Occupational Safety and Health Practices in Small Manufacturing Units (SMUs) Industry in Punjab 2021

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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
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Labour & Human Resource Department Government of the Punjab

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Acronyms

SMUs	Small Manufacturing Units
HSE	Health, Safety and Environment
SMEDA	Small and Medium Enterprise Development Authority
PBS	Pakistan Bureau of Statistics
SBP	State Bank of Pakistan
MCB	Miniature Circuit Breaker
OSHA	Occupational Safety and Health Administration
OSH	Occupational Safety and Health
PPE	Personal Protective Equipment
BMI	Body Mass Index
LO	Labour Inspector
NIHL	Noise-induced hearing loss

1. Introduction

Small Manufacturing Units (SMUs) are indispensable to the progress of the nation. Countries all over the world associate their national development to a strong, thriving SMUs sector. Furthermore, SMUs hold great potential in initiating domestic-led growth and reinforcing strength of the economy in the period of cut-throat competition [1]. The contribution of Pakistani SMUs is less as compared to other countries, yet their significance cannot be denied [2].

SMUs of Pakistan have been lacking in efforts towards implementation of occupational safety and health (OSH) due to a lesser attention by industrialists [3]. OSH situation in establishments vary country to country, but both death toll and injuries take place at larger extent in the developing countries. In Pakistan, working deaths are reported higher than in other developing economies [4] and approximately 7444 fatal accidents and 5,680,740 occupational accidents take place annually, which keep workers away from work at least for 3 days. However, fatality rate and accident rate per 100,000 workers are approximately 20.7 and 16,000 respectively [5]. It has been observed that work related accidents are higher in SMUs as compared to larger enterprises [6]. Generally working conditions are not up to the mark to mitigate rate of accidents. Implementation of OSH management system at workplace to reduce the occurrence of accidents. OSH management system is executed through safety measures by the top management [7].

In adopting such a system at enterprise level, the rate of accidents, material damage, personal injuries and absenteeism of employees is reduced while improvement in the working conditions, productivity, sales and profit is evident [8]. It is also evident that companies which do not adopt safety management systems have lower performance as compared to those which do [9].

Each country has its own definition of what constitutes a SMU. Certain size criteria must be met and occasionally the industry in which the company operates in is taken into account as well. Though small in size, SMUs play an important role in the economy of a country. They outnumber large firms considerably, employ vast numbers of people and are generally entrepreneurial in nature, helping to shape innovation [10]. Small and Medium Enterprise Development Authority (SMEDA), SME Bank, Pakistan Bureau of Statistics (PBS) and State Bank of Pakistan (SBP) have defined SMUs in different ways. Under fifth schedule to the Companies Ordinance 2015, Securities and Exchange Commission of Pakistan (SECP) also classified large, medium and small companies exclusively. SMEDA defines a SMU based upon the number of employees and total number of productive assets. The SME bank uses only total number of assets as the criterion. PBS takes into consideration only the number of employees. Whereas, SBP's definition of a SMU is based on the nature of the business, number of employees, amount of capital employed and net sales value per annum.

As there is no clear definition of SMU in current legislations of Pakistan, however, the enterprises whose employment strength is 250, turnover is up to Rs. 800 million and productive assets up to Rs.100 million may be called as SMUs [11].

2. Objectives

The main objectives of this literature review are to explore specific workplace hazards in small and medium manufacturing units to investigate the safety and health risks from manufacturing process.

i. To conduct occupational safety and health risk assessment of small manufacturing units in the Punjab
ii. To formulate an analysis report on occupational diseases and to suggest control measures.

3. Methodology

In the present study, different industrial sectors of SMU were visited to evaluate safety, health and environment (HSE) conditions and train workers to improve their working conditions. Following activities were carried out.

i. Risk Assessment Activity
ii. Training of management/workers
iii. Spirometry testing
iv. Noise level testing
v. Audiometry testing
vi. Total Dust (Personnel Exposure)
vii. Illumination Level Testing

All these activities were officially sanctioned by Competent Authority. Latest state of the art calibrated instruments were used in data collection/hazards assessments activity.

i. Risk Assessment Activity

For risk assessments activity, checklists regarding electrical, chemical, mechanical, fire, ergonomics, physical hazards & for construction sector were devised translated in Urdu so that these could be used by industrial officials also. All risk assessment data was recorded using these checklists.

Figure 1: Risk assessment

During risk assessment, interaction with workers in close coordination with the field formations of Directorate General Labour Welfare Punjab was done in order to highlight their problems and suggestions. Also, on-site/ workstation training was also carried out so that task specific hazards could be minimized.

Training of management/workers Workers/management were trained after detailed risk assessment. First of all, a detailed visit of enterprises was done in detail to observe all kinds of hazards and training sessions were conducted to create awareness about workplace hazards.

Figure 2: Training activity

Management was persuaded to rectify highlighted issues. Usually cost-effective solutions/engineering controls were introduced and discussed to avoid any complication. Hazard's identification, risk assessment & recommendations were generated based on 5x5 international risk matrix shown below.

Table 1: Risk assessment matrix

Probability	Severity: Catastrophic 5	Critical 4	Moderate 3	Marginal 2	Negligible 1
Frequent 5	High-25	High-20	Serious-15	Serious-10	Medium-5
Probable 4	High-20	Serious-16	Serious-12	Medium-8	Medium-4
Occasional 3	Serious-15	Serious-12	Medium-9	Medium-6	Low-3
Remote 2	Serious-10	Medium-8	Medium-6	Medium-4	Low-2
Improbable 1	Medium-5	Medium-4	Low-3	Low-2	Low-1

Risk matrices are widely used in risk management [12]. Based on this matrix, seriousness of hazards was categorized [13].

ii. Spirometry testing

MIR Spirodoc was used for spirometry testing. The test was performed on randomly selected employees from various sections of the enterprises. Sterilized mouth piece were used for each worker only once. Results of the spirometry were as follow.

Table 2: Spirometry of Workers

Sr. No.	Interpretation/Results	Number of employees (%)
1.	Normal Spirometry	41.4
2.	Mild to Moderate Restriction	41.0
3.	Moderate Severe Restriction	9.9
4.	Severe Restriction	7.7

These results were automatically generated by the instruments. Approximately 41.4% workers were having normal spirometry, while 41%, 9.9% & 7.7% workers were having mild to moderate, moderate severe & severe restrictions respectively.

