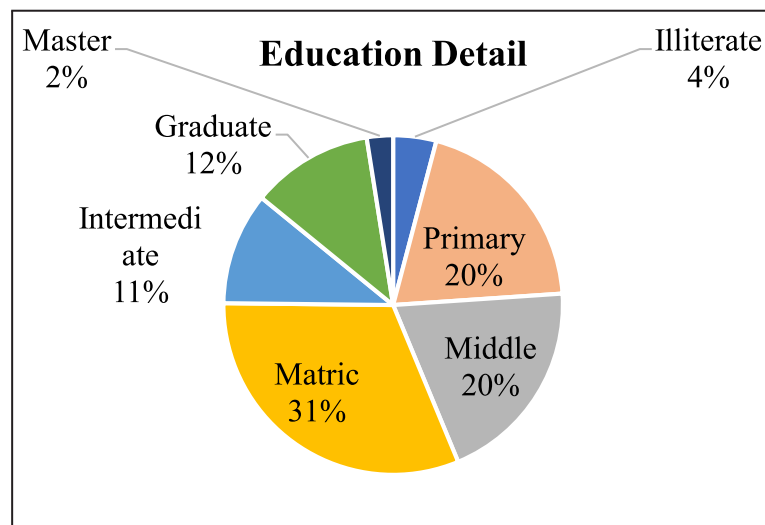


Figure 3: - Educational status of the workers

4.1.4 Gender Status of the Workers

13% female and 87 % male were sampled among the textile population, as shown in figure 4.

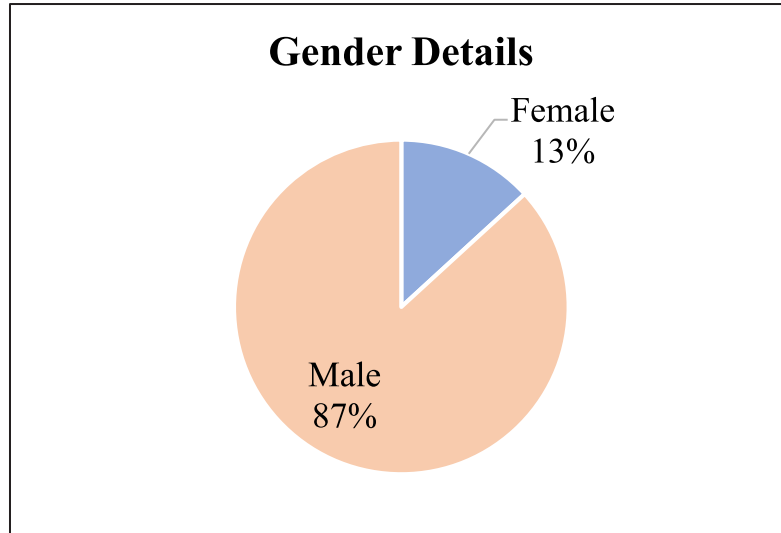


Figure 4: - Gender status of the workers

4.1.5 Social Status and Other Demographics of the Workers

70% of the workers were married, 27% unmarried, while 3% were divorced, as shown in Figure 5(a).

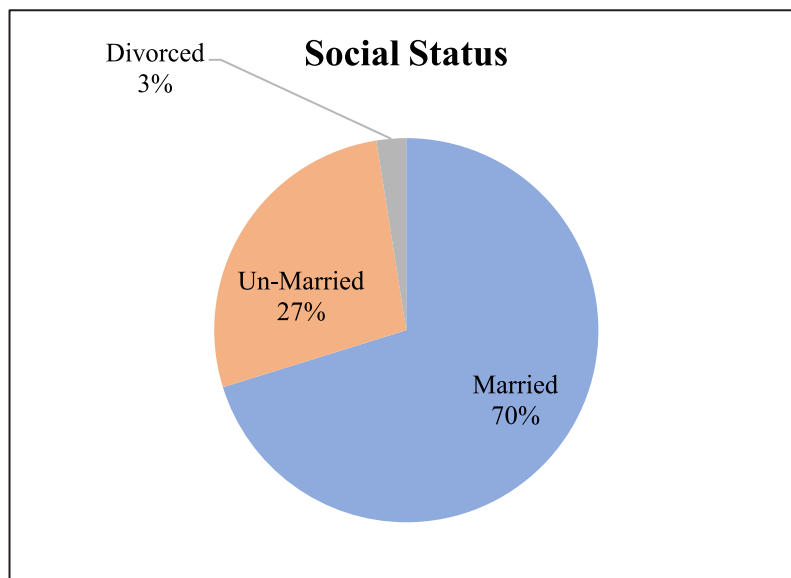


Figure 5(a): - Social status of the workers

Most of them had their own house (74%), 21% lived in a rented place, and the least number of workers lived with their families (5%)

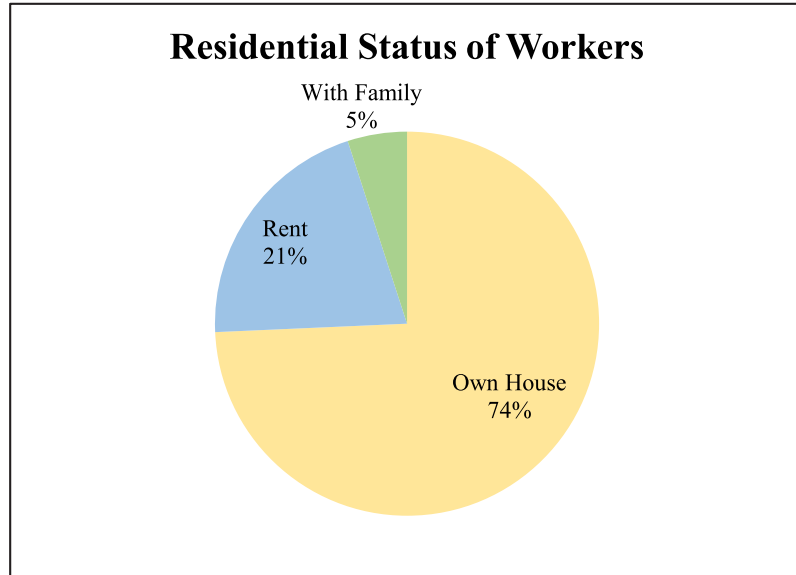


Figure 5(b): - Residential status of the workers

48% of the workers had an insurance policy, 49% bore it with personal expense, and only 3% were on government aid.

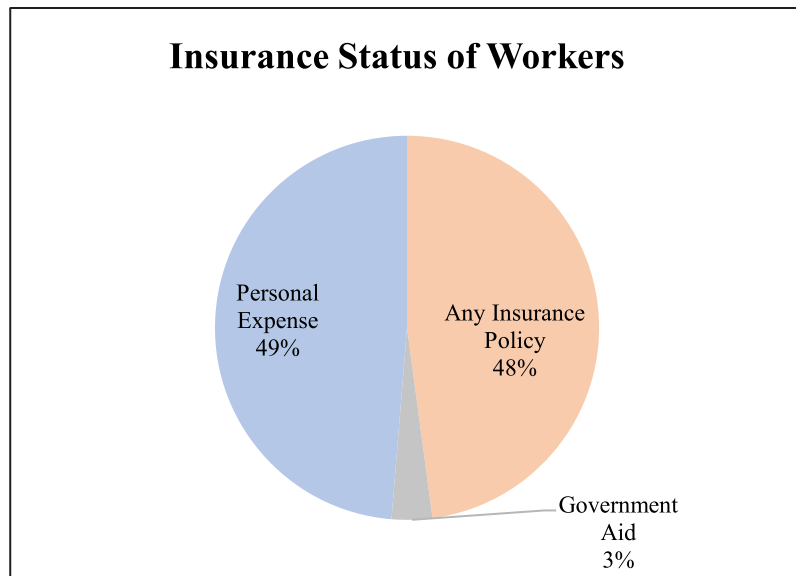


Figure 5(c): - Insurance status of the workers

Furthermore, 69% of workers were permanent, 20% temporary, 8% contractual, and almost 3% part-time

