

# Occupational health scenario of Indian informal sector

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**Abstract:** Workers in the Indian informal sector are engaged with different occupations. These occupations involve varied work related hazards. These occupational hazards are a consequent risk to health. The study aimed to determine occupational health scenario in the Indian Informal sector. One thousand eleven hundred twenty two workers from five different occupations namely weaving (handloom and power loom), construction, transportation, tobacco processing and fish processing were assessed by interviewer administered health questionnaire. Workers suffered from musculo-skeletal complaints, respiratory health hazards, eye problems and skin related complaints. There was a high prevalence of self-reported occupational health problems in the selected sectors. The study finds that workers have occupational exposures to multiple hazards. The absence of protective guards aggravate their health condition. The study attempts to draw an immediate attention on the existing health scenario of the Indian Informal sector.

**Key words:** Occupational health, Informal sector, Musculo-skeletal

## Introduction

Health hazards on human systems such as respiratory, dermal, auditory and musculoskeletal vary with occupational exposures. The risk assessment has been incorporated as a requisite in occupational health and safety legislations in Denmark<sup>1)</sup> and India<sup>2)</sup>. An efficient surveillance system aids to identify principal occupational hazards and thereby prevent them<sup>3)</sup>. Thus, there is a need to identify prevalent occupational health patterns in the different workgroups.

Poor work environment, unhealthy life style, work related exposures and demographic factors influence worker's health. The informal sector is characterized by poor working conditions and high exposure to hazardous substances<sup>4)</sup>. Poor work organization, poor access to clean

water and sanitation, ergonomic hazards, strenuous hand tools and exposure to dusts and chemicals are major risk factors identified in African informal sector<sup>5)</sup>. Workers at small scale enterprises of the UK have been known to experience health problems as work related stress, MSD problems, mucous membrane irritation, headache, skin diseases, respiratory problems, hearing loss, headaches and eyestrain<sup>6)</sup>. Gangopadhyay and Nag<sup>7, 8)</sup> have reported that the Indian unorganized sector is characterized with congested workplaces, restricted work area, poor illumination, high noise levels (80–90 dB) and extreme environmental conditions of high temperatures and humidity. These conditions in informal workgroups expose them to varied nature of health related hazards that gets implicated in their impaired health and poor well-being.

Demographic factors such as age, gender, smoking habits, working hours and job tenure were associated with injuries in construction workers and Indian laborers. Unsafe work practices were associated with injuries in workers at fish processing<sup>8)</sup>, gem polishing<sup>9)</sup>, construction

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work<sup>10</sup>) and coal mining<sup>11</sup>). Further, psychosocial aspects such as job control, poor management, emotional instability and psychometric disorders were associated with the injuries in construction workers, Indian coal miners, Indian farm laborers and craftsmen<sup>9, 11</sup>).

Exposures to food irritants and repeated hand washing at food manufacturing in UK based workers<sup>12</sup>), fish juice in African fish processing workers<sup>13</sup>), oil grease and petrol in Tanzanians garage workers<sup>14</sup>) and cement and related allergens in Netherlands brick processing workers<sup>15</sup>) were reported to cause skin related diseases. Food irritants in food manufacturing<sup>12</sup>), smoking and higher job involvement in Indian agricultural workers and textile workers<sup>13</sup>), organic dust in sewing industry workers<sup>17</sup>), tobacco dust in Croatian and Indian tobacco processing workers<sup>18</sup>), chemical exposures in Tanzian garage workers<sup>19</sup>), organic dust in Indian flour mill workers<sup>20</sup>) and construction dust, asphalts and gases and vapors in Iranian construction workers<sup>21</sup>) were associated with respiratory symptoms. The above literature builds a premise that workers employed in different occupations are exposed to varied risk. These risks lead to varied health hazards.

Various researchers have studied health hazards of varied occupations in the informal sector<sup>22, 23</sup>). Respiratory problems, injuries and MSD problems in construction<sup>9, 10</sup>), weavers<sup>11</sup>) and transportation<sup>12, 13</sup>) have been reported. Headache, giddiness, nausea, vomiting, injury and respiratory disease in beedi rolling have been reported<sup>14–16</sup>). There exist scientific evidence on health related complaints of aches in back, body and head and respiratory disorders arising out of physical labor demands and dusty work environment in textile workers<sup>19</sup>). But the data on current overall occupational health scenario of these Indian informal sectors is lacking. We examined the morbidity patterns via a questionnaire in selected occupational groups.