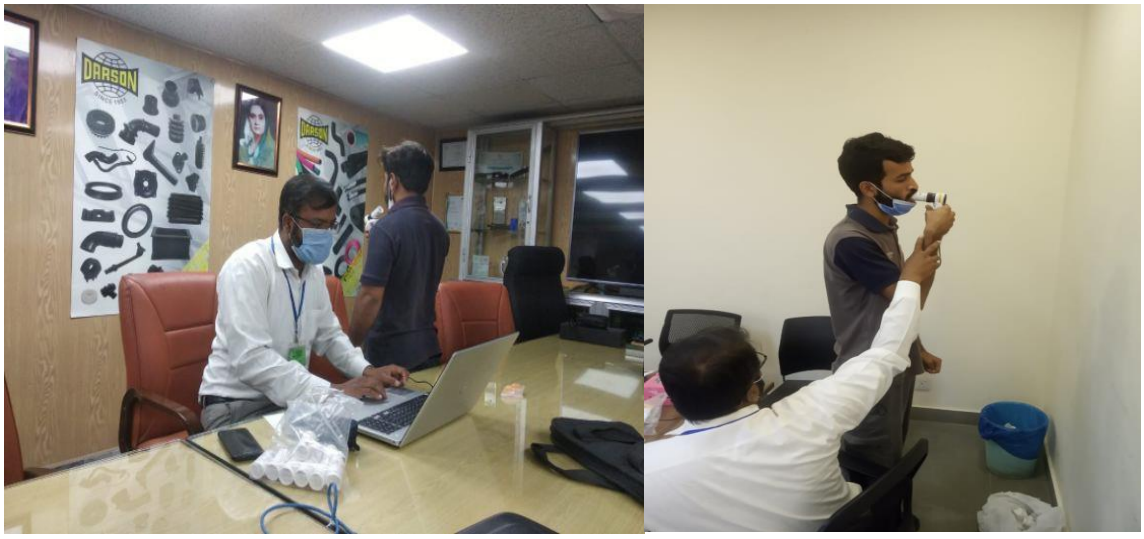


Figure 3: Spirometry Testing

Instant results of the spirometry were also conveyed to workers on the spot so that they may pay special attention to the health and show no negligence in adopting personal protection.

iii. Audiometry testing

Noise-induced hearing loss (NIHL) continues to be one of the most prevalent occupational conditions which occurs across a wide spectrum of workplaces. Occupational hearing loss is preventable through a hierarchy of controls, which prioritize use of the engineering, administrative controls and personal protective equipment [15].

NIHL can be diagnosed with audiometry testing. Sibelmed audiometer was used to measure hearing acuity for variations in sound intensity, pitch and for tonal purity, involving thresholds and different frequencies. The results are summarized below:

Table 4: Audiometry of employees

Sr. No.	Interpretation/Results	Number of employees (%)
1.	Normal	16.7
2.	Slight hypoacusis	55.9
3.	Moderate hypoacusis	11.3
4.	Severe hypoacusis	16.1

From table, it is clear that normal to slight hypoacusis was 72.6% while 27.4% had moderate to severe symptoms. This means that 1 out 4 workers were having hearing problems.

Figure 4: Audiometry Testing

As done in spirometry, audiometry testing results were also shared with workers instantly.

iv. Total Dust (Personnel Exposure)

Exposure monitoring of total dust (personnel dust exposure) was carried out in different sections of the enterprises by using batches of Cassella Personal Dust Sampler.

Figure 5: Personnel Dust Sampler

The workers were exposed to dusts and fumes during their routine activities. Total dust level was higher than permitted threshold limit of 10mg/m^3 [16] in some SMUs. Details of these as follow.

Table 5: Total dust

Industry	Departments/Sections	Avg. Total Dust (mg/m^3)
"A" is tyres, tubes, lubricants and spare parts manufacturing unit located in Sheikhupura	Car Tube	3.75
	MC Tube	3.03
	Security	0.39
	UTY	0.39
	FGS	1.16
	RAW Material Store	0.39
	Quality Tube	0.42
	Process Section Quantity Tyre	0.38
	Electrical Maintenance	14.58
	Mixing Rubber	1.75

	Boiler House	0.82
	CM Tube	3.47
	Mixing	3.65
"B" is latex foam & rubber hoses, manufacturing unit located in Lahore.	Dispersion Mixture	1.42
	Design and assembly	1.98
	Water Proof	4.96
	Batch Wing	1.77
	Processing	1.04
	Samad Rubber packaging	1.5
"C" is footwear, motor cycle and cycle tyres manufacturing unit located in Gujrat.	Bead Wire	31.51
	AGRI Tube	3.71
	MC tube	4.53
	ULT 2	3.82
	MC Tube Mold washing	0.83
	Chemical Store	3.18
	Wrapping	3.45
	RIM Weld	14.63
	MC Tyre	1.2
	Cycle Tube	3.13
	Rim Belt	13.67
	Cleaning area	1.39
	Mixing	1.19
	Collection	5.98
	Rickshaw Tub	8.52
"D" is manufacturing unit of automotive, industrial hoses and molded parts located in Gujranwala	RADIATOR A	5.82
	RADIATOR B	1.63
	RADIATOR C	2.68
	TOOLING WORKSHOP	4.80
	COMPOUNDING	2.72
	ACCOUNTS	1.86
	HOUSEKEEPING	2.36
	EPZ	0.39
	BOILER ROOM	8.86
	Ext-150	0.29

v. Illumination Level Testing

The illumination level monitoring was carried out to find out intensity of light in different sections/areas of the enterprises. The measurement was done by lux meter (EXTECH, Color LED Light Meter LT-45). General and localized lighting was measured at the site. The section-wise light intensity was calculated as the average of values taken at the workplace.

Table 6: Illumination Level

Industry	Departments	Illumination Level (lux)
"A" is tyres, tubes, lubricants and spare parts manufacturing unit located in Sheikhupura	MC Tube	294
	Car tube	141.7
	EC Tyre Rim patty	355
	MC Tyre	313
	Rickshaw Tyre	213
	Car Tyre	212
	Power house	266
	Electrical work shop	300
	Mixing	45
"B" is latex foam & rubber hoses manufacturing unit located in Lahore.	Molding section	164
	Waterproof	210
	Autoclave Section	260
	HR Office	116
	Design & Assembly	340
	Batch Weighing Store	378
	Chemical Store	300
	HR Office (Time Office)	237
	Carpenter section	380
	Packing	56
	Goods Store	34
	Tube Section Packing (Cap)	117
	Engineering Section	109
	Workshop Office	90
	laboratory	74
	Lab Office	142
"C" is footwear, motor cycle and cycle tyres manufacturing unit located in Gujrat.	MC Tube	97.3
	Compound Area (MC Tube)	5000
	Black mixing area	97.2
	Rim patty area	294.6
	MC Tyre	190.2
	Mixing 440 area	193
	Mix bag area	110.2
	Boiler house	10.2
	Cycle tyre	227.4
	UL Tube	102.3
	Material store	29.2
	Molding Final department	185
	Radiator-1 department	286
	Radiator-2 department	255
	Radiator-B department	310
	Radiator-C department	400

“D” is manufacturing unit of automotive, industrial hoses and molded parts located in Gujranwala	Silicon Hall	385
	Quality Office	556
	Laboratory	400
	Compounding department	413
“E” is electric cable manufacturing unit located in Lahore.	Hall-1	933
	Hall-2	962
	Hall-3	742
	Workshop	81
"F" is an auto mobile and ups battery manufacturing unit located in Faisalabad	Finishing	120
	Packing	148
	BFRT	145
	Water bath	174.8
	First assembly machine	93.7
	Combi Machine at COS check point	424
	Battery plate curing and drying	170
	Buffer operation machine	121.9
	Grid Casting	149
	Injection Mounding	142.9
	RM Warehouse	140
	Punch machine No. 4	169
	ERP System user point	48.7

It was observed that total illumination level was below minimum standard prescribed by DIN (Deutsches Institut für Normung) in approximately all sections of SMUs. Permissible limits for rough and bookkeeping /office work are 250 (lux) and 500 (lux) respectively for eight hours work shift [17].

vi. Noise level testing

Noise level near machinery was high in approximately all SMUs. The noise level monitoring was carried out with Casella precision sound level meter type 2100. Noise level standards in local laws does not exist. Therefore, OSHA standards were taken as reference [14]. Permissible noise level limits in OSHA are 85 dB(A) for eight hours work shift. It was observed that 5 SMU units had higher noise level. These are as follow.