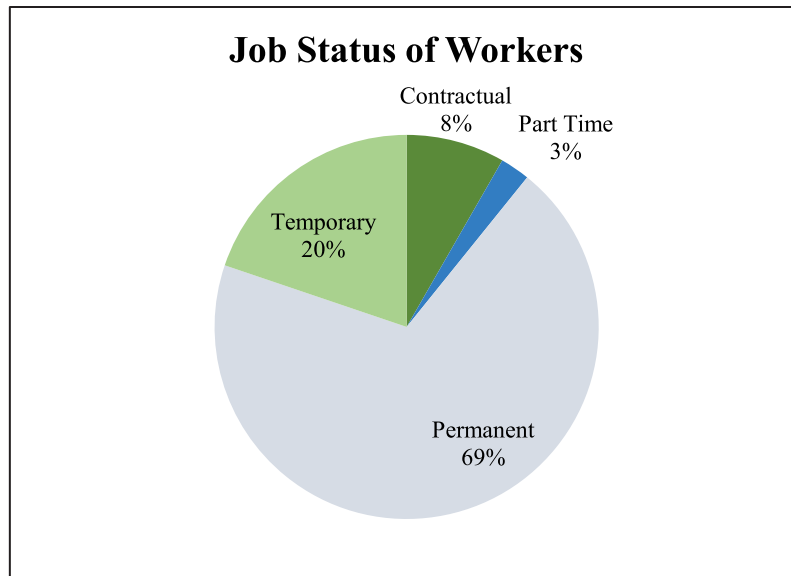


Figure 5(d): - Job status of the workers

4.1 6 Wage Particulars of the Workers

As shown in figure 6, around 43% of workers' salaries were between Rs. 10000 to Rs. 19999, and 53% of workers were drawing Rs. 20000 to Rs. 49999. Only 4% were in the Rs. 50000 to Rs. 99999 salary range. Most of the workers complained about their minimum wage, which was the prime and legal responsibility of the employer. To prevent the workers from their fundamental right of minimum wage, enterprise administration usually had nexus with the field staff. Workers did not have access to their job letters with basic terms and conditions as neither it was produced nor handed over. Therefore, the fundamental rights of the workers must be ensured as per the local laws.

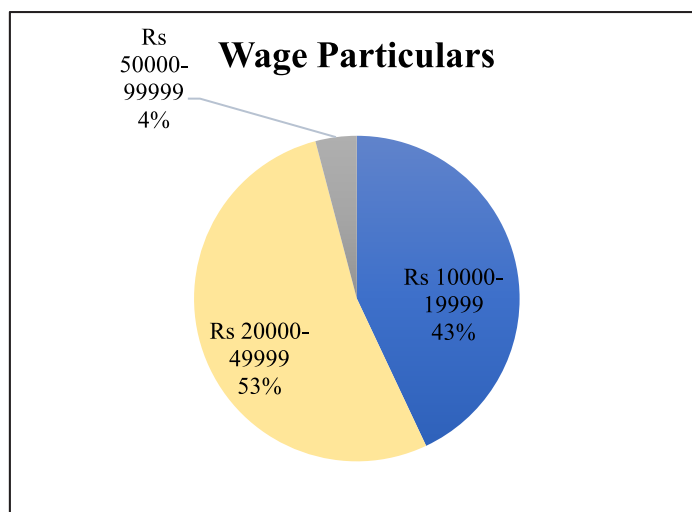


Figure 6: - Wage Particulars

4.1.7 Other Sociodemographic Data of Workers:

Other sociodemographic data shows that workers' minimum and maximum age ranges between 19 to 54 years. At the same time, the weight and height of workers vary from 44 kg to 165 kg and 58 cm to 187 cm, respectively. Moreover, the total number of family members fluctuates from 2 to 20 persons whereas the total number of children and young persons are 0 to 11 and 0 to 12, respectively. In addition, the total no. of bread earners are 1 to 6 persons per family, as shown in **Table I**.

Descriptive Statistics				
Sr. No.	Category	Minimum	Maximum	Mean
1	Age of Employee (year)	19	54	7.762
2	Weight (Kg)	44	165	16.685
3	Height (cm)	58	187	15.520
4	Total Number of Family Members	2	20	2.757
5	Total Number of Children	0	11	1.936
6	Total Number of Young Persons	0	12	2.356
7	Number of bread earners	1	6	1.122

Table 1: Sociodemographic Summary

4.2 Physical Hazards

4.2.1 Noise:

A high noise level was observed in many areas of textile units ≥ 85 dB(A), which may affect the hearing capacity of the workers, as shown in **Table 2**. OSHA recommends an 85 dB(A) standard for noise levels in industries. As highlighted by *Ashraf et. al 2009* in his research, *continued exposure to noise may have damaging consequences for people who experience it for a long period of time. It causes speech interference and hearing loss [9]*.



Figure 7: - Noise monitoring

Table 2: Noise monitoring areas of textile units		
Sr. No.	Departments/Sections	Noise Level dB (A)
1.	Ring	87
2.	Auto Cone	90
3.	Simplex	86
4.	Combing	85
5.	Drawing	88
6.	Blow Room	87
7.	Sorting Area	86
8.	Maintenance Room	78
9.	Laboratory	67
10.	Store Room	70
11.	Filter Comber	87
12.	Ring	87
13.	Auto Cone	90
14.	Simplex	86
15.	Combing	85
16.	Drawing	88
17.	Blow Room	87
18.	Dye drum area	94
19.	Buffing section	95
20.	Finishing	84
21.	Near Inspection	82
22.	Sizing Department	90
23.	Boiler House	92
24.	Knitting	82

OSHA standard for industrial noise is **85 dB(A)**

4.2.2 Audiometry Testing

Audiometry tests of workers indicated that some workers had slight to severe hypoacusia during their ear testing. **Table 3** shows that 2.8% of overall tested workers had normal audiometry, 41% had slight hypoacusia, 39.2% moderate, and 17.5% with severe hypoacusia.



Figure 8: Audiometry testing

Audiometry testing was carried out by a Sibelmed Audiometer. The results are summarized below in **Table 3**.

Sr. No.	Unit Type	Total Number of Employees	Normal	Slight hypoacusia	Moderate hypoacusia	Severe hypoacusia
1	Unit-1(Nishat)	36	0	0	23	13
2	Unit-2 (I-1)	50	02	28	18	02
3	Unit-3 (K-W & D)	41	0	05	20	17
4	Unit-4 (C)	28	02	13	11	02
5	Unit-5 (US)	36	02	28	03	03
6	Unit-6 (Shams)	26	0	15	10	01
Total		217	06	89	85	38

Table 3: Summary of Audiometry Test Results.

Illumination:

Illumination testing results are shown in **Table 4**. Illumination levels specifically and generally on some machines and working areas were below the permissible limits, except a few with good values, which may lead to eye stress and strain (ergonomic hazards), slip, trip and fall hazards and other problems during activity. Poor illumination also plays a vital role in accidents while working on machines. *According to Section 19 of The Punjab Factories Act 1934, proper lighting must be provided at the workplace. Section 39 of The Punjab Factories Rules 1978 states that lighting must be 8-foot candles (86 lux) at a workplace where work is actually being done.* Therefore, it is recommended to improve the

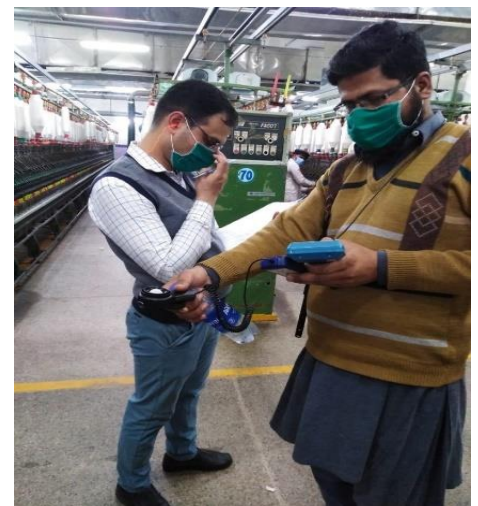


Figure 9: Illumination level

illumination level on machines as well as in the working areas. The reference standard DIN was used to compare illumination levels. The permissible limit for rough and bookkeeping /office work is 250 (lux) & 500 (lux), respectively, for eight hours work shifts.

Table 4: Illumination level monitoring areas of textile units		
Sr. No.	Departments/Sections	Illumination Level (lux)
1	Ring	160
2	Auto Cone	242
3	Simplex	86
4	Combing	84
5	Drawing	88
6	Blow Room	78
7	Sorting Area	226
8	Maintenance Room	59
9	Laboratory	393
10	Store Room	61
11	Filter Comber	58
12	Knitting	648
13	Finishing	600
14	Toe Closing	621
15	Tights	666
16	Generator Operator Room	83
17	Store	147

4.2.4 Poor Housekeeping

Poor housekeeping was observed in various sections, such as maintenance and raw material areas. All workplaces, including passageways, storerooms and service areas, must be kept clean, orderly, dry, and in good hygienic condition with proper stacking in storage areas. Walkways must be non-slippery and enlightened. There must be appropriate floor markings and must be decontaminated regularly.