## Methods and Materials

The study was conducted in compliance with the Indian Council of Medical Research's ethical guidelines. The Institutional Ethical Committee's clearance was obtained to conduct the study and the informed consent was obtained from each participant for study. Questionnaires were administered face-to-face to each worker and it consisted of three parts, including: (1) personal characteristics, (2) self-reported health complaints, and (3) musculo-skeletal pain. Personal details of workers, including age, work experience, life style, working hours and treatment received were noted.

### *General health questionnaire*

Self reported health complaints such as (1) injury during their work life, (2) respiratory symptoms—breathing problems, coughing, tuberculosis, chest pain and asthmatic, (3) eye problems—burning, redness, watering, low vision, and itching, (4) hearing problems, (5) headache, (6) giddiness, (7) nausea, (8) vomiting, (8) impaired postural balance and control and (9) abdominal pain were noted.

### *Musculo-skeletal discomfort*

The prevalence of musculoskeletal pain and discomfort among the informal workers was evaluated using NIOSH checklist.

### *Statistical analysis*

SPSS 15 was used for statistical analysis. Descriptive values and percentage were calculated for the prevalence of health morbidities in these occupations. Relative risk estimates were calculated to identify the influence of demographic factors on health outcomes. We calculated the relative risk estimates for workers to examine the influence of demographic factors on worker's health hazards. The workers who were female (against males), age less than 35 years (against age more than 35 years), job duration of more than 10 years (against less than equal to ten years), married (against unmarried), literate ( against illiterate), and working for more than six hours (against working less than six hours) were used for calculating the health risk.

## Results

Details about job description, work related exposures and number of workers who participated in the study is shown in Table 1. The socio-demographic details of the workers are given in Table 2. Occupational injury pattern of the workers and the causative mechanism have been reported in Table 3. Occupational health prevalence of selected informal sector is presented in Table 4.

### *Transportation*

Transportation work involves driving for irregular working hours with exposures to noise, dust, heat and vibration in the work environment and continuous attention demands. Sample group of male workers covered under transportation had mean age and employment duration of 36 ( $\pm 9.4$ ) and 12.2 ( $\pm 7.08$ ) years respectively. Health problems such as headache (24%), injury (18%), eye problem, abdominal pain and giddiness (16% each) and pain

**Table 1. Occupation and exposures**

Occupation	Exposures
Transportation (N=51)	The automobile driven by workers was a three-tiered auto-rickshaw. The workers were self-employed.
Powerloom weavers (N=224)	Weavers in powerloom units are engaged in working on machine in a production area (four machines simultaneously) to check on fabric production/correct machine malfunction when yarn breaks and then restart the machine. Workers transport and load raw material (warp and filling yarn) on weaving machine, unload and then transport the finished products.
Handloom weavers (N=293)	Worksites selected in the study were distributed in centralized sheds and home-based. The tasks include manual sorting of raw materials, carding and spinning on carding and spinning machine, dyeing and weaving.
Tobacco processing (N=453)	Beedi is made out of processed tobacco wrapped in tendu leaf. The task include soaking, cutting, making beedis and walking distance to get raw materials and give finished products (beedis) to contractors.
Fish processing (N=52)	The fish processing workers pack, cut, remove tentacles and sort.
Construction (N=49)	Construction workers selected perform unskilled and skilled activities. The job profiles of workers were pipe laying, plumbing masonry, tiles fitting, flooring and glass fitting.

**Table 2. Socio-demographic details of workers in Informal sector**

Occupation	Transportation	Powerloom weavers	Handloom weavers	Tobacco processing	Fish processing	Construction
Average Age (SD) years	37 (9.3)	40 (13.4)	39.6 (11.1)	37.5 (11)	20.4 ( $\pm$ 2.3)	28 (11)
Age > 35 years (%)	51	58	59	0.51	—	16
Average duration (SD) years	12.5 (7.1)	17.6 (12.9)	19.6 (11.4)	19.7 (11.4)	3.6 ( $\pm$ 2.8)	9.2 (8.1)
Duration > 10 years (%)	49	59	72	72	2	30
Literacy (%)	45	25	32	63	79	55
Married (%)	65	85	69	77	41	65
Poor life style (Tobacco chewing, Smoking) (%)	76	76	82	10	—	20
Average Working hours (SD)	12.1 (7)	9.8 (2.9)	8.6 (3.1)	7.1 (2.1)	12.0	8 (2.3)
Hours (> 8 hours/day) %	61	38	46	16	100	77
Males in the studied sample (%)	100	47	47	34	—	77