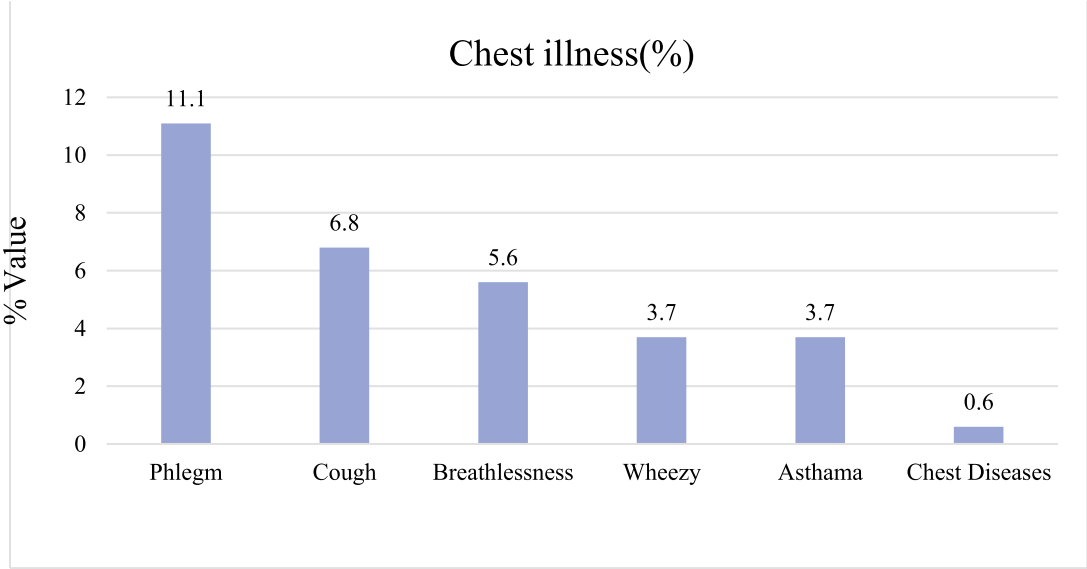
Table 7: Noise Measurement

Sr. No.	Departments	Sections/Areas	Noise Level dB (A)	Industry
1.	MC Tube	Curing	92.8	"A" is a manufacturing unit of tyres, tubes, lubricants and spare parts in Sheikhupura
		Green	98.4	
		Splicing - 1	86.6	
		Splicing - 2	89.9	
	Car Tube	Green	94.4	
		Splicing	85	
		Curing	89.3	
		Packing	90.3	
	MC Tyre	Curing	87.2	
		Green	87.7	
		Packing	91.4	
	Power house		103.2	
	Boiler Area		86.1	
	Mixing		88.6	
2.	Molding Section		87	"B" is latex foam & rubber hoses manufacturing unit located in Lahore.
	Autoclave Section		89	
	Rubber Mixing-2		85	
	Rubber Mixing-3		90	
	Generator Area		96	
	Bond Packing		89	
3.	Black mixing area		88.4	"C" is footwear, motor cycle and cycle tyres manufacturing unit in Gujrat.
	MC Tyre		90	
	Boiler house		90.2	
4.	Molding Final department		85.2	"D" is manufacturing unit of automotive, industrial hoses and molded parts located in Gujranwala
	Compounding department		95.6	
5	Hall-3		86	"E" is electric cable manufacturing unit located in Lahore.

Main reason behind high noise level was delayed/improper maintenance of machinery. Also wear and tear creates noise. There were non-technical staff members who rectify machinery related problems temporarily but they were unaware about root causes. So, machines are operated with fixing high noise.

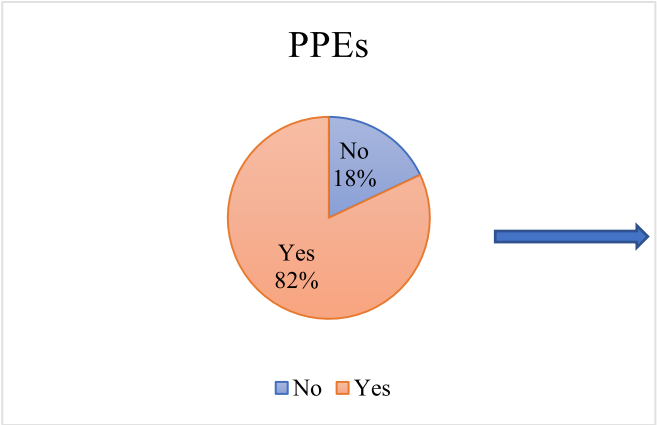
4. Demographics

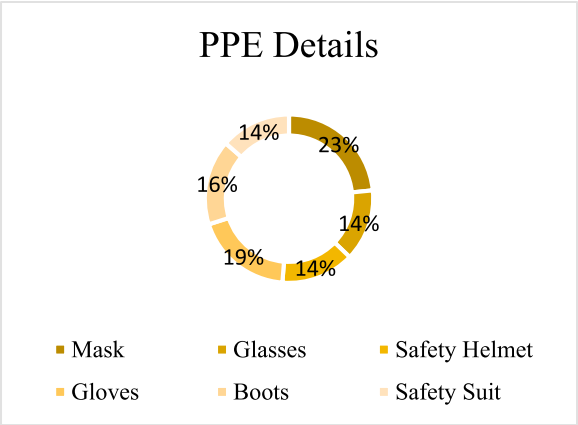
In this section demographic of SMUs different aspects will be discussed. During industrial visits, different information regarding workers were collected. It was noted that lungs were the most effected organ of the workers.



Chest illness was the category where multiple diseases were categorized. These diseases were mostly related to nature of work or addiction of tobacco. Most of the workers feel discomfort in wearing face mask. They wear it during management visits/inspections and when they were working alone or as a team, they did not use face mask. It is responsibility of the owner to provide all workers with appropriate personal protection equipment necessary for the task and it is obligation of the worker to own and wear them.