Figure 10: Poor housekeeping

4.2.5 Temperature/Humidity/Ventilation

Poor ventilation was observed in some areas of textile units which in case of high temperature, humidity in the industry can cause heat stress, heat illness, sweating, dehydration, deficiency of salts in the body, headache and heat stroke. There was also respirable dust present in the workplace environment which may affect the lung efficiency of the workers.

4.2.6 Stack Emission Testing

The stack emission monitoring was carried out during the general shift using calibrated Flue Gas Analyzer Testo 350. The results are all textile units are summarized in **Table V** below. All the values are within permissible limits of Punjab Environmental Quality Standards except a few of them, such as NO_x and H₂S values.

Parameters	Unit	PEQS	Unit-1	Unit-2			Unit-3	Unit-4	Unit-5			
			Generator	Boiler-A	Boiler-B	Boiler-D	Engine No. JGS620	Boiler	Generator I	Generator II	Generator	Generator IV
Fuel	--	--	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Wood	Natural Gas	Natural Gas	Natural Gas	Natural Gas
CO	mg/Nm ³	800	376	5	2.5	2.5	686.2	10	10.82	9.89	11.80	9.45
NO _x	mg/Nm ³	400	314	72.3	54.3	50.3	80.13	106.41	523	707.5	757.5	760
NO	mg/Nm ³	--	312	70.9	53.5	49.5	78.9	104.36	290.3	261.2	374.0	593.1
NO ₂	mg/Nm ³	--	2.23	1.4	0.8	0.8	1.23	2.05	282.3	254.2	366	576.7
CO ₂	%	--		9.34	8.1	8.91	4.99	13.71	8.0	7.0	7.4	16.4
SO ₂	mg/Nm ³	1700	0	0	0	0	0	2.85	5.73	6.25	5.17	6.50
H ₂ S	mg/Nm ³	10	0	12.3	5.01	2.9	13.9	0	0	0	0	0

*The sum of NO and NO₂ values used for the calculation of NO_x value.

**NGVS: No guideline value set for mixed fuel.

***PEQS: Punjab Environmental Quality Standards.

4.3 Use of Personal Protection

Usually, there is no practice to provide and use special PPE's while working on machines except basic ones in the textile sector. However, before procurement of the safety equipment, there must be size, fitness and quality evaluation. Therefore, it was recommended to provide workers with suitable and quality PPEs. In addition, workers must ensure their compliance with safety rules by using such personal safety equipment. **Figure 11** shows that PPE'S had been provided to 82.6 % of the workers, which doesn't imply they were being supplied with every type of PPE's. The remaining 17.4% of workers did not have access to such personal safety equipment except face masks.

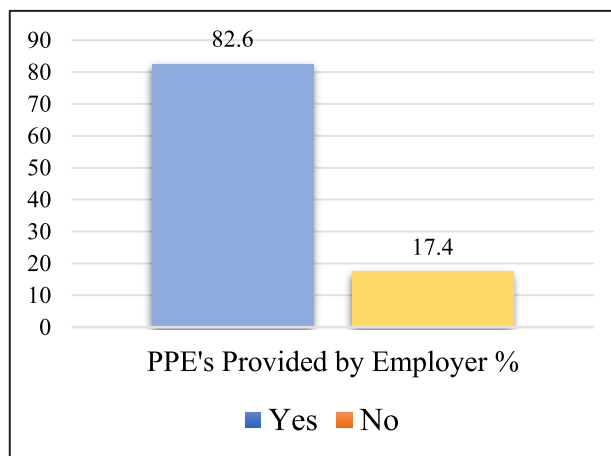


Figure 11: - Use of Personal Protection

4.4 Fire Hazards

Fire hazards were observed in processing, chemical storage areas, welding, mechanical and electrical workshop, and some of the fire extinguishers were found expired.

4.4.1 Emergency Exits/ Lighting

Emergency exits were found locked with unnecessary material placed at some places. It was recommended to check all fire doors, escape routes, associated lighting and emergency lighting with safety signboards.



Figure 12: - Walkways and firefighting equipment blockage

4.4.2 First Aid Facilities/Equipment

First aid boxes were found either empty or with insufficient material during risk assessment of the enterprises. The Health and Safety (First-Aid) regulations require all employers to provide adequate and appropriate first aid equipment, facilities, and qualified people so that employees can receive immediate help in case of an emergency.

4.5 Mechanical Hazards

The observed mechanical hazards were unguarded machinery, improper stacking of material, and disarrangement of tools in the electrical/mechanical store. Pipelines and structural supports on platforms were found corroded in dyeing sections. Some machine covers were discovered removed for maintenance purposes while the Lockout/Tagout (LOTO) system was not implemented.



Figure 13: - Unguarded machines

4.6 Chemical Hazards

The main chemical hazards observed in textile units were cotton dust, poorly maintained storage, and mixing chemicals and dyes in the designated area. Toxic chemical handling and mixing without proper PPE's is a significant concern in the textile sector, and no reasonable precautions against cotton dust which is very hazardous to human health.



Figure 14: - Chemical hazard

4.6.1 Chemical Exposure

Figure 15 depicts that 85.1% of the workers were unaware of their chemical exposure, while 14% were aware.

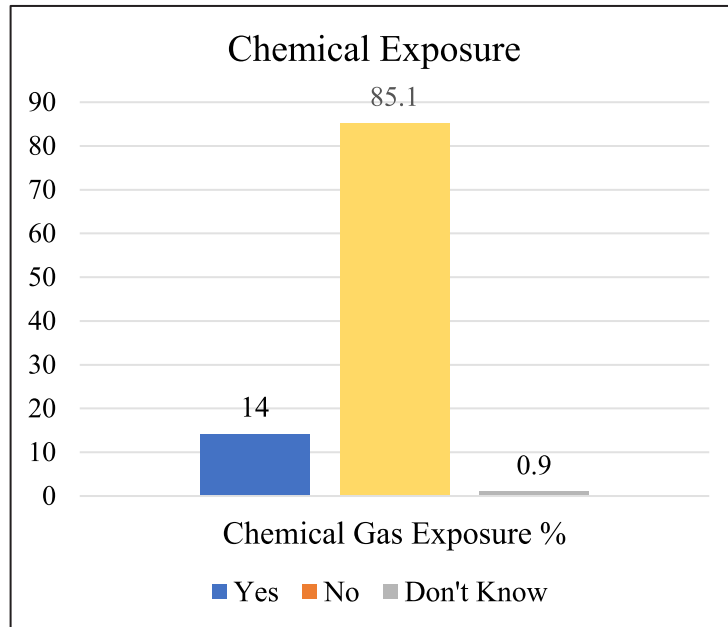


Figure15: - Chemical Exposure at the workplace

4.6.2 Total Dust Exposure

The maximum concentration value of total dust was observed in the mixing area with avg of 2.68 mg/m³, which is less than the threshold limit of 10mg/m³ as per ACGIH standards. **Table VI** shows personnel dust exposure levels in textile units.

Table 6: Noise monitoring areas of textile units		
Sr. No.	Location / Machine	Total dust concentration (mg/m³)
1	Ring	1.45
1.	Drying Simplex	0.29
2.	Back Process	1.59
3.	Mixing	2.68
4.	Maintenance	2.22
5.	Production	0.39
6.	Auto Winding	0.68
7.	Roller Cover	0.43
8.	Blow Room	0.88
9.	Comber	1.81
10.	Laboratory	0.83
11.	Processing	0.80
12.	Yarn Dyeing	0.65
13.	Knitting	0.69
14.	Finishing	0.53
15.	Raw Material	0.27

Figure 16 shows that 9% of workers were exposed to extensive dust, 28% moderate, while 60% had less dust exposure. However, 3% of workers were unaware of their exposure to dust due to a lack of understanding and information.

