Health Concerns of Textile Workers and Associated Community

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Abstract

Background: Workers in the textile industry risk developing various respiratory and pulmonary diseases due to exposure to cotton dust. The particles from the cotton lint are inhaled by the workers and results in the breathing problems including asthma, shortness of breath, cough and tightness in the chest. The poor health of labor contributes to the low productivity of the labor and in serious cases loss of jobs leading to the poverty. Objective: To assess the prevalence of respiratory symptoms among the textile workers and associated community. To contrast the health profiles of the textile workers, associated community and the control group to factor out any confounding factors. Methods: This study explores the health profiles of the textile workers and associated community and contrast them against the health profile of the control group to factor out any confounding factors. The study is conducted on cotton industry in Kasur, Pakistan. We interviewed 207 workers, 226 people from associated community (living in vicinities of weaving units) and 188 people for control group (from areas far away from weaving units and people are not associated with weaving industry) based on stratified random sampling technique. We employed descriptive methods and logistic regression to explore the association between respiratory diseases and weaving workers. Results: Overall, prevalence of postnasal drip, byssinosis, asthma, and chronic bronchitis were 47%, 35%, 20%, and 10%, respectively, among the workers. These percentages are significantly higher than the control group. An additional year of work increase the risk of postnasal drip, byssinosis, asthma, and chronic bronchitis by 5–6%. Among workers, 43% and 21% feel difficulty in hearing against noisy background and at low volume, respectively. Due to bad light arrangements at workstations, 21% and 31% workers are suffering from myopia and hyperopia, respectively. Proportions of the workers suffering from continuous headache, skin infection, depression, and low back pain are 28%, 29%, 27%, and 44%, respectively. Chi-square test results confirms that no confounding factor like air pollution is involved in this cause-and-effect study implying the association between the cotton dust and associated diseases is not spurious. Conclusion: Respiratory symptoms were statistically significantly more common in the weaving workers compared to control group. Better environment at workstations, use of protective gears and education are the factors which reduce the risk of associated diseases among workers.

Keywords

cotton dust, power-looms, respiratory diseases, Kasur

Q: What do we already know about the topic.

Ans: Workers in the textile industry risk developing various respiratory and pulmonary diseases due to exposure to cotton dust.

Q: How does this research contribute to the field?

Ans: This study explores the health profiles of the textile workers and associated community and contrast them against the health profile of the control group to factor out any confounding factors.

Q: What are your research's implications towards theory, practice, or policy?

Ans: This study finds no involvement of confounding factors with regard to associated diseases among the weaving workers in Kasur, Pakistan and the particular matter (cotton dust) is the main reason of ill health of workers.

Through proper planning and management, employers in weaving industry of Kasur should minimize the direct exposure of workers with cotton dust. Awareness campaigns and lecture series for the workers, highlighting the implications of not using the protective gears (e.g., Ear plugs, face masks, gloves and proper uniforms), should be the regular feature of this industry. Employers may get their workers registered for social safety net benefits like "Sehat Sahulat Program" scheme by the current government of Pakistan.

Introduction

Many countries around the world heavily rely on their industries as they create employment opportunities, contribute to output production, and add to the country's wealth creation. Pakistan is a semi-industrialized economy with a strong agrarian background which provides a sturdy foundation for the textile industry to thrive. Pakistan's textile industry has become the country's mainstay contributing approximately 8.5% to the overall GDP whilst generating employment opportunities to 38% of the manufacturing workforce and 45% of the overall workforce which is a compelling number considering that Pakistan is a labor abundant country. It is the eighth largest exporter of textile products in Asia and contributes 57% to the country's export revenues.

In Pakistan, about 15 million out of the total 49 million unskilled work force is employed in the textile industry, it is imperative to shed light on the working conditions these workers must endure during their tenure in this industry. There are several health and safety issues that workers in a textile industry must face irrespective of the unit they are working in it. The vast availability of labor, low health and safety standards and negligible implementation of laws on behalf of the government are putting the health of labor working in the industry in grave danger.