**Table 3. Occupational injury and their types**

Occupation	Male (%) (SE)	Female (%) (SE)	Injury type and causes
Transportation	17.6 (0.02)	—	Accidents caused while driving
Powerloom weavers	43.2 (0.04)	28.8 (0.04)	Fingers stuck in machine and shuttle flying out of machine and hitting
Handloom Weavers	36 (0.04)	28.2 (0.04)	Shuttles getting slipped while weaving
Tobacco processors	39.5 (0.02)	19.9 (0.04)	Cuts by sharp edged tools such as knives and blades while cutting the leaves
Fish processing workers	—	34.6 (0.05)	Cuts by sharp edged tools and pricks on hands by fish thorns
Construction workers	39.5 (0.1)	63.6 (0.08)	Injuries caused by minor accidents as falls and while handling tools

in body were reported by the workers. The study identifies that the transportation workers develop respiratory symptoms, eye problems, headache and pain. Workers reported higher prevalence of pain in upper back, knee and hand.

#### *Powerloom weaving*

Working with the power loom units imposes workers to exposures such as cotton dust, humidity, noise, confined workplace, whole body vibrations via feet, poor workplace organizations, lifting beams and long working hours with the incorporated shift system. Further non availability of the personal protective equipments aggravate their situation. Powerloom weavers aged 37 (9.3) years and a job

involvement of 12.5 (7.1) years participated in the study. More than 58% of the weavers were in the age group of more than 35 years. Males and females reported headaches (42 and 43% respectively) and eye problem (59% and 36% respectively). The higher number of men reported impaired hearing and skin problems. About 43% males and 20% females reported cuts on fingers due to unguarded machinery. Pain in the upper back, lower back and knee was reported to be prevalent in power loom weavers. The power loom workers suffered from respiratory problems, impaired hearing, injuries and pain chiefly in knee and lower back.

**Table 4. Prevalence percentage of work related health problems amongst the workers**

	<i>Transport</i>		<i>Power loom weavers</i>		<i>Handloom weavers</i>		<i>Tobacco processors</i>		<i>Fish processors</i>	<i>Construction</i>	
	Male % (SE)	Female % (SE)	Male % (SE)	Female % (SE)	Male % (SE)	Female % (SE)	Male % (SE)	Female % (SE)	Female % (SE)	Male % (SE)	Female % (SE)
Headache	23.5 (0.06)	41.7 (0.04)	42.5 (0.07)	25.5 (0.04)	46.8 (0.04)	51.3 (0.04)	65.1 (0.03)	3.84 (0.06)	32.4 (0.07)	72.7 (0.4)	
Giddiness	15.7 (0.05)		12.3 (0.02)	12.7 (0.03)	45.2 (0.04)	19.7 (0.03)	32.9 (0.02)	1.9 (0.05)	35.1 (0.06)	72.7 (0.12)	
Nausea	3.9 (0.02)	7.9 (0.02)	8.2 (0.02)	2 (0.01)	14.4 (0.03)	7.9 (0.03)	7.6 (0.08)	—	21.6 (0.05)	81.8 (0.12)	
Vomiting	3.9 (0.02)	9.9 (0.02)	9.6 (0.02)	—	5.3 (0.02)	3.9 (0.02)	10.3 (0.01)	—	13.5 (0.08)	18.2 (0.1)	
Eye problem	15.7 (0.07)	58.9 (0.04)	35.6 (0.3)	55.9 (0.001)	10.1 (0.1)	69.7 (0.01)	52.8 (0.03)	5.76 (0.07)	56.8 (0.08)	90.9	
Abdominal pain	—	13.9 (0.03)	—	13.7 (0.03)	8.5 (0.1)	10.5 (0.02)	10 (0.01)	—	32.4 (0.7)	54.5	
Hearing loss	—	46.4 (0.04)	4.1 (0.01)	2.9 (0.01)	2.1 (0.009)	—	—	—	2.7 (0.02)	9.1 (0.08)	
Postural imbalance	3.9 (0.09)	19.2 (0.3)	2.7 (0.01)	1 (0.0001)	—	—	1.7 (0.01)	—	—	—	
Skin problems	—	26.5 (0.2)	12.3 (0.02)	10.8 (0.1)	22.3 (0.004)	5.3 (0.02)	8.6 (0.001)	5.8 (0.02)	27 (0.06)	72.7 (0.2)	
Respiratory problem	9.8 (0.05)	48.3 (0.45)	20.5 (0.03)	52.9 (0.05)	35.6 (0.4)	54.6 (0.04)	39.5 (0.03)	26.9 (0.06)	51.4 (0.08)	72.7 (0.1)	