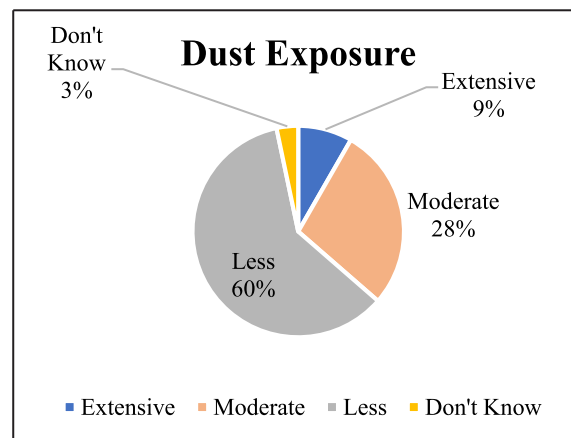


Figure 16(a):- Total Dust Exposure at workplace



Figure 16(b): - Measuring Dust Exposure of a worker

4.6.3 Spirometry Testing

Spirometry testing of randomly selected employees from various enterprise sections was performed using a MIR Spirodoc to diagnose occupational asthma, chronic obstructive pulmonary disease (COPD), and other conditions that affect the respiratory system. The details are summarized below:



Figure 17: Spirometry test of workers

4.6.4 Spirometry Testing Results

In figure 18, it was revealed that the highest percentage of the workers had breathlessness problems, 6.6 with cough symptoms, 4.1% had phlegm, 1.7% wheezy indications, and 0.8% workers had Chest illness.

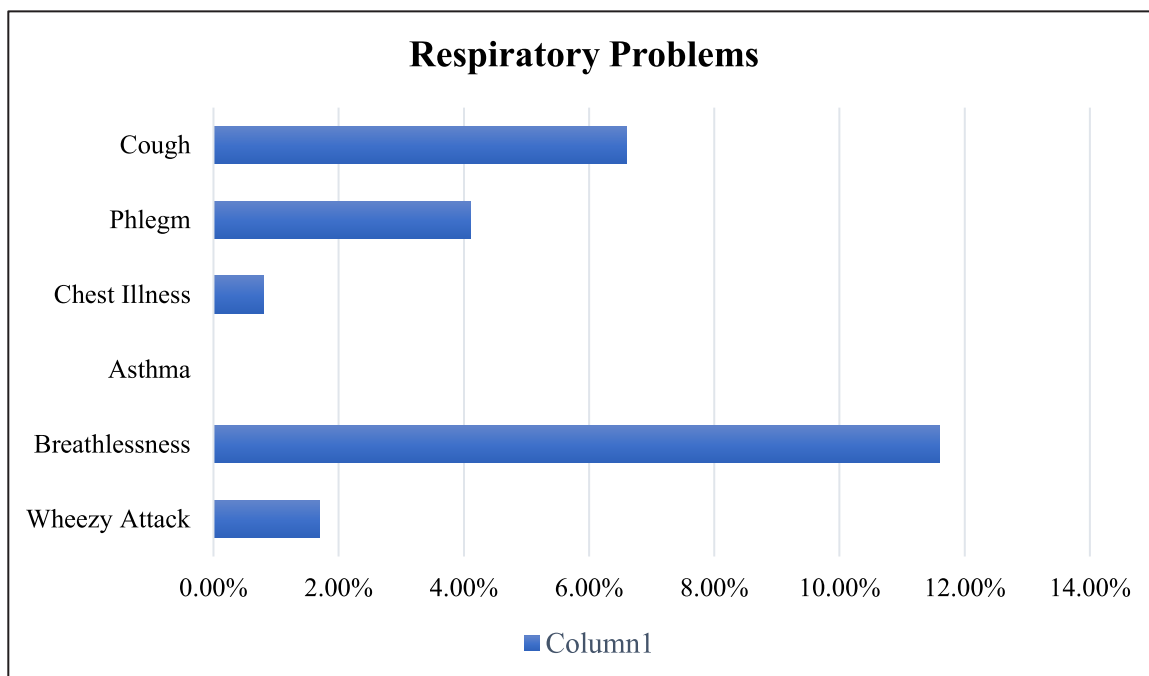


Figure 18(a): - Respiratory problems of workers in the textile industry

As shown in **Figure 18(b)**, the Spirometry tests of workers illustrated that 40.3 % of the workers had normal spirometry, whereas 45.1% had mild to moderate respiratory problems. Moreover, 6.7% showed moderate to severe, and 7.9% had severe respiratory restrictions. This may be linked to workplace cotton dust/chemical exposures or smoking. Therefore, a pulmonologist should properly check such workers.

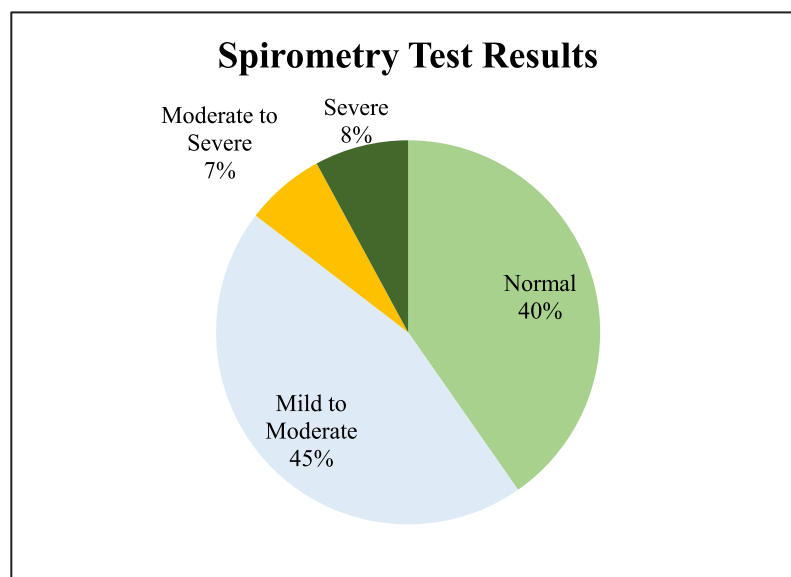


Figure 18(b):- Spirometry Result of Workers

The workers inhale the particles from the cotton lint that can result in breathing problems, including asthma, shortness of breath, cough, and tightness in the chest. The poor health of labour contributes to the low productivity and, in severe cases, loss of jobs leading to poverty. The association between the existence of respiratory illnesses among the industrial workers from the cotton dust is well recognized in the literature (Roy et al., 2019, Mahmood, 2019, Ali et al., 2018, Mastrangelo, Fedeli, Fadda, Milan, & Lange, 2002; Memon et al., 2008; Farooque et al., 2008; Ayesha et al., 2009; Nafees et al., 2013 & Paudyal et al., 2011).

4.7 Electrical Hazards

It was found at some points that wet and dirty switch sockets were connected to the machines. Grounding was not according to the standard, and wires were hung without cable trays. Conduits of cables were broken, which increased the chances of electrical shock. Most organizations require continuous inspection and checking insulation mechanisms, which unfortunately was very weak and would result in severe consequences. Earthing of electrical equipment was not properly maintained. Electrical fire hazard in different sections was present due to naked electrical wires. There is a greater risk of electrical fire if this situation persists.

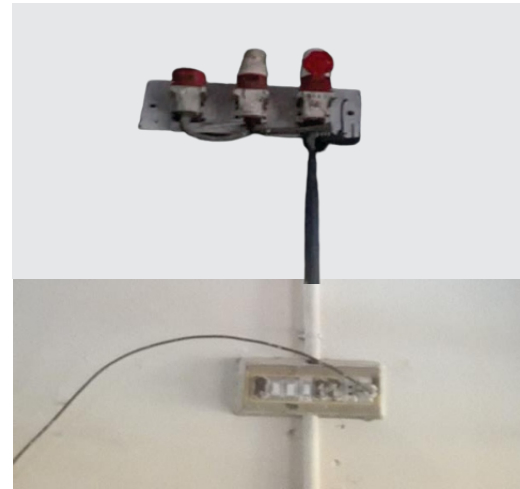


Figure 19: - Exposed electrical wires

4.8 Ergonomics Hazards

The most neglected part of the hazards which needs more attention from the employer are ergonomic hazards. For example, awkward body movements and postures while performing tasks such as forcing, kneeling, overreaching, bending, repetition of work & body twisting, which was observed in almost every section of the enterprises. The most common hazards were personal, task-related, equipment and environmental risk factors. However, it is need of the hour to educate employees through training and placing safety signboards. In addition, user-friendly hand tools must be incorporated into the system to prevent musculoskeletal disorders. Similarly, it was also observed that outdated stools, machinery and technology were being used, as depicted in figure 20.