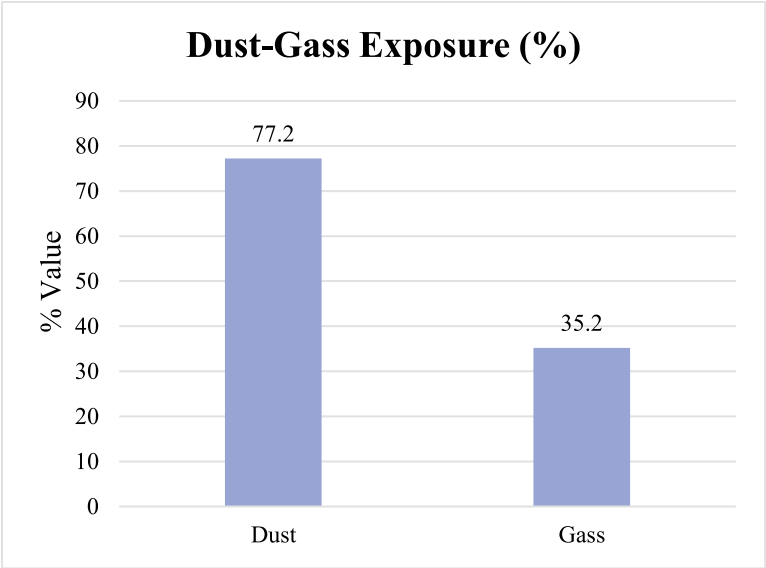
Data shows that 11.1%, 6.8%, 5.6%, 3.7%, 3.7% & 0.6% workers reported phlegm, cough, breathlessness, wheezing Asthma & other chest diseases respectively. Phlegm & cough is most common among smokers & due to allergic reactions by the contaminants.



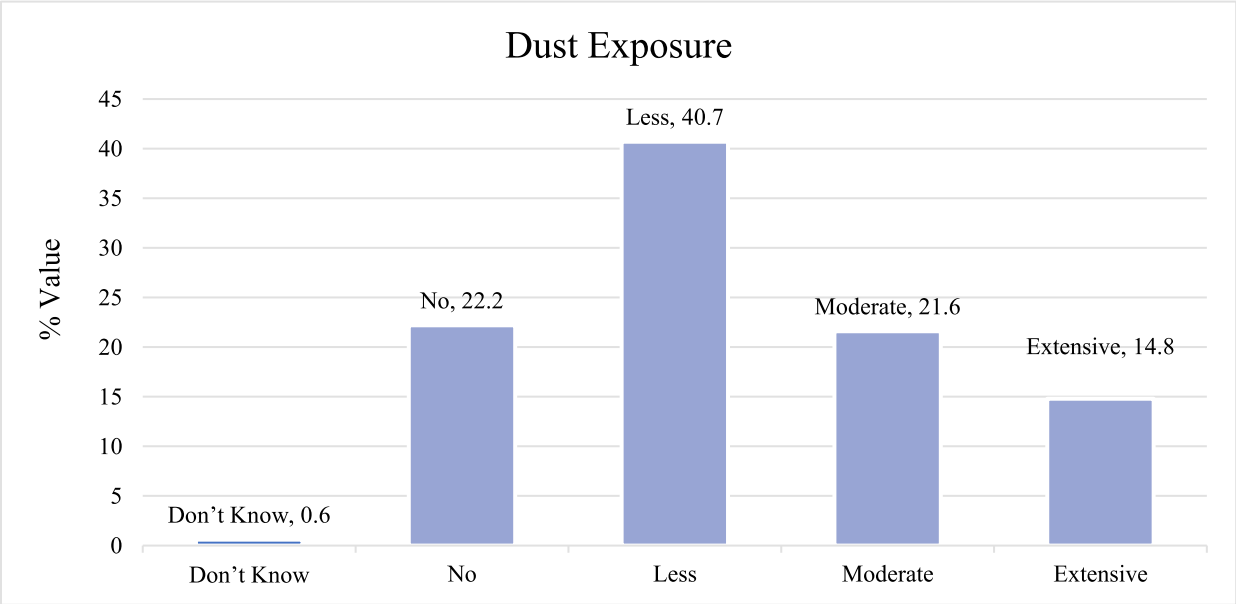


PPEs are the last line of defense. Engineering controls must be first priority to control hazards. It was observed that 18% workers of SMUs did not have any kind of PPE. Remaining 82% had some kind of protection. It was observed that workers had facemask, glasses, safety helmet, gloves, safety shoes & safety suits in 23%, 14%, 14%, 19%, 16%,14% ratio respectively.

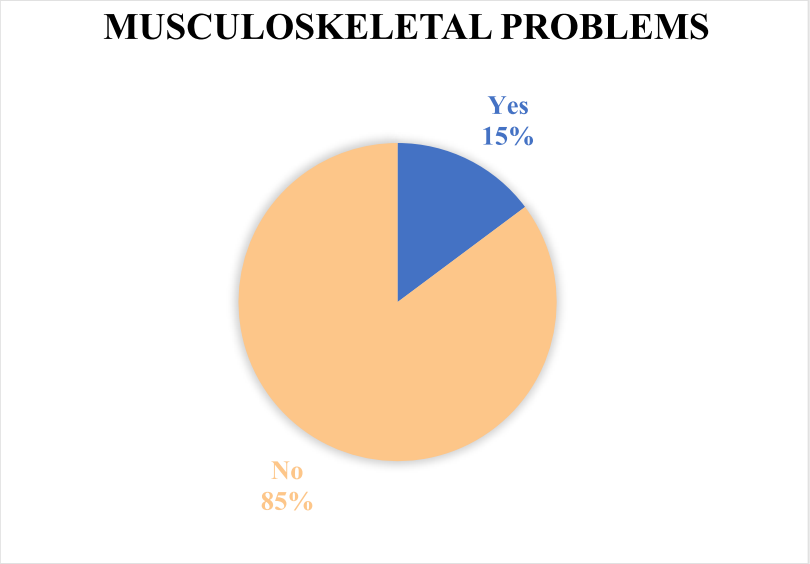
Availability of soap/sanitizer is also need of the hour due to Covid-19. It was observed that most of the industries had provided soap/handwashing liquids to the workers. Still 7% workers were deprived of such facilities at workplace in the conditions of pandemic.



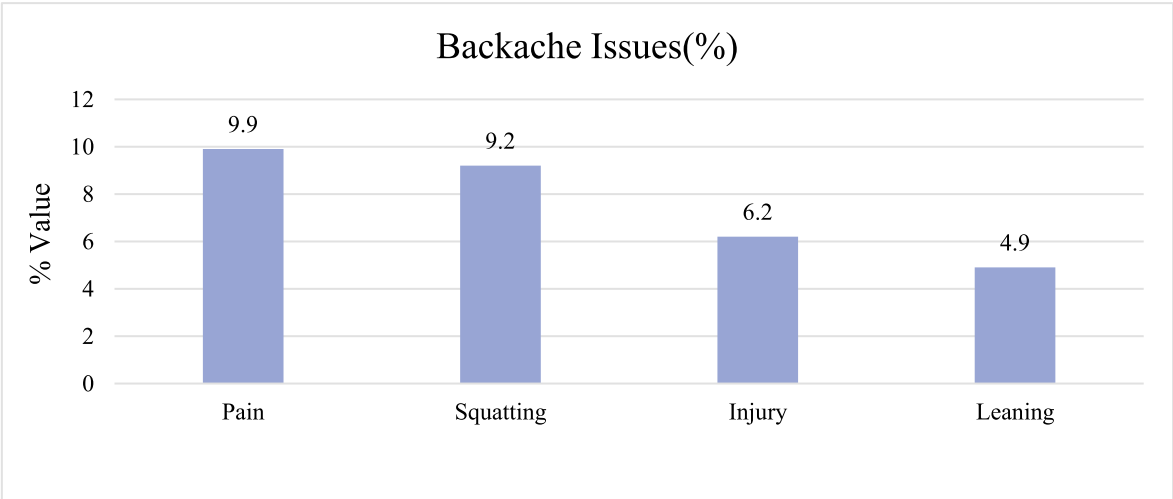
It was observed that only 35.2% workers reported gas exposure & 77.2% workers reported dust exposure.