The weaving unit involves the process of threading or interlacing together different yarns to make cloth or fabric. There are certain health hazards workers might be exposed to in weaving units, be it integrated or independent weaving units or power loom units. The particles from the cotton lint are inhaled by the workers and results in the breathing problems including asthma, shortness of breath, cough, and tightness in the chest. The poor health of labor contributes to the low productivity of the labor and in serious cases loss of jobs leading to the poverty. The association between the existence of respiratory illnesses among the industrial workers from the cotton dust is well recognized in literature.[1-12]

Due to extended exposure to cotton dust, workers in the cotton processing industries face risk of developing obstructive respiratory conditions.[13] The affected workers of the factory further transform the diseases to the members of their family that widen the effects to the overall community. These effects caused by exposure to cotton dust could be short term and long term chronically damaging the overall health publicly.[14] Due to bad postures for long hours and lifting heavy weights, workers are also prone to developing musculoskeletal disorders like carpal tunnel syndrome, forearm tendinitis, bicipital tendinitis, and lower back pain.

Workers might also develop hearing problems due to some weaving machines emitting noises greater than 90 dBs. Continued exposure to noise may have damaging consequences for people who experience it for long stretches of time. High noise causes speech interference and hearing loss.[15] Yildirim et al,[16] investigated that hearing threshold of the textile workers changes significantly as compared to normal human beings and the noise causes oxidative stress among the textile workers. In the long term, the effects are not only limited to a sensory deficit but are rather influential on the psychological as well as economic aspect of a worker's life. Moreover, cotton dust can cause various pulmonary disorders and may even cause skin irritation.[4,17]

The scarce literature on occupational health in weaving industry of Pakistan highlights the associated diseases among the workers of weaving industry without comparing with the control group or without controlling for the confounding factors. There is hardly any study available which studies the impact of ambient particulate matter (cotton dust) on the health of associated community. This study is aiming to bridge this gap in literature by (i) comparing the treatment group (weaving industry workers) with the control group and (ii) studying the impact on the associated community. This study mainly focuses on the health hazards that workers employed in the textile industry in District Kasur are exposed to. District Kasur was formed in 1976 and is located at about 55 km towards South of Lahore with a population of 3 454 996 (Bureau of Statistics, 2017). Tanneries and textiles are major industries in the district. Overall, the textile sector in district Kasur comprises of 7756 looms, 46 916 rotors and 2 036 489 spindles (Pre-Investment Study—District Kasur, 2012).

Methods

A cross-sectional study is conducted in dozens of small weaving units located in East, West, and South-East of Kasur, Punjab. We randomly selected 7, 7 and 6 units from East, South-East and West strata, respectively. The "*Rand()*" command in Excel is used to randomly select weaving units from each stratum. Sample size is calculated by the formula given in Singh and Masuku[18]

$$n = n_0 \Big/ \Big[1 + \big\{ (n_0 - 1) / N \big\} \Big]$$

$$n_0 = z^2 p (1 - p) / e^2$$

by using the proportion of respiratory symptoms ($P = .20$) based on pilot study, 95% confidence interval, and 5.0%

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Table 1. Household Indicators.

Variables/Groups	Control Group (n = 188)				Associated Group (n = 226)				Workers (n = 207)			
	Mean	Std. Dev	Min	Max	Mean	Std. Dev	Min	Max	Mean	Std. Dev	Min	Max
Age	39	14.96	15	80	41	15.29	14	80	42	13.12	14	85
Education (Years)	5	5.10	0	16	6	5.68	0	16	2	3.67	0	14
Sex (male %)	.86	—	—	—	.87	—	—	—	.90	—	—	—
No. of adults	6.19	3.70	2	22	6.14	3.57	2	35	4.15	2.48	2	12
No. of children	2.04	2.13	0	12	1.88	2.04	0	8	2.07	2.09	0	9
Monthly income[a]	18 290	17 810	0	200 000	16 948	12 597	0	55 000	13 165	4459	2000	40 000
Health expenditure[a]	2155	2586	0	20 000	1892	1641	0	12 000	1273	1574	0	14 000