Respiratory problems: Breathing difficulty, asthmatic, chest pain, coughing, Tuberculosis; Eye problem: Burning, redness, watering, low vision and itching and Skin problems: Itching, irritation, redness, rash, blanching, allergic symptoms.

### *Handloom weaving*

Handloom weaving involves sitting on an unsupported desk with constant body movements. The occupational exposures that pose risks were dusty and hot environments and improper ventilations, poor work postures, repeated arm movements and high concentration demands. Handloom weavers aged 39.6 ( $\pm 11.1$ ) and having job involvement of 19.6 ( $\pm 11.4$ ) years participated in the study. Females formed 53% of total workers that participated in the study. Around 56% males reported eye problem and 53% reported respiratory symptoms. Amongst the females 47% reported headache, 45% giddiness, 36% respiratory symptoms and 28.2% injury. 36% males and 28% females reported injuries due to unguarded looms. Poor seating arrangements, task demands of long working hours and stretching and repetitive movements caused pain in back, knee, calf, shoulders and hands.

### *Tobacco processing*

The tobacco processors performed work at home based workplaces in a confined environment, spending longer working hours in floor seated postures, exposing themselves to tobacco dust and the repetitive nature of work requiring constant finger movements. Workers of age 37.6 ( $\pm 11.1$ ) years and job involvement 19.7 ( $\pm 11.4$ )

years, participated in the study. About 72% of workers had job involvement of more than 10 years. Male and female tobacco processors reported respiratory problems (55% and 39%), headache (51% and 65%) and eye problems (69% and 52%). Injuries reported were chiefly cuts on hands due to handling of blades and cutting with scissors. They reported high prevalence of pain in lower back, shoulders and hands.

### *Fish processing*

Safety risks posed to fish processing plant workers involve working in a cold environment, repetitive nature of activity, standing for long hours on the metal platform, continuous hand movements, shift work, working in the presence of bio-aerosols, wet floors, poor ergonomic practices and poor work place organization. Female fish processing workers of age 20.6 years ( $\pm 2.3$ ) and with job duration of 3.6 ( $\pm 2.8$ ) years participated in the study. 84% of workers were relatively inexperienced. Cuts on hands (35%) were either due to sharp edged tools or pricks by fish thorns. Respiratory problems (27%), neuroticism (35%) and fatigue (16%) were the other major health complaints. Pain in shoulders, neck, hand, forearm and knee were reported by the workers (Fig. 1). Standing and repetitive hand movements lead to pain in the workers. Respira-