Figure 20: - Repetition of Work

4.8.1 Musculoskeletal Disorders

According to the assessment, as shown in Figure 21, less than 10% of people showed muscular problems than 90% of workers. Employees must be educated regarding ergonomic hazards through training and counselling. The ergonomic diseases usually develop over time in poor workplace conditions.

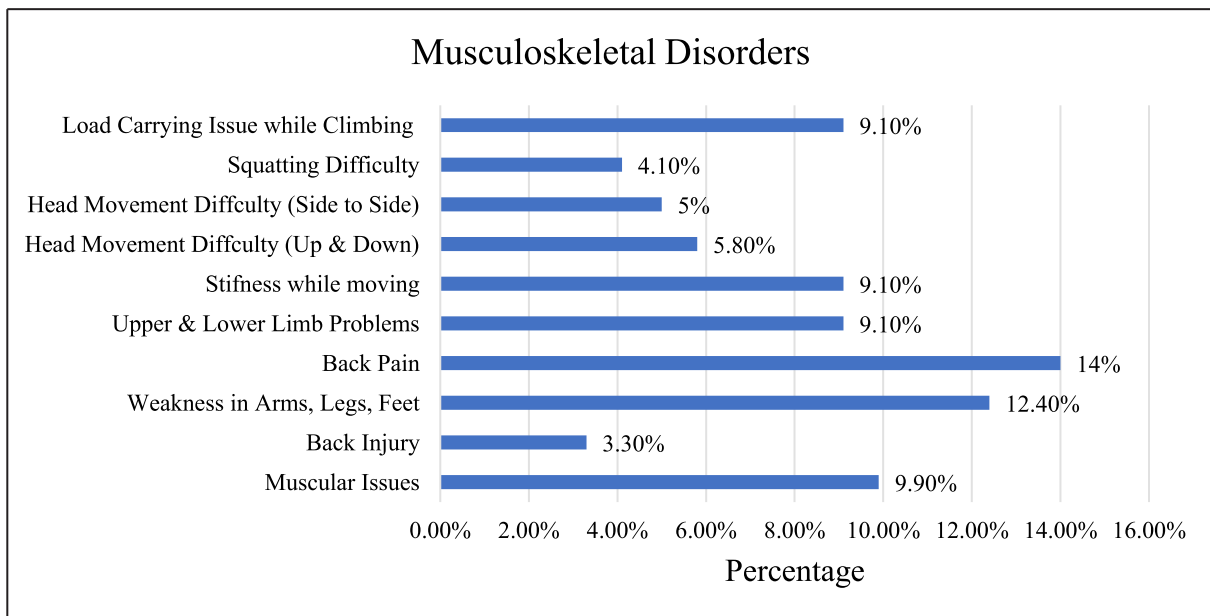


Figure 21: - Respiratory problems to the workers at the workplace

4.8.2 Problems while kneeling and using Respirators

As depicted in Figure 22, 4.1% and 7.4% of workers feel problems while using respirators and kneeling during performing tasks. This percentage is less because people are usually unaware of the ergonomics hazards. However, it is necessary to educate them regarding this tier of risks.

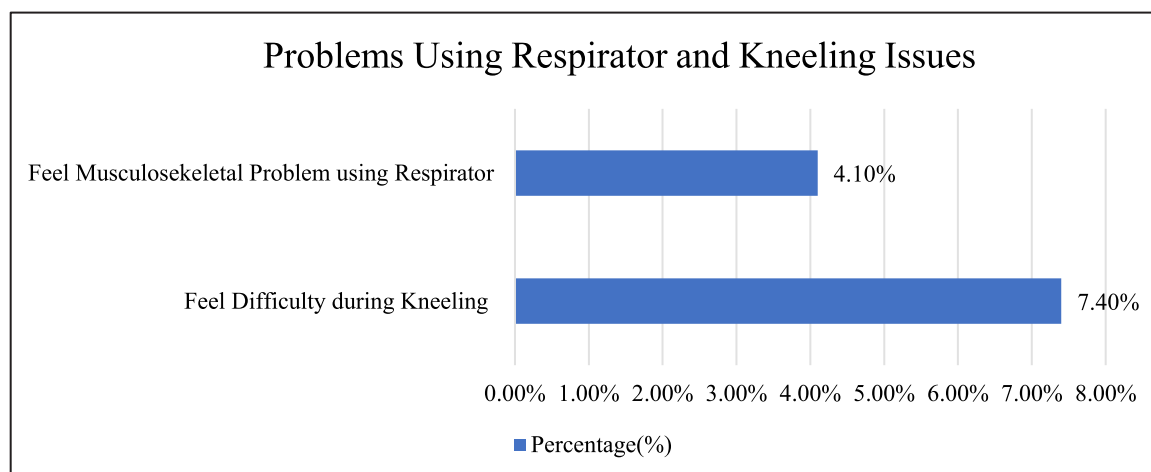


Figure 22: - Respiratory problems to the workers at the workplace

4.8.3 Smoking

As stated in figure 19, the ratio of the employees around 12.4% and 0.8% workers had smoking habits which far less than those not smoke. Such personal factors may also enhance the risks of musculoskeletal issues at the workers.

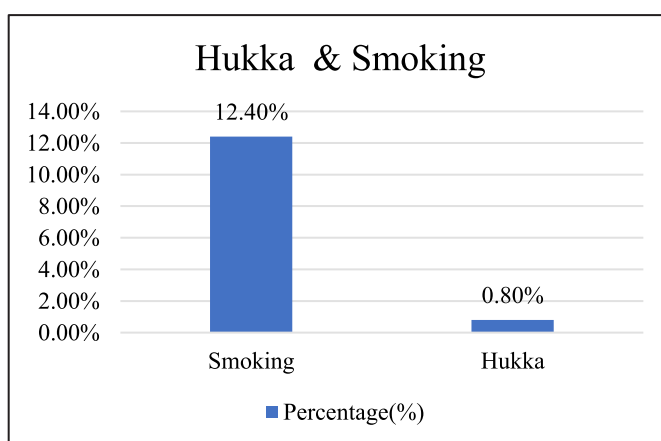


Figure 23: - Smoking habits of the workers at the workplace

4.9 Biological Hazards:

Latrines, kitchen, and some work areas were unhygienic and not cleaned, which may lead to the workers' ill health, as shown in Figure 24. Workers must be provided medical checkups twice a year, precautions against contagious or infectious disease and compulsory vaccination and inoculation according to sections 23, 23-A and 47 of The Factories Act 1934 and The Punjab Factories Rules 1978, respectively.



Figure 24: - Biological hazard

5. OSH Training Provided

Sr. No	Industry	Number of Participants	Total Participants
1	Unit-I	18	237
2	Unit-II (A & B)	37	
3	Unit-III	75	
4	Unit-IV	48	
5	Unit-V	31	
6	Unit-VI	28	

6. About Covid-19

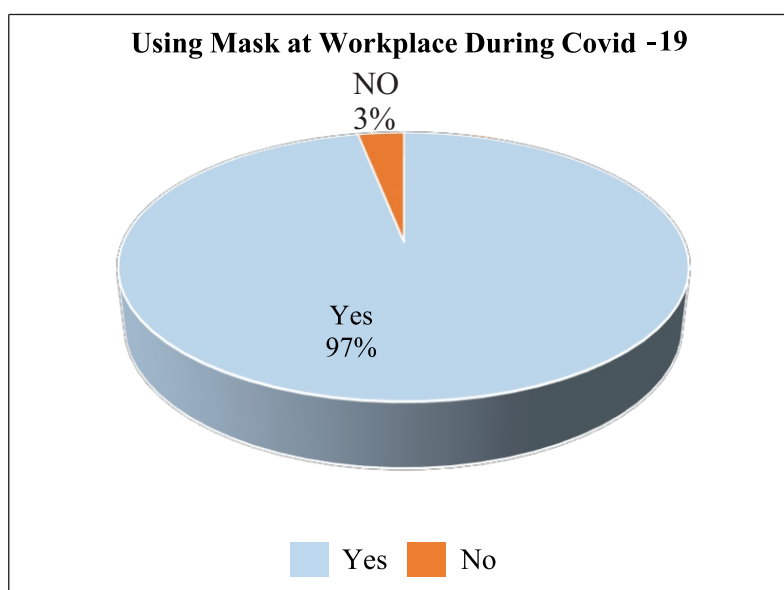
The COVID-19 pandemic has changed the world. As the science revealed that the COVID-19 virus was spreading via airborne droplets, public health and safety and health experts recommended the use of face coverings or respirators when around other people. COVID-19, which started in 2020 and is continuing into 2021, the SAA Centre for the Improvement of Working Conditions & Environment (SAACIWCE), Directorate General Labour Welfare Punjab, Labour & Human Resource Department received multiple requests for COVID-19 related trainings and follow-ups of standard operating procedures and performed several compliance assistance activities on respiratory protection at workplaces. As a result, SAACIWCE provided valuable information about occupational safety and health, risk assessment activities and personal protection to groups of employers, workers, and future workers during the pandemic.