Control group comprises of those who neither work in weaving industry nor live near to it, *associated group* consists of those individuals who live about the industry and *workers* are those who are working in the weaving industry of Kasur.
[a]ANOVA test rejects the null hypothesis of equality of mean monthly income and health expenditures for the 3 groups.

margin of error. Selected weaving units were visited and the workers present at the time of visit were interviewed by a team of well-trained investigators. Workers were briefed about the purpose of the study and their consent was obtained before administrating the questionnaire. It is pertinent to mention that a pilot study was conducted as well to improve and validate the questionnaire. The Cronbach's alpha value for the final questionnaire was .75 which falls in acceptable range of social sciences.

Overall, we interviewed 207 workers, 226 people from associated community and 188 people for the control group. Control group comprises of those who neither work in weaving industry nor live near to it, associated group consists of those individuals who live about the industry and workers are those who are working in the weaving industry of Kasur.

We employed descriptive methods and logistic regression to explore the association between respiratory diseases and weaving workers. Descriptive techniques include analysis of variance (ANOVA) and Chi-Square test of no association. The continuous and discrete nature of the data motivated the choice of these test statistics. To compare the average values of continuous variables like monthly income and health expenditures, we employed the analysis of variance F-test and to test the hypothesis of no association among the discrete variables, Chi-square test is employed. Acceptance of the null implies that all 3 groups are facing the same level of respiratory diseases. Hence, cotton dust is not the cause, there might be any confounding factor involved (like air pollution) which is affecting everyone.

Logistic regression is the natural choice when studying the outcomes that are naturally or necessarily represented by a binary variable.[19] Logistic regression analysis is used to study the impact of education, work experience and working environment on the prevalence of different respiratory diseases. The dependent variables are categorized as binary where 1 indicates the incidence of the disease and 0 indicates otherwise. Multiple questions pertaining to work environment and worker's satisfaction in this regard were asked to workers. To reduce the dimensionality of the work environment, Factor Analysis technique is used to construct an index of work environment. The index is used as an explanatory variable in the logistic regressions.

Results

Descriptive Analysis

Table 1 summarizes the descriptive statistics of the household indicators of the 3 groups. Majority of our respondents in control, associated, and workers' group were male with 86.0%, 87.0%, and 90.0%, respectively. Age and education are 2 elements that influence human behavior towards occupational health and safety either directly or indirectly. The economic condition of an individual may be gauged through their reported monthly income and their health status can be assessed through the health expenditures. The average age of respondents from the control, associated and worker's groups were 39, 41 and 42 years, respectively. The average educational level, measured in years of schooling, for control and associated groups is primary and below primary for workers. Average number of children are 2 in all groups, average number of adults are 6 for control and associated groups and 4 for workers group.

To compare the average monthly income levels of the groups, we apply ANOVA test which rejects the hypothesis of equal monthly income across the groups (*P*-value=.0002). Worker's monthly earnings are lowest (PKR 13,165) among all groups and it is even lesser than the official minimum wage rate of PKR 17,500. Additionally, on an average, all 3 groups spend equal proportion of their income for health services (ANOVE F-test *P*-value=.2864). This indicates that the textile workers relatively face more burden of diseases as compared to associated community and control group. Therefore, workers visit district hospital Kasur more frequently than other groups for free treatment and medicine.