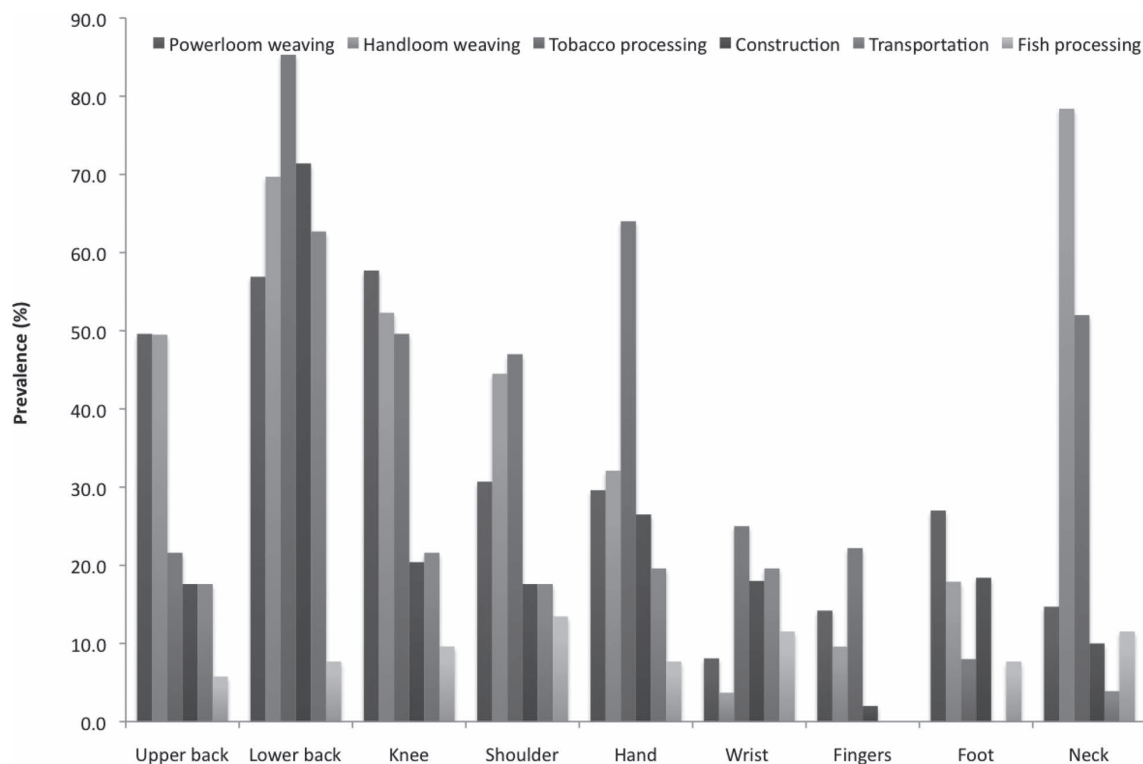


Fig. 1. Musculo-skeletal discomforts of workers in Informal sector.

tory problems, pain in the upper extremities and injuries were identified as major health hazards in fish processing.

#### Construction

The occupational risks imposed on these workers were load handling, hot and dusty environment, long working hours, strenuous work postures, repetitive movements and high physical activities. Mean age and job duration of the male construction workers were 27.6 ( $\pm 10.8$ ) and 8.7 ( $\pm 1.3$ ) years, while of females were 29.7 ( $\pm 13.8$ ) and 8.5 ( $\pm 2.2$ ) years respectively. More than 70% of workers were males amongst the participants. The workers belonged to the young age group <30 years. Tools hitting their uncovered legs and falls from unlevelled surfaces lead to injuries at construction sites. More than 70% of females reported skin problems, respiratory symptoms, headache, giddiness and eye problems. Respiratory problem, injury and headache were reported in more than 30% males. Construction workers reported pain in lower back, shoulders and hands.

#### Health facilities—availability and usability

India has around twenty three thousand one hundred and nine primary health centers, three thousand community health centers, twelve thousand district hospitals and fourteen thousand sub-health centers<sup>2</sup>. Giang and Allebeck<sup>19</sup>

suggested that examining the use of the health facilities imparts a view on available health resources to the public and planning the health services. District hospital (59%) and primary health centers (30%) were the chief medical facilities used by workers. Self-remedial measures such as painkiller were the major combat used by workers in transportation (37%), tobacco processing (35%) handloom (17%), fish processing (11%) and construction (10%) against MSDs.

#### Socio-demographic variables and health complaints

Relative risk estimates of socio-demographic variables and health is given in Table 5. Females were at a higher risk to respiratory complaints (OR 2.1, 95%CI 1.6–2.7), injury (OR 2, 95%CI 1.5–2.7) and eye related complaints (OR 1.8 95%CI 1.3–2.4). Workers in higher age groups (>35 years) were at a risk to develop respiratory OR (1.8 95%CI 1.4–2.3) and eye related problems (OR 2.2, 95%CI 1.6–3.9). Workers who worked for more than 10 years were at a risk to develop respiratory OR (2.1 95%CI 1.5–2.7), eye related problems (OR 1.8, 95%CI 1.4–2.4) and general health complaints (OR 1.2, 95% CI 1.1–1.6). Workers who were married were at a higher risk for eye problems (OR 1.3, 95%CI 1.1–1.6), musculo-skeletal complaints (OR 1.1, 95%CI 1.0–1.2) and respiratory problems (OR