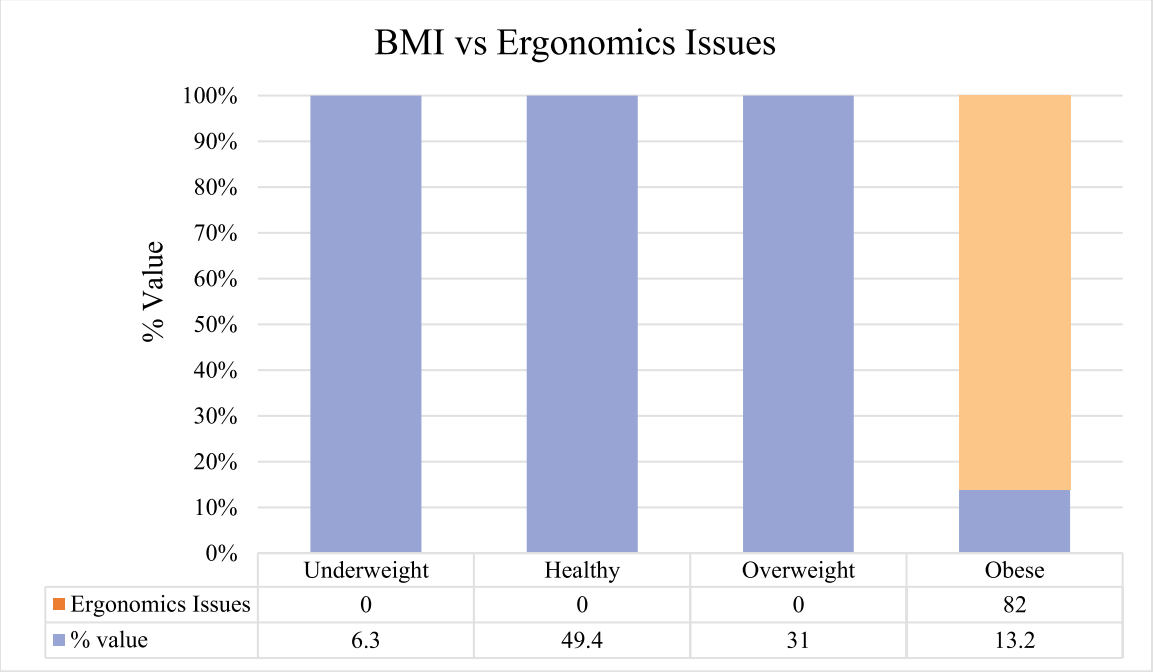
0.6% workers don't know about their dust exposure. 22.2% reported no dust exposure. 40.7% workers of SMUs were exposed to low dust. 21.6%, 14.8% reported moderate and extensive dust exposure respectively.



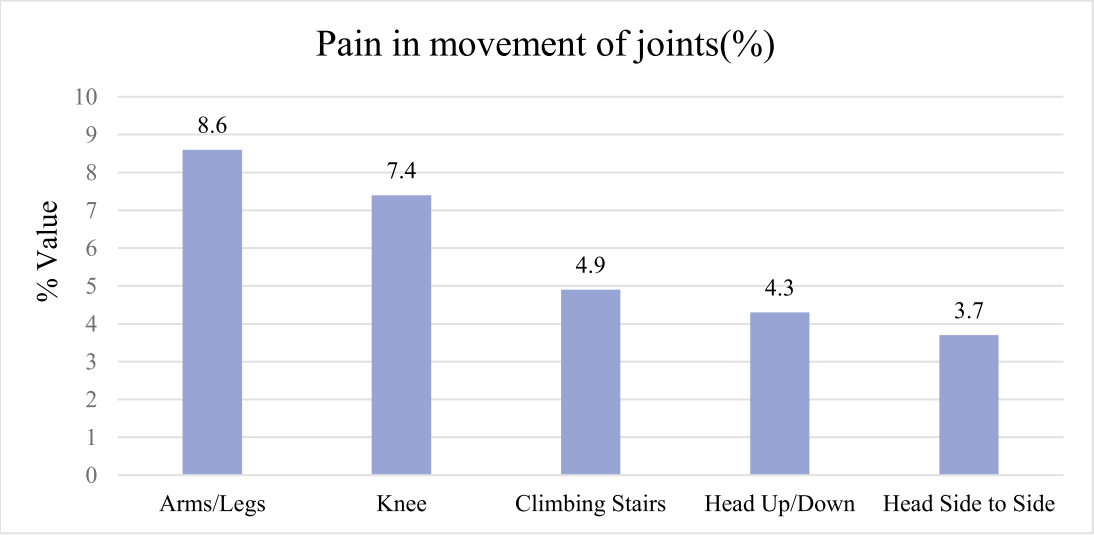
Musculoskeletal problems were usually not present in young persons /new workers. Old workers are more prone to these problems. In organizations, senior workers mostly do not participate in data collection activities. They send new comers for these purposes. Senior workers follow same routine daily throughout the life and don't like change in their life pattern. This leads to musculoskeletal problems. New workers usually don't not develop these issues but if they do not give proper attention, then they may also face these problems [23].



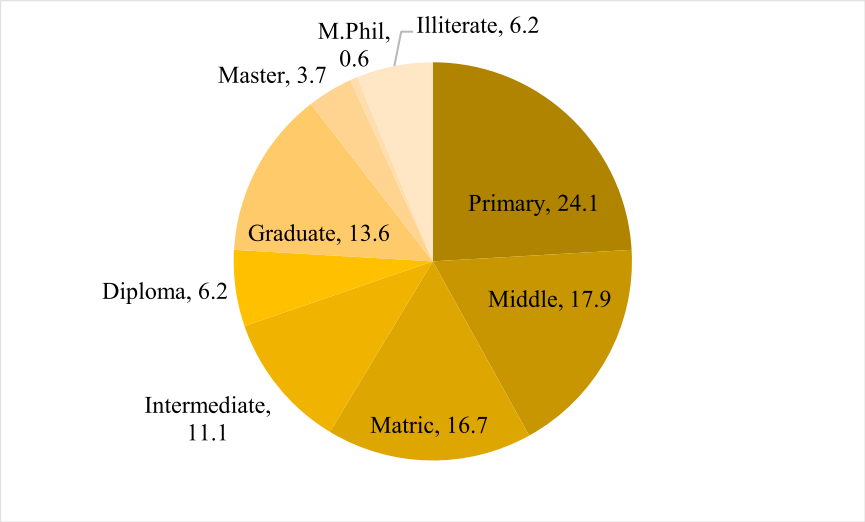
Backache was most highlighted problem in workers. 9.9%, 9.2%, 6.2% & 4.9% workers reported backbone ache, difficulty in squatting, back injury & difficulty in leaning respectively.