Workers were inquired about the availability of ventilation, adequate lighting, washrooms, first aid and protective gears and they were to report their satisfaction with the

facilities provided (Table 2). Majority of the weaving units provide ventilation and toilet facility to workers however only 62% are satisfied with the hygiene of washrooms. First aid facility is not available to 89% workers at their workstations and 5% cover their head and nose on duty. However, an overwhelmingly low percentage (2.0%) reported actual usage of the protective gears. These statistics further reiterate the fact that there is a need to promote provision of protective gears to the workers and create awareness amongst the workers to safeguard themselves against a plethora of occupational health hazards. Table 3 highlights the prevalence of diseases and smoking habits across the 3 groups of individuals. Smoking was seen to be predominant amongst the weavers (37%) with years of smoking averaging at 7.49 and 4 cigarettes being smoked per day on average. In comparison, the prevalence of smoking is lower in the individuals of the control group and associated communities, that is, 22% and 23%, respectively.

Table 2. Working Environment.

Variable	Obs	Percentage
Ventilation	207	.72
Ventilation satisfaction	207	.71
Light satisfaction	207	.78
Washroom availability	207	.88
Washroom cleanliness satisfaction	207	.62
Availability of first aid	207	**.11**
Head and nose cover	207	**.05**
Use of protective gears	207	**.02**

Table 3 indicates that 47% workers complain of postnasal drip which may be described as a feeling of mucus secretions moving up and down the back column of the throat that causes a constant need to cough to clear the throat. The incidence of postnasal drip was much lower amongst individuals of associated community (6%) and amongst the control group (10%). Among 207 workers, the occurrence of byssinosis was found to be 35%, whereas it was 12 and 18% in associated community and control group, respectively. This is primarily because byssinosis is an occupational lung disease that cotton industry workers are most prone to due to presence of cotton dust in their surrounding environments.[20] More importantly, inadequate ventilation in the weaving units adds to its causation. Similarly, asthma and chronic bronchitis was found to be dominant amongst the workers (20% and 10%) as opposed to individuals in the control (12% and 6%) and associated community (14% and 5%). Weavers are on an advantage to other groups in terms of myopia (nearsightedness) and hyperopia (far sightedness), respectively. This could be an indication that the workers were indeed satisfied with the lighting conditions as mentioned earlier. Audibility issues and ear sufferings were overwhelmingly dominant in the weavers. A great majority complained of audibility against noisy background (43%); 21% complained of audibility issues at low volume and 26% of miscellaneous ear sufferings. In comparison, the control and associated communities were found to have lesser hearing and ear problems. Again, the ear problems are aggravated amongst the weavers due to loud machines and a lack of provision of protecting equipment like earmuffs etc. Moreover, amongst workers 28% suffered from continuous headaches

Table 3. Group-wise Diseases and Smoking Habits.

	Workers		Control		Associated	
Variable	Obs	Percentage	Obs	Percentage	Obs	Percentage
Smoking	207	.37	188	.22	226	.23
Years of smoking	207	7.49	188	3.03	226	3.81
Cigarettes smoked per day	206	3.82	187	2.18	226	2.20
Postnasal drip	207	.47	188	.10	226	.06
Byssinosis	207	.35	188	.18	226	.12
Asthma	207	.20	188	.12	226	.14
Chronic bronchitis	207	.10	188	.06	226	.05
Myopia	207	.21	188	.24	226	.32
Hyperopia	207	.31	188	.18	226	.34
Audibility against noisy background	207	.43	188	.10	226	.10
Audibility issue at low volume	207	.21	188	.11	226	.08
Ear sufferings	207	.26	188	.03	226	.01
Continuous headache	207	.28	188	.06	226	.10
Skin infections	207	.29	188	.07	226	.06
Depression	207	.27	188	.13	226	.07
Low back pain	207	.44	188	.31	226	.25

which may be a result of exposure of continuous industry noise or work-related stress. In comparison, the incidence of headaches was lower in the control group and associated communities. Prevalence of skin infections amongst workers was 4 time higher (29%) as compared to control group (7.0%). This could also be attributed to exposure to cotton dust. Furthermore, 27% of the worker were reportedly suffering from depression as well. A great majority (44%) suffered from lower back pains which could be due to lifting heavy rollers and continuously standing on power-looms for an extended period during weaving.