**Table 5. Relative risk estimates of influence of socio-demographic variables on studied work population**

Socio-demographic variables	OR	95% CI	<i>p</i> value
<b>Gender (Females compared against males)</b>			
Respiratory	2.1	1.6–2.7	<i>p</i> <0.0001
Injury	2	1.5–2.7	<i>p</i> <0.0001
Eye problem	1.8	1.3–2.4	<i>p</i> <0.0001
<b>Age &gt; 35 (compared against age ≤ 35 years)</b>			
Respiratory	1.8	1.4–2.3	<i>p</i> <0.00001
Eye problem	2.2	1.6–3.9	<i>p</i> <0.00001
<b>Duration &gt; 10 years (compared against duration ≤ 10 years)</b>			
Respiratory	2.1	1.5–2.7	<i>p</i> <0.00001
Eye problem	1.8	1.4–2.4	<i>p</i> <0.00001
Poor health	1.2	1.1–1.6	<i>p</i> <0.05
<b>Married (compared against unmarried)</b>			
Eye problems	1.3	1.1–1.6	<i>p</i> <0.05
Musculo-skeletal problems	1.1	1.0–1.2	<i>p</i> <0.05
Respiratory problems	1.2	1.1–1.6	<i>p</i> <0.05
<b>Working hours (&gt;6 hours per day) (Compared against ≤ 6 hours)</b>			
Injury	1.4	1.1–1.9	<i>p</i> <0.05

1.2, 95%CI 1.1–1.6). There was no association of literacy level and poor life style habits with worker's health status.

## Discussion

Literature review suggested an association between work related exposures and risk to ill health. The study hypothesized that health-risk are imposed on to the respiratory, musculo-skeletal, neurological system and overall human system by occupational exposures.

India has legislations which include the Factories Act, 1948 as amended in 1987; the Dock Workers (Safety, Health and Welfare) Act, 1986; the Building and other Construction Workers (Regulation and the Employment and Conditions of Service) Act, 1996; the Child labour (Prohibition and Regulation) Act 1986; the Mines Act 1952, as amended in 1957 and the Mines Rules 1957. In addition, there are also other specific regulations on particular hazards or focused on particular sectors and territories. OSH in India is the primary responsibility of the Ministry of Labor and other State Labor Departments in the country. The Ministry of Labor has also issued a National Policy on Safety, Health and Environment in the Workplace. The health care services in primary care units provides with the

information about hazard recognition and potential disease occurrence at each unit. Certain government institutes such as the National Institute of occupational health and all India institute of hygiene and public health provide training for hazard identification and training. The government has aimed to put efforts to ensure the health and safety of workers through legislations, institutes, extending medical facilities and safety training programs.

There are some studies on types of injuries in the informal sector. American day laborers suffer from injuries from falls, burns, lacerations and crush<sup>24</sup>). In the studied cases, the prevalence, mechanism and nature of injuries differed with occupation. Males of weaving and tobacco processing reported higher injuries in comparison to females of the respective group which corroborates with findings of earlier studies<sup>25</sup>). Females in construction were involved with unskilled labor and thereby reported higher injuries in comparison to their male counterparts. Injuries of females working in handloom weaving and tobacco processing associated with job duration of more than 20 years. Longer working hours were associated with occupational injuries amongst the handloom weavers and construction. Longer working hours have been known to increase physical and mental fatigue at work with reduction in precision and concentration at work leading to injuries<sup>26, 27</sup>). Young fish processing workers were more at risk to get injured that corroborates with the findings of Bull *et al.* 2002, Munshi *et al.* (2005) and Gardner *et al.* (1999) and Blanc *et al.* 2003<sup>28, 29</sup>) that might be due to their inexperience and lack of knowledge on safety. The absence of personal protective equipments and absence of machine guard leads to injuries have been reported in other studies<sup>30</sup>).

Exposures to vapors, gases, dust, or fumes lead to respiratory symptom. The work exposures of cotton (weavers), tobacco dust (beedi workers), cement dust (construction) and bio-aerosols (fish processing) lead to respiratory problems in workers. Longer exposures of higher working hours, higher age and longer job duration have been correlated with respiratory symptom<sup>31</sup>). Handloom weaving and tobacco processing involves high visually demanding tasks that caused eye related problems in these occupations.