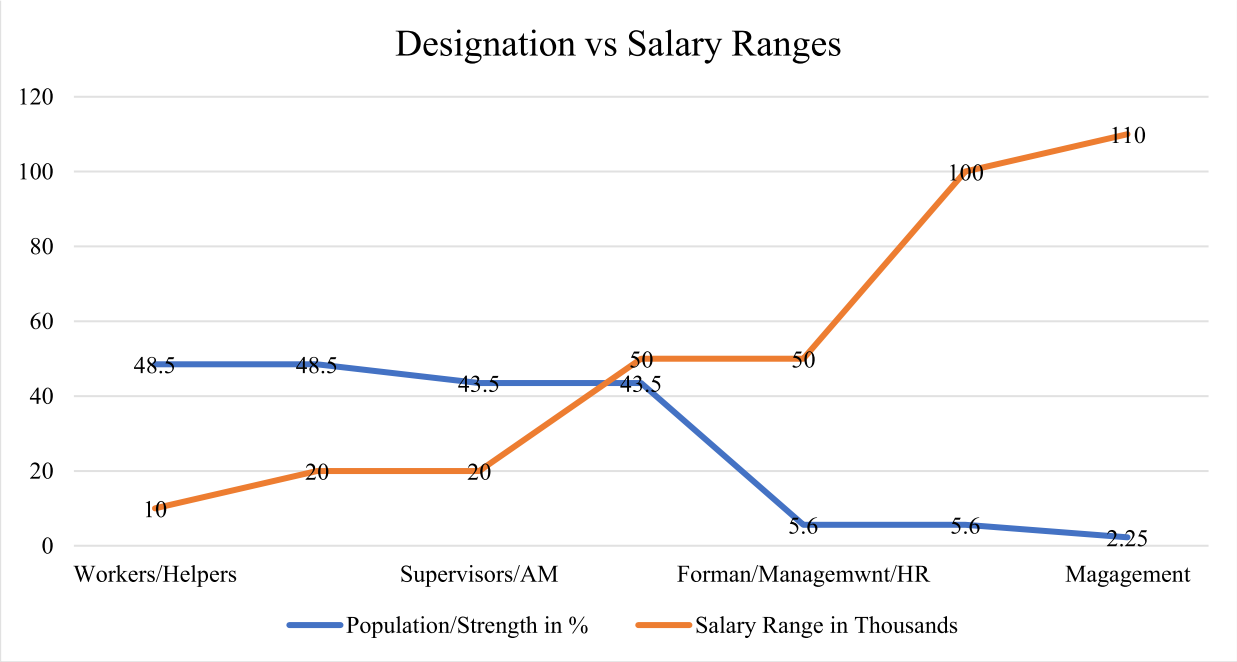
A most important factor in ergonomics related problems is obesity [18]. It was observed that ergonomics issues were only reported by obese workers which were 13.2% of the target population. 82% of them had ergonomics related issues respectively. Healthy workers occupy major volume but second most population was of workers being overweight. So along with repetition of work, obesity must be taken in to account.



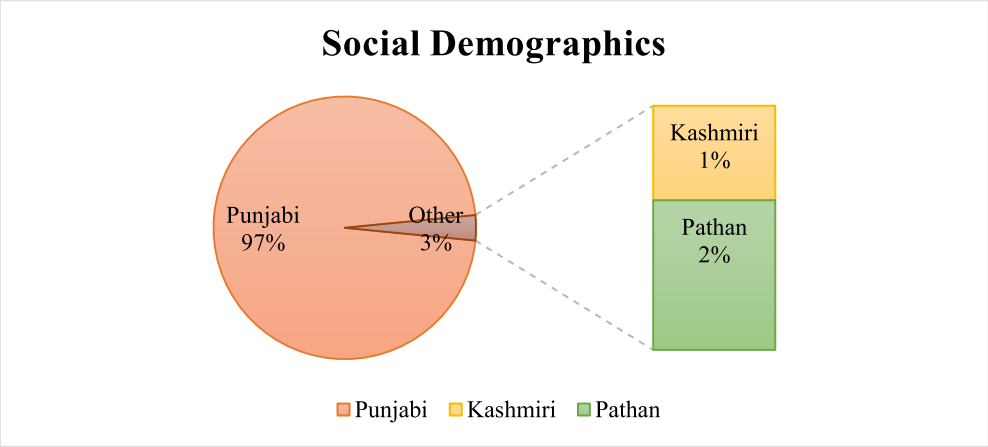
8.6% workers reported arms/legs joints pain. Similarly, 7.4%, 4.9%, 4.3% & 3.7% workers reported pain in knee joints, problems in climbing stairs & head up/down/side to side movement respectively. Pain in neck joints was mainly due tilting head in direction of work activity continuously. This leads to stiffness of neck joints. Similarly knee joints pain was due to movement across the stairs. SMUs usually had no lifts. They transport items manually on trollies. So, stress on knee joints was high.



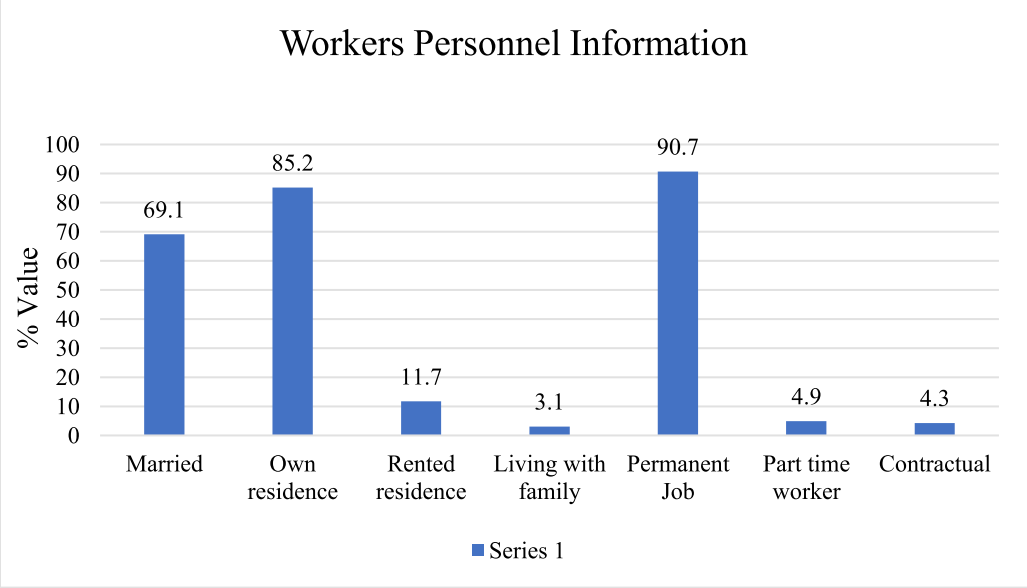
Education level of workers indicate that 24% workers were educated up to 5th class standard only. The illiteracy rate was 6% among them. There must be special incentives for workers enrolled in different education programs.