Table 4 presents the descriptive statistics of other diseases that the workers either suffered from or diseases that were deduced from the color of mucus they reported when the questionnaires were administered. Out of 110 workers, 43.6% suffered from chronic obstructive pulmonary disorder (COPD), 48.1% from sinusitis, 3.64% from fungal infections, 2.73% from lung cancer and .91% from lung abscess as well as allergic rhinitis. Our findings related to COPD are in line with Mahmood.[9]

The prevalence of disease is categorized as binary variable where 1 indicates the incidence of disease and 0 no incidence of disease and group is a factor variable. Therefore, for these categorical variables, Chi-square statistic is used for testing the hypothesis of no association between the groups and various diseases. The null hypothesis of no association is rejected for all diseases except for asthma and chronic bronchitis at 5% level of significance (Table 5). Thus, we may conclude that these diseases are linked with working in the weaving industry. At 10% level of significance, all diseases are associated with working in the weaving industry.

In short, the weaving industry workers in Kasur are more prone to postnasal drip, byssinosis, asthma, chronic bronchitis, myopia, hyperopia, audibility against noisy background, audibility issue at low volume, ear sufferings, headache, skin infection, depression and lower back pain than the comparison groups-associated community and control group due to the septic environment at work and smoking habits.

Regression Analysis

Table 6 summarizes the logistic regression results highlighting the relationship between the associated diseases and work experience, educational level of the workers and the index for work environment. Several questions were asked to workers relating to work environment and their satisfaction in this regard. To cater for the multicollinearity issue, factor analysis is employed to all these questions to bring in an index of work environment.

The odd ratios (Table 6, column 2) indicate that the educated workers are less likely to caught by postnasal drip and low back pain as compared to their peer group with low or no education. The cotton dust exposure leads to postnasal drip problem and lifting heavy cotton sacks and rollers causes low back pain among the workers. Improving education of

Table 4. Descriptive Statistics: Other Diseases.

Diseases	Freq	Percent	Cum
COPD	48	43.64	43.64
Lungs cancer	3	2.73	46.36
Allergic rhinitis	1	.91	47.27
Fungal infection	4	3.64	50.91
Lung abscess	1	.91	51.82
Sinusitis	53	48.18	100.00

Table 5. Association between diseases and groups.

Variable	Chi2	P-Value
Smoking	15.14	.0010
Postnasal	129.10	.0000
Byssinosis	38.02	.0000
Asthma	5.05	**.0800**
Chronic bronchitis	5.15	**.0760**
Myopia	7.81	.0200
Hyperopia	14.64	.0010
Audibility against noisy background	91.61	.0000
Audibility issue at low volume	15.96	.0000
Ear sufferings	84.69	.0000
Headache	43.81	.0000
Skin infection	54.27	.0000
Depression	35.42	.0000
Low back pain	19.26	.0000
Family respiratory history	22.15	.0000

the workers by 1 year reduces the risk of postnasal drip and low back pain by 12 and 7.5%, respectively. Highly significant relationship is found between work experience and all associated diseases among the weaving workers in Kasur. More work experience means more exposure to cotton dust and more prone to associated diseases like postnasal drip, byssinosis, asthma, chronic bronchitis, myopia, hyperopia, audibility against noisy background, audibility issue at low volume, ear sufferings, skin infection, depression, and lower back pain. An additional year of work increase the risk of postnasal drip, byssinosis, asthma, and chronic bronchitis by 5–6%.

Other than cotton dust, the light and ventilation arrangements and other hygienic conditions (based on the worker's perception) are merged into a work environment index. Higher value of the index depicts higher level of worker's satisfaction with work environment provide to them. It is evident from the results that better work environment reduces the incidence of postnasal drip and headache among workers which strengthen the findings in literature.[9,12]

Discussion

This study explores the health profiles of the textile workers and associated community and contrast them against the

Table 6. Relationship between diseases and explanatory variables (Odd ratios).