It is the obligation of the employers, workers, and their organizations to collaborate with health authorities to prevent and control COVID-19. Cooperation between management and workers and their representatives is essential for workplace-related prevention measures. Workers are responsible for following measures for occupational safety and health, infection prevention and control established for their workplace, and participating in training provided by the employer. Workers should immediately report to their supervisor any situation which may present an imminent and severe danger to their life or health. Even workers have the right to remove themselves from any workplace

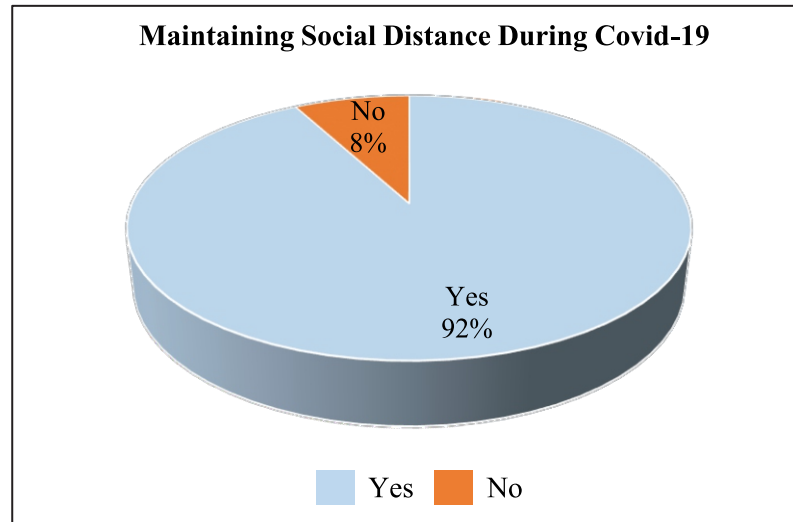
that they reasonably believe presents an imminent and serious threat to their life or health and should be protected from any undue consequences as a result of exercising this right (POSH Act 2019).

The pandemic has severely hampered the risk assessment activities on OSH during the field visits while maintaining the day-to-day guidelines issued by the Primary and Secondary Health Care Department, Government of the Punjab in accordance with the National Command Operation Centre (NCOC). During the OSH risk assessment activity, some questions related to the COVID-19 were also incorporated into the questionnaire. Analysis of the data showed that in the Cotton & Textile sector, as handwashing facilities were provided to the workers, on average, every worker washed their hands ten times daily. In these times of the pandemic, wearing a mask at the workplace is mandatory.

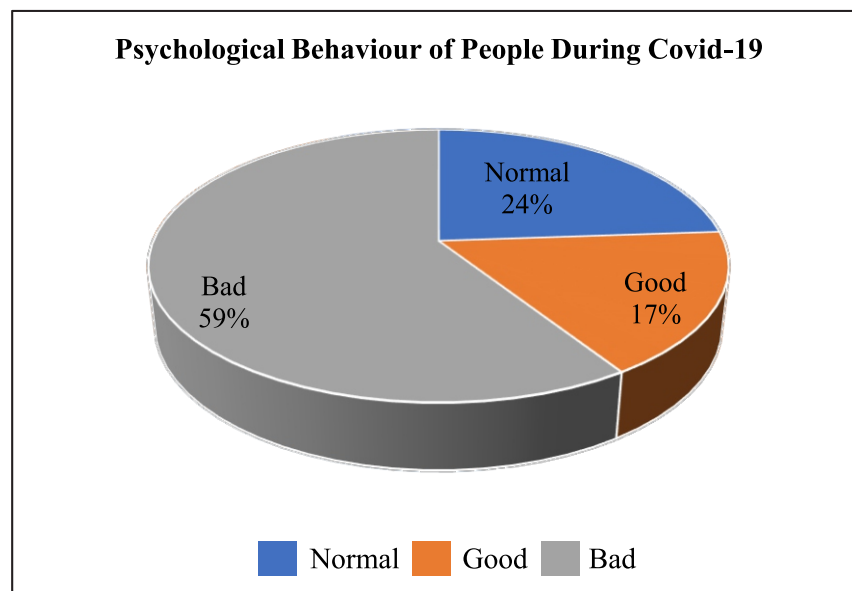
Around 97% of workers responded they were using a mask at the workplace. An average of Rs.349/- per month was being spent on purchasing them by the employer.



The data showed that around 92% of the workers and their co-workers maintained social distancing while at work. By applying statistical tools on the data, it was evident that the respiratory problems among the workers were more who were repeatedly using the mask due to non-availability of sufficient financial resources or carelessness in using them. These results are in agreement with the research studies conducted by the University of Health Sciences Lahore.



Workers were asked about the psychological behaviour during the covid-19 times. 17% of the workers responded to the behaviour as good, 24% normal, while 59% bad.



7. Challenges During Study

7.1 Pandemic

Several challenges were faced during these activities, but one of the significant challenges was the COVID-19 pandemic. So naturally, it slowed down our field activities. Still, the OSH unit performed their tasks wholeheartedly by following the Government guidelines (National Command and Operation Center) to cope with Novel Corona Virus. As a result, most of the activities were completed by the SAACIWCE OSH team during the peak of the disease.

7.2 Other Challenges

Employers' management was reluctant in allowing the OSH team to conduct their activities freely and steadily for the wellbeing of the workers. Employees working for many years without having standard job letters with proper terms and conditions written in the local legislation and the difference in the minimum wage (employers record and actual salary), as complained received during the assessment. "The enterprises' management avails this opportunity with coordination of concerned government department and exploits the workers' rights somehow", stated many workers off the record. It was also observed there was no suitable person for the right job to deal with OSH matters. Management usually appointed a person as a safety/compliance officer without having a proper degree and skills, compromising the local legislation which prevents the Government objective of "Vision Zero". These issues can be resolved by the actual implementation of local legislation by the concerned government department.

Recommendations

1. Noise levels in most of the areas in the textile sector were above the permissible limits of the OSHA standard (85dB(A)). OSHA standard was followed as local legislation regarding noise does not exist. The administration needs to focus on reducing the noise produced with personnel protection to concerned employees. It must be ensured that proper size and type of ear protectors are provided to the workers for maximum effectiveness. Workers in high noise areas must be rotated and allowed to work in less noisy areas for at least half of their shift. Machines must be well maintained and lubricated to stem the unnecessary noises.
2. Audiometry tests of workers indicate that maximum workers in the textile sector had mild to moderate hypoacusia. Therefore, a medical doctor must properly check those workers for further medical treatment.
3. Spirometry tests showed that significant workers had mild to moderate respiratory problems. At the same time, some had moderate to severe respiratory issues that may be attributed to smoking or exposure to dust/chemicals. A pulmonologist must properly check such workers. The maximum number of the workers had normal spirometry.
4. The maximum concentration value of total dust was observed in the mixing section with an average of 2.68 mg/m³. In contrast, the minimum value was 0.27 mg/m³ in the raw material store, which is less than the threshold limit of 10 mg/m³ per ACGIH standards as no local legislation exists to address this. However, dust exposure must be prevented with dust control mechanisms and good housekeeping.
5. A comprehensive fire risk assessment should be done regularly. When working with flammable and combustible liquids, eliminate ignition sources (sparks, smoking, flames, hot surfaces). Use less amount of flammable liquid necessary in the work area. Keep storage areas cool and dry. Store flammable and combustible liquids away from incompatible materials. All workers, visitors and staff members must be aware of the escape routes. Make sure that emergency exit doors are not wedged open. Combustible material must not be stored near emergency exit doors/escape routes. Minimum fire protection requirements such as fire alarm, fire extinguishers, emergency response plans and fire drills must be in place.
6. At the workplace, material/tools/machinery must be appropriately stacked, all components of mechanical systems that transmit energy must be guarded, and machines must be adequately safeguarded to avoid entanglement/draw in / cut/ crushing hazard. Moreover, ensure maintenance of forklift and other such machinery. Pipelines corrosion under insulation must be carried out, and corroded pipelines and structural supports must be replaced in the dyeing section. During service/maintenance activity of machines or equipment, a Lockout/Tagout (LOTO) system must be implemented.
7. The hazard communication program must be developed and implemented accordingly. Activity-based suitable and clean PPE's must be available to the workers with proper training. PPEs,

especially nylon gloves, must be provided to workers involved in the handling of dyeing chemicals. Fume hoods must be installed in the welding section to prevent workers from ill health effects.