Salary packages were ranging from Rs. 10,000 to Rs. 100,000 & above in SMU. Management staff was only 2.25% having salary from Rs. 0.1million & above. After that foreman, supervisors & helpers/workers come with 5.6%, 43.5% & 49.5% population respectively. Employer has shown resistance when salary of workers was enquired. Most of the workers were not willing to disclose their salary. This may be due to non-compliance of minimum wages or a threat of expulsion from the job. So, salary details were collected randomly from selected workers.



97% workers in SMUs were Punjabi while 2% were Pathans and 1% Kashmiris. Due to minimum salary packages, only local workers can afford to work in SMUs. Workers from periphery cannot afford accommodation in given salary packages.



Marital status indicates that 69% workers were married. 85% workers had their own residence while rest of them were living with their family or in rented residences. 90% workers were permanent. Mostly these workers did not switch jobs & all of them were male workers.

Table 8: Family size

Parameter	Minimum	Maximum
Family Members	1	15
Children	0	8
Young Persons	0	11
Job holders	1	5

It was noted that each worker had 6 family members & 2 children in average. It was also noted that among 6 family members, 3 family members are young persons. Each family had 2 job holders.

5. Hazards in SMUs:

Following are major hazards identified during risk assessment activity:

i. Damaged cables/Joints

SMUs had usually low power requirements but in spite of this, choice of power cables was not up to the task. Most SMUs had deployed small sized cables which were insufficient for power requirement. Small size cables are very dangerous. Usually, these wires heat up and short circuit occurs which may lead to major fire accidents. Small size cables usually remain heated due to their less conductivity. This continuous heating process makes their insulation hard and brittle. Now whenever these wires move or twist, bare conductor becomes visible due to brittle insulation.

Joints are the most important and critical for electrical wiring. When two or more cables are connected, coper connector must be used. it was seen that most of the time, twisting of wires was used to joint cables. Twisting of wires is not standard way to connect cables. When twisting is done, resistance increases at the point of junction. This resistance becomes reason of heat generation. But if we use copper connector, the resistance of joint becomes very low. So, heating effect reduces. therefore, it is always recommended to used copper connector on joints so that heat generated can be reduced.

ii. Cable Routing

Cable routing has very important effects on voltage. If long route is adopted, then cost of cable increases and voltage drop per unit length per ampere also increases. In order to save cost, cables were routed on shortest paths. This creates rush of cables. Similarly, most SMUs had hooked wires on wall. No cable tray or conduits were used to support cables. Whenever any cable is hooked on wall, then

pressure on insulation at the support increases. This may damage insulation. It is recommended to use cable tray when heavy cables are routed.

It was noted that broken conduits were very common in all SMUs. Rectification process was very slow as compared to wear and tear. Also, cable trays were damaged and rusty.

iii. Meggering Results

Meggering or insulation testing is a method in which insulation resistance is checked. Meggering must be done after 10 years on all cables especially on larger diameter cables. This will give record of insulation strength. This insulation results must be compared with previous maggering values and degradation in insulation must be noted.

iv. Earthing/Grounding

It was observed that earthing has not been given first priority & all kinds of electrical equipment were earthed with 4mmsq wire. Diameter of earthing cable must be at least half of the neutral wire's diameter. Similarly, all 3 phase systems must be earthed at two pints with different earthing wires. In SMUs, number of earth pits were very small as compared to electrical appliances. Earth pits are usually constructed at the time of construction. It is assumed that no testing of earth pits was done using earth tester

v. Protection Devices (this is point should be deleted)

Most SMUs were constructed in old buildings with no electrical protection system. Simply Miniature Circuit Breakers (MCBs) were used for protection. MCB does not provide protection in case of electric shock. No residual current devices were seen in most SMUs.

vi. Inexperienced technical staff

Electrical staff present in SMUs were experienced but only know their daily routine work. They were unaware about latest protection devices. Technical staff must be trained and have knowledge of updated equipment and technology.

vii. Machine guarding

In SMUs, almost all machines had no machine guard. Machine safeguarding must be ensured to minimize the risk of accidents for machine-operator. SMU owners usually buy old/used/second-hand machinery in order to save initial cost. So, these machines had no safe guard [19].

viii.Personal hygiene/Dress Code

Long working hours and tough work restricts workers from taking frequent baths. All staff members must be provided with uniform. These uniforms can also reduce personal hygiene issues as workers cannot buy new dress regularly.

ix. Housekeeping/Slip Trip & Fall Hazards

Housekeeping was major problem in SMUs. Due to limited space, stacking of items creates issues which may lead to slip, trip and fall hazard at workplace.

x. Firefighting equipment/Emergency Exits

Most SMUs had one or two fire extinguisher which were expired. These extinguishers were only kept for display and to convince regulatory bodies only. There were no clear marking of emergency exits in case of availability. Usually stacking of items was placed on exit or it was used as regular doorway.

xi. Ergonomics issues

Workers had no chairs/stools. They were not allowed to sit during working hours. Workers had long experience of work so they were accustomed of same posture during work. Job rotation was usually not done in SMUs.

Equipment that creates vibration includes grinders, sanders and jig saws etc. It was noted that no shock absorber gloves/grips were provided to workers. This is one of the main reasons behind 8.6% workers complaining pain in arms/legs joints.

xii. PPEs

No proper PPEs were available for workers. In some SMUs, workers were wearing PPEs but they were damaged. In most of the cases, workers did not wear PPE as they think it will reduce their speed of work. Also, workers were not accustomed of wearing PPEs.

6. Discussions & Recommendations:

In this section, some recommendations will be discussed to improve working conditions of SMU workers.