	Odd Ratio	SE	Z	P-Value	95% Interval	
Variables			Dependent: Postnasal Drip			
Education	.884	.040	−2.750	.006	.809	.965
Work experience	1.063	.014	4.700	.000	1.036	1.090
Work environment	.716	.086	−2.770	.006	.565	.907
Constant	.690	.330	−.770	.438	.270	1.763
			Byssinosis			
Education	.941	.042	−1.350	.176	.863	1.027
Work experience	1.061	.014	4.520	.000	1.034	1.088
Work environment	.858	.100	−1.320	.188	.684	1.078
Constant	.221	.110	−3.040	.002	.083	.586
			Asthma			
Education	.963	.050	−.720	.472	.870	1.067
Work experience	1.054	.016	3.540	.000	1.024	1.086
Work environment	1.171	.171	1.080	.280	.880	1.558
Constant	.045	.030	−4.720	.000	.013	.163
			Chronic bronchitis			
Education	.973	.065	−.410	.681	.854	1.108
Work experience	1.051	.020	2.600	.009	1.012	1.091
Work environment	.952	.165	−.280	.776	.678	1.336
Constant	.037	.029	−4.150	.000	.008	.175
			Myopia			
Education	1.059	.047	1.290	.198	.970	1.156
Work experience	1.024	.014	1.780	.075	.998	1.052
Work environment	.986	.129	−.110	.912	.763	1.274
Constant	.131	.074	−3.600	.000	.043	.397
			Hyperopia			
Education	1.060	.046	1.340	.179	.974	1.154
Work experience	1.063	.015	4.430	.000	1.035	1.092
Work environment	.857	.102	−1.300	.194	.679	1.082
Constant	.128	.068	−3.860	.000	.045	.364
			Ear suffering			
Education	.9319	.0448	−1.4600	.1430	.8481	1.0241
Work experience	1.0273	.0132	2.1000	.0360	1.0018	1.0534
Work environment	.8464	.1011	−1.4000	.1630	.6698	1.0696
Constant	.3219	.1610	−2.2700	.0230	.1208	.8579
			Headache			
Education	.997	.043	−.060	.952	.917	1.085
Work experience	1.012	.012	.990	.324	.988	1.037
Work environment	.760	.087	−2.410	.016	.607	.950
Constant	.599	.283	−1.090	.277	.237	1.510
			Skin infection			
Education	.945	.043	−1.260	.208	.864	1.032
Work experience	1.027	.013	2.180	.029	1.003	1.052
Work environment	.931	.109	−.610	.543	.739	1.172
Constant	.286	.141	−2.540	.011	.109	.751
			Depression			
Education	.961	.044	−.860	.387	.880	1.051
Work experience	1.034	.013	2.600	.009	1.008	1.060
Work environment	.846	.100	−1.420	.155	.672	1.065
Constant	.279	.139	−2.560	.010	.105	.741
			Low back pain			
Education	.925	.038	−1.910	.057	.853	1.002
Work experience	1.037	.012	3.110	.002	1.013	1.060
Work environment	1.068	.119	.590	.556	.858	1.329
Constant	.347	.160	−2.290	.022	.140	.857

health profiles of the control group. This allows us to factor out any confounding factors while establishing the association between the diseases and work environment. A confounding factor is defined as a third variable in a study examining a potential cause-and-effect relationship. For example, air pollution could be a confounding factor in this study leading to respiratory diseases in the district Kasur. This study controls for the confounding factors by comparing the group of interest (weaving workers) with control group.