8. Awkward body movement and posture in some section must be reduced by short rest breaks to prevent worker from the musculoskeletal disorders.
9. Working platform and stools quality must be enhanced for the said purpose. Moreover, environmental conditions and intra-space between workplate forms must be improved for the worker's comfort.
10. There must be a proper inspection and checking system to prevent electric shocks and fire.
11. A suitable dust control mechanism with a proper exhaust and ventilation system should be installed, give rest breaks, ensure availability of isotonic cold drinks, and provide heat-resistant clothing to the worker. In addition, build cold refugees and resting and health surveillance facilities for the workers.
12. To prevent workers from biological hazards, all sections must be disinfected and cleaned using appropriate PPEs.

ATS-DLD-78-A
ADULT QUESTIONNAIRE - SELF COMPLETION
(for those 13 years of age and older)

Thank you for your willingness to participate. You were selected by a scientific sampling procedure, and your cooperation is very important to the success of this study.

This is a questionnaire you are asked to fill out. Please answer the questions as frankly and accurately as possible. ALL INFORMATION OBTAINED IN THE STUDY WILL BE KEPT CONFIDENTIAL AND USED FOR MEDICAL RESEARCH ONLY. Your personal physician will be informed about the test results if you desire.

IDENTIFICATION

IDENTIFICATION NUMBER: #####

NAME: _____
(Last) (First) (MI)

STREET _____

CITY _____ STATE _____ ZIP _____

PHONE NUMBER: () _____ - _____

INTERVIEWER: ###

DATE: _____
MO DAY YR =====

1. BIRTHDATE: _____
Month Day Year

2. Place of Birth: _____

3. Sex: 1. Male _____
2. Female _____

4. What is your marital status? 1. Single _____
2. Married _____
3. Widowed _____
4. Separated/Divorced _____

5. Race: 1. White _____
2. Black _____
3. Oriental _____
4. Other _____

6. What is the highest grade completed in school? _____
(For example: 12 years is completion of high school)

=====

SYMPTOMS

These questions pertain mainly to your chest. Please answer yes or no if possible. If a question does not appear to be applicable to you, check the does not apply space. If you are in doubt about whether your answer is yes or no, record no.

COUGH

7A. Do you usually have a cough? 1. Yes ____ 2. No ____
(Count a cough with first smoke or on first going out-of-doors. Exclude clearing of throat.) [If no, skip to question 7C.]

B. Do you usually cough as much as 4 to 6 times a 1. Yes ____ 2. No ____

day, 4 or more days out of the week?

C. Do you usually cough at all on getting up, or first thing in the morning? 1. Yes ____ 2. No ____

D. Do you usually cough at all during the rest of the day or at night? 1. Yes ____ 2. No ____

IF YES TO ANY OF THE ABOVE (7A, 7B, 7C, OR 7D), ANSWER THE FOLLOWING:
IF NO TO ALL, CHECK DOES NOT APPLY AND SKIP TO 8A.

E. Do you usually cough like this on most days for 5 consecutive months or more during the year? 1. Yes ____ 2. No ____
8. Does not apply ____

F. For how many years have you had this cough? _____
Number of years
88. Does not apply ____

=====

PHLEGM

8A. Do you usually bring up phlegm from your chest? 1. Yes ____ 2. No ____
(Count phlegm with the first smoke or on first going out-of-doors. Exclude phlegm from the nose. Count swallowed phlegm)
[If no, skip to 8C.]

B. Do you usually bring up phlegm like this as much as twice a day, 4 or more days out of the week? 1. Yes ____ 2. No ____

C. Do you usually bring up phlegm at all on getting up or first thing in the morning? 1. Yes ____ 2. No ____

D. Do you usually bring up phlegm at all during the rest of the day or at night? 1. Yes ____ 2. No ____

IF YES TO ANY OF THE ABOVE (8A, B, C, OR D),
ANSWER THE FOLLOWING:
IF NO TO ALL, CHECK DOES NOT APPLY AND SKIP TO 9A.

E. Do you bring up phlegm like this on most days for 3 consecutive months or more during the year? 1. Yes ____ 2. No ____
8. Does not apply ____

F. For how many years have you had trouble with phlegm? _____
Number of years
88. Does not apply ____

=====

EPISODES OF COUGH AND PHLEGM

9A. Have you had periods or episodes of (increased*) cough and phlegm lasting for 3 weeks or more each year? 1. Yes ____ 2. No ____
*(For individuals who usually have cough and/or phlegm)

IF YES TO 9A:

B. For how long have you had at least 1 such episode per year? _____
Number of years
88. Does not apply ____

=====

WHEEZING

10A. Does your chest ever sound wheezy or whistling:

- | | |
|-----------------------------------|----------------------|
| 1. When you have a cold? | 1. Yes ___ 2. No ___ |
| 2. Occasionally apart from colds? | 1. Yes ___ 2. No ___ |
| 3. Most days or nights? | 1. Yes ___ 2. No ___ |

IF YES TO 1, 2, OR 3 IN 10A:

B. For how many years has this been present?

Number of years
88. Does not apply ___

11A. Have you ever had an ATTACK of wheezing that has made you feel short of breath?

1. Yes ___ 2. No ___

IF YES TO 11A:

B. How old were you when you had your first such attack?

Age in years
88. Does not apply ___

C. Have you had 2 or more such episodes?

1. Yes ___ 2. No ___
8. Does not apply ___

D. Have you ever required medicine or treatment for the(se) attack(s)?

1. Yes ___ 2. No ___
8. Does not apply ___

=====

BREATHLESSNESS

12. If disabled from walking by any condition other than heart or lung disease, please describe and proceed to Question 14A.

Nature of condition(s): _____

13A. Are you troubled by shortness of breath when hurrying on the level or walking up a slight hill?

1. Yes ___ 2. No ___

IF YES TO 13A:

B. Do you have to walk slower than people of your age on level because of breathlessness?

1. Yes ___ 2. No ___
8. Does not apply ___

C. Do you ever have to stop for breath when walking at your own pace on the level?

1. Yes ___ 2. No ___
8. Does not apply ___

D. Do you ever have to stop for breath after walking about 100 yards(or after a few minutes) on the level?

1. Yes ___ 2. No ___
8. Does not apply ___

E. Are you too breathless to leave the house or breathless on dressing or undressing?

1. Yes ___ 2. No ___
8. Does not apply ___

=====

CHEST COLDS AND CHEST ILLNESSES

14A. If you get a cold, does it usually go to your chest? (Usually means more than 1/2 the time)

1. Yes ___ 2. No ___
8. Don't get colds ___

15A. During the past 3 years, have you had any chest illnesses that have kept you off work, indoors at home, or in bed?

1. Yes ___ 2. No ___

IF YES TO 15A:

- B. Did you produce phlegm with any of these chest illnesses? 1. Yes ___ 2. No ___
8. Does not apply ___
- C. In the last 3 years, how many such illnesses, with (increased) phlegm, did you have which lasted a week or more? ___ Number of illnesses
___ No such illnesses
___ Does not apply

=====

PAST ILLNESSES

16. Did you have any lung trouble before the age of 16? 1. Yes ___ 2. No ___
17. Have you ever had any of the following:
1A. Attacks of Bronchitis? 1. Yes ___ 2. No ___
- IF YES TO 1A:
B. Was it confirmed by a doctor? 1. Yes ___ 2. No ___
8. Does not apply ___
- C. At what age was your first attack? ___ Age in years
88. Does not apply ___
- 2A. Pneumonia (include bronchopneumonia)? 1. Yes ___ 2. No ___
- IF YES TO 2A:
B. Was it confirmed by a doctor? 1. Yes ___ 2. No ___
8. Does not apply ___
- C. At what age did you first have it? ___ Age in years
88. Does not apply ___
- 3A. Hayfever? 1. Yes ___ 2. No ___
- IF YES TO 3A:
B. Was it confirmed by a doctor? 1. Yes ___ 2. No ___
8. Does not apply ___
- C. At what age did it start? ___ Age in years
88. Does not apply ___
- 18A. Have you ever had chronic bronchitis? 1. Yes ___ 2. No ___
- IF YES TO 18A:
B. Do you still have it? 1. Yes ___ 2. No ___
8. Does not apply ___
- C. Was it confirmed by a doctor? 1. Yes ___ 2. No ___
8. Does not apply ___
- D. At what age did it start? ___ Age in years
88. Does not apply ___
- 19A. Have you ever had emphysema? 1. Yes ___ 2. No ___
- IF YES TO 19A:
B. Do you still have it? 1. Yes ___ 2. No ___
8. Does not apply ___
- C. Was it confirmed by a doctor? 1. Yes ___ 2. No ___
8. Does not apply ___
- D. At what age did it start? ___ Age in years
88. Does not apply ___
- 20A. Have you ever had asthma? 1. Yes ___ 2. No ___