- In order to reduce running cost, owners usually deploy a smaller number of employees. These employees were forced to work extra hours after their shift. This leads to frustration/ anxiety. Also, low salary packages were recorded. Only minimum wages were adopted by owners of SMUs & annual increment was negligible. A person "A" from a SMU in Kasur had salary of Rs. 24,000 after working 25 years in same industry. It was observed that some SMUs had implemented different types of contracts in order to avoid minimum salary compliance. Workers were given amount according to per items basis. They cannot get even Rs. 17500/- if they work 12 hours daily as rate per item was kept very low. In this way they had found a loop hole in minimum wages law [20]. So, in order to lift living standard of workers, salary packages must be improved.
- Workers were enforced with long working hours & overtime. They were bound to work extra hours. They were given very little time for lunch or dinner. Some of the workers travel very long to reach their organization. This increases their working time and reduces sleep time. Also, only single holiday is awarded. workers must be given liberty for overtime [22].
- SMUs provide very little benefits to their workers. Usually no medical, housing travelling benefit was provided. Some SMUs provide food and travelling facilities but they deduct a considerable amount from their salary for these facilities. Some workers were living on rent. They cannot afford to pay their rent. Workers must be provided with health insurance, lunch facilities, marriage grants etc.
- It was observed that exhaust fans in all SMUs were not according to the demand. Owner of the organizations usually deploy less number of exhaust fans in order to save electricity. All those SMUs who had installed correct number of exhaust fans had used small powered motors. There must be proper ventilation system. This will also reduce heat stress.
- Cough and phlegm were mostly reported by workers. 11.1% workers reported phlegm & 6.8% workers reported cough. This was due to fact that owners didn't provide PPEs. Appropriate PPEs must be provided to workers & engineering controls must be implemented to purify air.
- Back bone & joints pain related issues were high due to non-availability of proper equipment for weight lifting & absence of lifts. 9.9% workers reported pain in back bone. Lifts must be installed in SMUs where offices were in multi stories buildings. Also, proper lifting and transportation equipment must be provided. Repetition of work must be altered. Job rotation is necessary. An

occupational health physician must check all workers ergonomics related issues [21].

- Literacy rate was high but 24.1% workers were lying up to 5th class standard only. Literacy rate must be increased. Owners of SMUs must provide special incentives for workers who got admission in different educational institutes.
- Emergency exits are the most important for workers life. No firefighting equipment/emergency exits were present in SMUs. Owner/management of SMUs must create/construct emergency exits & allocate special sites for firefighting equipment. These exits must be according to the number of workers and structure.
- Approximately all SMUs had no electrical protection devices. Simply Miniature Circuit Breakers (MCB) were installed. These devices were not enough for workers safety. Residual Current Devices (RCD) & Earth Leakage Circuit Breakers (ELCB) must be installed. These devices are not very costly.

Some industries were hesitant to conduct our proposed activity. They had a fear that our department will perform legal action if they allow us to perform risk assessment activity. Covid-19 has also narrowed down our time line. Workers were hesitant to participate in audiometry & spirometry. They confused spirometry with Covid-19 screening test.

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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? (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.] 1. Yes ___ 2. No ___

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 phelgm lasting for 3 weeks or more each year? *(For individuals who usually have cough and/or phlegm) 1. Yes ___ 2. No ___

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. Occaisonally 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 ___ 8. Does not apply __

C. How old were you when you first started regcigarette smoking? — ____ Age in Years 88.Does not apply __

D. If you have stopped smoking cigarettes completely, 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 completely, 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 standard pouch of tobacco contains 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 brochitis?	_____	_____	_____	_____	_____	_____
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 مشین سیفٹی

نام فیکٹری _____ تاریخ _____

نمبر شمار	سوال	ہاں	نہیں	عملی اقدامات
.1	کیا ملازمین کو مشین پر کام کے لیے محفوظ طریقوں سے آگاہی کیلئے کوئی تربیتی پروگرام بنایا گیا ہے؟			
.2	کیا ملازمین کو مشین چلانے کے محفوظ طریقہ کار پہ یقینی عمل پیرا ہونے کیلئے مناسب نگرانی مہیا کی گئی ہے؟			
.3	کیا مشینری اور آلات کے حفاظتی معائنہ کا باقاعدہ پروگرام بنایا گیا ہے؟			
.4	کیا تمام مشینری اور آلات صاف اور مناسب طریقے سے برقرار ہیں؟			
.5	کیا مشینوں کو چلانے و مرمت کے لیے سامان کو رکھنے اور کچرے کو ٹھکانے لگانے کیلئے مشینوں کے گرد اور ان کے درمیان مناسب فاصلہ ہے؟			
.6	کیا سامان اور مشینری کو محفوظ طریقہ سے اور اچھی طرح نصب کیا گیا ہے تاکہ گرنے یا دیگر نقل و حرکت کی صورت میں ملازمین کو چوٹ سے بچایا جاسکے؟			
.7	کیا ہر مشین پہ پاور شٹ آف سوئچ آپریٹر کی پہنچ میں ہے؟			
.8	کیا تمام پلیاں اور بیلٹ جو کہ سطح زمین سے سات فٹ کی بلندی تک ہیں' ان پر مناسب حفاظتی حصار لگائے گئے ہیں؟			
.9	کیا تمام متحرک زنجیریں' گراریاں' بیلٹ' فلائی ویل' پلیاں' شافٹیں' سپنڈل پر مناسب حفاظتی حصار لگائے گئے ہیں؟			
.10	ایسی مشینیں جن میں کولنٹ کا استعمال ہے کیا ان پہ اسپلیش گارڈ (حفاظتی شیلڈ) نصب ہے؟			

.11	کیا مشین ایریا میں آپریٹر اور دیگر ملازمین کو کام کے دوران پیدا ہونے والے خطرات 'نپ پوائنٹس' گھومنے والے پرزے' اڑتے ذرات اور چنگاریوں سے بچاؤ کیلئے طریقے کار مہیا کئے گئے ہیں؟			
.12	کیا مشین گارڈ (حفاظتی حصار) محفوظ اور بہتر طریقے سے لگائے گئے ہیں؟			
.13	اگر مواد رکھنے اور ہٹانے کیلئے خصوصی دستی اوزار استعمال کئے جاتے ہیں تو کیا وہ آپریٹر کیلئے محفوظ ہیں؟			
.14	کیا بجلی کے اچانک بند ہونے یا شٹ ڈائون کے بعد بجلی بحال ہونے پر مشینوں کو خودکاری سے روکنے کیلئے بندوبست ہے؟			
.15	اگر مشینری کو کمپریسڈ ہوا سے صاف کیا جاتا ہے تو کیا کارکن اور اس کے ساتھیوں کو آنکھوں اور جسمانی چوٹ سے بچانے کے لئے خود حفاظتی آلات یا دیگر حفاظتی حصار استعمال کئے جاتے ہیں؟			
.16	کیا مشین کی سروس و مرمت کیلئے لاک آئوٹ / ٹیگ آئوٹ طریقہ کار کی پیروی کی جاتی ہے؟			
.17	کیا مشین کو چلانے و بند کرنے کے بٹن واضح طور پر نشان زدہ ہیں اور کارکن کی رسائی میں ہیں؟			
.18	اگر ایک سے زیادہ آپریٹر موجود ہیں تو کیا ان کو علیحدہ علیحدہ کنٹرول مہیا کئے گئے ہیں؟			
.19	کیا ایمرجنسی لائٹنگ لائق عمل ہے؟			
.20	کیا مشین کی تھرتھراہٹ قابو میں ہے؟			
.21	کیا اوزار' آلات اور مشینری کو اس طرح سے بنایا' رکھا یا استعمال کیا گیا ہے کہ کام کو آرام دہ طریقے سے سرانجام دیا جاسکے؟			

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

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