This study contrasts the health profiles of weaving workers and associated community against the control group. Average educational level is below primary for workers and primary for control and associated groups. Average monthly earnings of the workers are least among all groups (ANOA F-test *P*-value = .0002), even lower than the official minimum wage of PKR 17500 but facing relatively more burden of disease. Due to low education and awareness, 2% workers use proper protective gears leading to high incidence of associated diseases. Furthermore, smoking was predominant amongst the weaving workers (37.0%). On an average, a worker smokes 4 cigarettes per day with 7.5 years of smoking history. This reiterate the fact that there is a dire need to educate the workers and motivate the owner of small weaving units for provision of protective gears to them.

Among 207 workers, the occurrence of postnasal drip, byssinosis, asthma, audibility against noisy background, continuous headache, depression and low back pain is significantly higher than the control group. Chi-square test rejects the null hypothesis of no association between the 3 groups and diseases (Table 5) which rules out the involvement of any confounding factor like air pollution. Cotton industry workers are more prone to occupational lungs diseases due to the presence of cotton dust in their surrounding environment. Our results not only corroborate with the existing literature[2–4,7,10,11,20,21] but also strengthen the findings of literature that cotton dust is responsible for the associated diseases in textile industry.

Continuous exposure to noisy background leads to ear sufferings and frustration among the workers. During interviews, many works reveal that they want to quit the job, but they are unable to find the alternate due to low educational level which frustrate them. However, mostly are eager to invest in their children education to provide them better job opportunities.

Logistic regression is used to explore the linkages between the work experience, educational level of the workers and the index for work environment and the associated diseases. Regression results (Table 6) indicate that the educated workers are less likely to caught by postnasal drip and low back pain as compared to their peer group with low or no education. During interview, workers with better awareness or education revealed that they take local remedies against postnasal drip such as frequently drinking tea to clear their throat and eating gurr (raw form of sugar). Statistically significant

relationship is found between work experience and all associated diseases among the weaving workers in Kasur. More work experience means more exposure to cotton dust and more prone to associated diseases. Workers were asked questions relating to work environment and their satisfaction in this regard and an index is constructed based on their perception in this regard by using the factor analysis technique. Where the owner of the weaving units provides better light and ventilation arrangements, workers are less likely to suffer from postnasal drip and headache. Our results strengthen the findings in earlier literature[7,9] implying that the results of this study can be generalized to similar kind of populations exists in different cities of Pakistan including Multan, Gujranwala, and Faisalabad. However, scientific equipment should be used for the assessment of respirable dust exposure and noise level for more reliable results.

Conclusion

Highly septic infrastructure in the local weaving industry is the root cause of various diseases among the workers. Due to elongated exposure to cotton dust, workers in the cotton processing industries face risk of developing obstructive respiratory conditions.

We interviewed 207 workers, 226 people from associated community (living nearby the weaving unit) and 188 people for control group (from areas far away from weaving units and people are not associated with weaving industry) and contrasted the results to control for confounding factors. Cotton dust, smoking, time spent in cotton industry, working environment, low income,[1] and lack of financial support for medication, non-availability of protective gears and low level of education are the causes of the high incidence of associated diseases among the workers of small-scale weaving industry of Kasur. Postnasal drip, byssinosis, asthma, chronic bronchitis, continuous headache, depression, low back pain and skin infection were the noticeable health consequence of cotton dust in weaving industry. Improving education of the workers by 1 year reduces the risk of postnasal drip and low back pain by 12 and 7.5%, respectively. An additional year of work increase the risk of postnasal drip, byssinosis, asthma, and chronic bronchitis by 5–6%. Furthermore, Chi-square test results confirms that no confounding factor like air pollution is involved in this cause-and-effect study. We recommend training courses both for the workers and the managers of these small units to create awareness and provision of protective gears and first aid. Workers should be given financial support for the treatment of associated diseases. Employers may get their workers registered for "Sehat Sahulat Program" scheme by the current government.

Declaration of Conflicting Interests

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Note

1. Monthly average income of the workers is PKR 13165 approximately which is significantly less than the official minimum wage, that is, PKR 17500.

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