IF YES TO 20A:

- B. Do you still have it? 1. Yes ___ 2. No ___
8. Does not apply ___
- C. Was it confirmed by a doctor? 1. Yes ___ 2. No ___
8. Does not apply ___
- D. At what age did it start? ___ Age in years
88. Does not apply ___
- E. If you no longer have it, at what age did it stop? ___ Age stopped
88. Does not apply ___

21. Have you ever had:

- A. Any other chest illnesses? 1. Yes ___ 2. No ___
If yes, please specify _____
- B. Any chest operations? 1. Yes ___ 2. No ___
If yes, please specify _____
- C. Any chest injuries? 1. Yes ___ 2. No ___
If yes, please specify _____

22A. Has doctor ever told you that you had heart trouble? 1. Yes ___ 2. No ___

IF YES to 22A:

- B. Have you ever had treatment for heart trouble in the past 10 years? 1. Yes ___ 2. No ___
8. Does not apply ___

23A. Has a doctor ever told you that you have high blood pressure? 1. Yes ___ 2. No ___

IF YES to 23A:

- B. Have you had any treatment for high blood pressure (hypertension) in the past 10 years? 1. Yes ___ 2. No ___
8. Does not apply ___

=====

OCCUPATIONAL HISTORY

24A. Have you ever worked full time (30 hours per week or more) for 6 months or more? 1. Yes ___ 2. No ___

IF YES to 24A:

- B. Have you ever worked for a year or more in any dusty job? 1. Yes ___ 2. No ___
8. Does not apply ___

Specify job/industry: _____ Total years worked _____
Was dust exposure 1. Mild ___ 2. Moderate ___ 3. Severe ___ ?

- C. Have you ever been exposed to gas or chemical fumes in your work? 1. Yes ___ 2. No ___
8. Does not apply ___

Specify job/industry: _____ Total years worked _____
Was dust exposure 1. Mild ___ 2. Moderate ___ 3. Severe ___ ?

- D. What has been your usual occupation or job -- the one you have worked at the longest?

1. Job-occupation: _____
2. Number of years employed in this occupation: _____
3. Position-job title: _____
4. Business, field, or industry: _____

=====

TOBACCO SMOKING

- 25A. Have you ever smoked cigarettes? (NO means less than 20 packs of cigarettes or 12 oz. of tobacco in a lifetime or less than 1 cigarette a day for 1 year. 1. Yes ____ 2. No ____

IF YES to 25A:

- B. Do you now smoke cigarettes (as of 1 month ago)? 1. Yes ____ 2. No ____
88. Does not apply ____
- C. How old were you when you first started reg-
cigarette smoking? ____ Age in Years
88. Does not apply ____
- D. If you have stopped smoking cigarettes com-
pletely, how old were you when you stopped? ____ Age stopped
Check if
still smoking ____
88. Does not apply ____
- E. How many cigarettes do you smoke per day now? ____ Cigarettes/day
88. Does not apply ____
- F. On the average of the entire time you smoked,
how many cigarettes did you smoke per day? ____ Cigarettes/day
88. Does not apply ____
- G. Do or did you inhale the cigarette smoke? 1. Does not apply ____
2. Not at all ____
3. Slightly ____
4. Moderately ____
5. Deeply ____

- 26A. Have you ever smoked a pipe regularly?
(YES means more than 12 oz tobacco in a
lifetime.) 1. Yes ____ 2. No ____

IF YES to 26A:

- B1. How old were you when you started to
smoke a pipe regularly? ____ Age
2. If you have stopped smoking a pipe com-
pletely, how old were you when you stopped? ____ Age stopped
Check if still
smoking pipe ____
88. Does not apply ____
- C. On the average over the entire time you
smoked a pipe, how much pipe tobacco did
you smoke per week ? ____ oz per week (a stan-
dard pouch of tobacco con-
tains 1 1/2 oz)
88. Does not apply ____
- D. How much pipe tobacco are you smoking now? ____ oz per week
88. Not currently smoking a pipe ____
- E. Do or did you inhale the pipe smoke? 1. Never smoked ____
2. Not at all ____
3. Slightly ____
4. Moderately ____
5. Deeply ____

- 27A. Have you ever smoked cigars regularly?
(Yes means more than 1 cigar a week for a
year). 1. Yes ____ 2. No ____

IF YES to 27A:

- B1. How old were you when you started smoking cigars regularly? _____ Age
2. If you have stopped smoking cigars completely, how old were you when you stopped? _____ Age stopped
Check if still smoking cigars _____
88. Does not apply _____
- C. On the average over the entire time you smoked cigars, how many cigars did you smoke per week? _____ Cigars per week
88. Does not apply _____
- D. How many cigars are you smoking per week now? _____ Cigars per week
88. Check if not smoking cigars currently _____
- E. Do or did you inhale the cigar smoke? 1. Never smoked _____
2. Not at all _____
3. Slightly _____
4. Moderately _____
5. Deeply _____

FAMILY HISTORY

28. Were either of your natural parents ever told by a doctor that they had a chronic lung condition such as:

	FATHER			MOTHER		
	1. YES	2. NO	3. DON'T KNOW	1. YES	2. NO	3. DON'T KNOW
A. Chronic bronchitis?	_____	_____	_____	_____	_____	_____
B. Emphysema?	_____	_____	_____	_____	_____	_____
C. Asthma?	_____	_____	_____	_____	_____	_____
D. Lung cancer?	_____	_____	_____	_____	_____	_____
E. Other chest conditions?	_____	_____	_____	_____	_____	_____

- 29A. Is parent currently alive?

- B. Please Specify:

_____ Age if living

_____ Age if living

_____ Age at death

_____ Age at death

8. Don't know _____

8. Don't know _____

- C. Please specify cause of death.

چیک لسٹ (خطرہ تشخیص) برائے (بائیولوجیکل)

نام فیکٹری _____ تاریخ _____

نمبر شمار	سوال	ہاں	نہیں	عملی اقدامات
1.	کیا جائے کار پر پھپھوندی اور فنگس کے اطلاق کے حالات موجود ہیں؟			
2.	کیا کام کی جگہ پر خون اور دیگر جسمانی رطوبتیں (بلغم، پسینہ، پیشاب وغیرہ) موجود ہے؟			
3.	کیا تمام کارکنوں کو حفظان صحت کا کارڈ مہیا کیا گیا ہے؟			
4.	کیا ملازمین کو حفاظتی ٹیکے لگائے جاتے ہیں؟			
5.	کیا جائے کار پر صاف اور گندے پانی کی نکاسی کا باقاعدہ نظام ہے؟			
6.	کیا ہوا میں موجود جراثیم جائے کار پر کارکنوں کے انفیکشن کا باعث بنتے ہیں؟			
7.	کیا کاٹنے والے زہریلے حشرات جائے کار پر موجود ہیں؟			
8.	کیا کیڑے مار ادویات کا باقاعدگی سے استعمال کیا جا رہا ہے؟			
9.	کیا جائے کار پر خطرناک اور زہریلے نباتات موجود ہیں؟			
10.	کیا جائے کار پر جانوروں یا پرندوں کے باقیات یا بیٹ (droppings) موجود ہے؟			
11.	کیا جائے کار پر وبائی بیماری کے پھیلاؤ کے حالات موجود ہیں؟			

نام آفیسر بمعہ عہدہ _____



**Under ADP Scheme “Capacity Building of Occupational Safety and Health (OSH)
Regime to Promote Safer Working Conditions at Workplaces”**

Centre for the Improvement of Working Conditions & Environment

Directorate General Labour Welfare Punjab

Labour & Human Resource Department Government of the Punjab

Phone: 042-99262145, Email: arshadhset@gmail.com, www.ciwce.org.pk