High noise levels present in the Indian work environment influence the workers well-being and cause ill health symptoms<sup>30, 32</sup>) Powerloom units had 25–50 looms operated in a single housing. Workers were exposed to 8–16 hours of exposures. With the absence of engineered noise control, these occupational exposures caused impaired hearing. In the selected cases, noise exposures were associated with weaving (powerloom and handloom), transport

and construction, but the impaired hearing was observed only in male power-loom weavers. The high prevalence of impaired hearing in power loom weavers is associated with their working in two shifts (increasing their exposure) and absence of protective arrangements. This draws immediate attention to devise measures and mechanism to protect the workers from hearing impairment.

MSD symptoms were prevalent in all the selected cases, but their localized distribution differed. Construction workers had pain in upper and lower extremities that might be due to elevated hand movements, carrying weights and wrong posture<sup>33</sup>). Tobacco processing workers reported pain in upper and lower extremities due to repetitive hand movements and prolonged sitting posture. Power looms weavers had standing work postures accompanied with whole body vibration via feet that lead to pain in knee and lower back. Handloom weavers were exposed to repetitive movement and that lead to pain in back, knees and hand<sup>34, 35</sup>). Submerging hands in cold water, standing and repetitive hand movement lead to pain in hands and neck that corroborates with Nag and Nag<sup>18, 36</sup>). The transport workers showed higher prevalence of back pain and the causative factors identified were exhaustion, adoption of uncomfortable work postures and poor work environment. This is similar to observation made in other urban transit vehicle operators<sup>37</sup>). The work stressors varied with the workgroups, which got imbibed in their prevalence of pain and discomforts.

The present study corroborates with the findings of Giang and Allebeck<sup>38</sup>) that self-treatment, private medical facilities and district hospitals are chief health facilities used for disease prevention by the workers of the informal sector.

We examined the influence of different demographic variables on health risk in the studied population. There was an influence of age, job involvement, gender, marital status and working hours on risk of ill-health. In our study, workers who were of higher age and duration had an increased risk to develop health related symptoms. There have been similar studies where increase of age has been associated with health problems such as sleep problems, heart disease, stomach-ache, stress, irritability, vision problems and respiratory difficulties<sup>39-41</sup>). With the longer job involvement, respiratory symptoms, postural imbalance, eye problems and injuries increased which corroborates with the findings of Goldenhar<sup>28</sup>). However, poor life style and illiteracy did not exert an influence on health and well-being of the workers.

The study finds a necessity to develop an appropriate

industrial hygiene monitoring technique for exposure characterization of those workers at risk and medical surveillance protocols that utilize more sensitive immunological markers for early diagnosis to estimate disease burden. This could result in more reliable information being available to guide the timely implementation of appropriate interventions to minimize inhalation and dermal exposure to allergens and dust. The determination of appropriate quantitative exposure limits may require more detailed epidemiological studies. However, it appears that appropriate control strategies based on current knowledge can be designed. Specifically designed programme is needed to assist informal workplaces that generally do not have the capacity to manage the health risks associated with their work-related exposures. The study finds the necessity to determine the chief exposures at work that lead to worker's ill health. Health programs incorporating a participatory process (capacity building, risk analysis, problem prevention and solving, and monitoring and communication) aimed at promoting the worker's capacity to self-development in safety aspects. Systematic medical examinations of workers, visiting primary health centers and identifying occupational factors related to work causing the ill health can aid in disease prevention. Further preventive programs need to be developed for preventing work health related risks. Studies need to focus on execution of such programs.

## Limitations

With all self-reported data, the potential exist for recall bias. Some workers may have forgotten or outright denied they had experienced ill-health symptoms in the past 12 months. The study attempted to bring out an overall occupational health picture of the informal sector; however occupations which have not been included in the current study need an attention. Occupational health data in this study were based on self-report and could not be verified by medical examination. This might be a source of information bias.

## Conclusion

It was found that workers in informal sectors were exposed to varied work related exposures. Health complaints reported by workers were perceived and related to the work. Workers were not using protective devices and that aggravated their exposures. The temporary nature of occupational set up and belonging to poor socioeconomic status reduces their priority to occupational health and

safety. The study findings provide an insight into occupational health problems associated with selected cases of the informal sector. The medical team at primary health centres during the medical examinations can make workers more aware of the known risks and encourage them to improve their working conditions. Preventive measures concerning work and work condition could be conducted for informal workers, and especially for those most at risk.

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