Research Paper

Morbidity Profile and Associated Risk Factors among Power-loom Weavers in Mau District in Uttar Pradesh

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ABSTRACT

The power loom industry of Mau is ancient, and a very limited study is existing in Indian literature on the occupational health status of these workers, which are exposed to various occupational hazards. This study aims to assess the morbidity profile and associated risk factor among Powerloom weavers in Mau district of Uttar Pradesh. A sample of 300 workers selected from the identified power loom industries from six blocks of Mau district. The data were collected using a structured questionnaire and morbidity were asses using operational definition. Bivariate and Multivariate statistical analysis. Most of them belonged to the above age 30 (88%). The study found a prevalence of selected morbidities of impaired vision (48.7%), Anxiety (63.7%), Injury (25.7%), and pain in the lower back (56%). Anxiety, Lower back pain, and impaired vision were associated with the workplace environment. Similarly, Injury, low back pain, and low vision were significantly related to work duration. The present study shows the high prevalence of low back pain, impaired vision and injury among the weavers, along with anxiety, which indicates a need for periodic medical examination to rule out occupational hazards.

HIGHLIGHTS

⊙ Limited studies in India among occupational hazards among Powerloom weavers.
⊙ Present study describes self-reported morbidities patterns among Powerloom workers.
⊙ High prevalence of Low vision, low back pain, stress, and injury.
⊙ Possible solutions for decreasing the problem would be augmented ventilation and lighting, periodic medical check-ups, adequate rest time, and job rotation.

Keywords: Powerloom, Weavers, Occupational health, India

India has the distinction of being the second-largest producer of textile fiber globally (GOUP, 2018) and contributes 5 percent to India's GDP (*IBEF*, 2017). Further, it is also the second-largest sector providing employment after the agricultural sector and employs in urban and rural areas by providing jobs to over 45 million people directly and indirectly to more than 60 million (Subash Kumar & Das, 2019).

Powerloom is a cornerstone of the Indian economy in foreign exchange in the textile sector (GOI, n.d.). Uttar Pradesh is the third highest fabric producing state of India and employed about 4.21 lakh Powerloom weavers (GOUP, 2018).

Mau is considered the powerhouse of textile weavers in Eastern Uttar Pradesh because every household in this district has a loom used for making sarees, loincloths, suits, etc. (*DoMSME*, n.d.) About 21000 units of Powerloom and 40000 weavers are in the district (Surendra Sharma, n.d.).

The power loom industry exposes its workers to airborne dust, which contains infections, allergies, and Toxic substances related respiratory syndrome (Oldenburg *et al.* 2007) called Byssinosis (Chadha *et al.* 2019). Along with respiratory illness, they are also affected by additional occupational hazards mainly occurring due to threads, emitting hazardous chemical substances, long manual working hours, Noise pollution, etc (Sultana & Nisa, 2017). Poor ergonomics condition causes pain in hands and legs, and repetitive injuries like wrist, neck, shoulder, and knee (Kolgiri & Hiremath, 2017). Due to poor working conditions (Khan *et al.* 2015) and lack of personal protective equipment (Prasad *et al.* 2015), weavers are exposed to many occupational hazards.

Literature Review

Little information is available regarding the morbidity pattern of Powerloom workers in developing countries especially in India. A study was done in India among Powerloom workers found prevalence of Byssinosis were 98% (Chadha *et al.* 2019). The main disease conditions of textile workers in Rajasthan were body pains (19.4%), respiratory illness (12.1%), and fever (7.7%). Workers employed in dyeing suffered the most (25.5%) from aches, while workers belong to printing and bleaching groups mostly suffered from respiratory problems (15.5%) (Singh *et al.* 2005). In another research conducted in Meerut city of UP, it was found that most of the power loom workers are facing respiratory-related issues (52%), musculoskeletal problems (22%), injuries (14%), and hearing loss (8%) (Goel *et al.* 2013).

With the increase of population and demand for clothing accordingly, morbidities are also growing among weavers. It is also observed that limited studies have been carried out in India among occupational hazards among Powerloom weavers. Further, these studies have also not considered the occupational and individual characteristics that also determine the weavers' health-

related risks. So the present study was designed to describe self-reported morbidities patterns among Powerloom workers and study the association between these morbidities with occupational characteristics like duration of work in years, substance use, and work environment.

METHODS

Design of the Study

This was a cross-sectional descriptive study conducted during August-September, 2019, in the Mau district of Uttar Pradesh, part of a Ph. D. program. There are nine blocks in Mau district from them; six blocks were selected where more Powerloom industries are set up. These six blocks were Ranipur, Ghosi, Dohrighat, Muhammdabad, Kopaganj, and Pardaha.

Sample size and sampling

A total of 300 weavers were interviewed for the study, keeping in mind limited resources. From each blocks, 50 power loom weavers were selected. The selection process kept in mind that all social groups were selected in the study. Prior permission was taken for an interview, and wearing house was decided for an interview place to observe the working condition.

Study Variables

Socio-demographic related background data were collected using a self-developed questionnaire. Socio-demographic data consisted of age, education, family type, family members, caste, religion, marital status, residence, Type of house, Monthly income, Monthly medical expenses, healthcare utilization. Some occupational characteristics, like work duration, substance use, and Work Place environment, were also captured.

Outcome variables

The outcome variables used in the study are "Impaired vision," "Anxiety," "Injury," and "Low back pain," and measured responses in 'Yes' and 'No'. During the survey, impaired vision was assessed by asking, "do

your sight reduce from the past or how well you can see while doing close work such as reading or putting a thread into a needle". Similarly, anxiety was asked, as do you feeling stress in the past three months.

The injury was asked, "do you meet any accidents while working in the last 12 months"? Similarly, regarding back pain question was asked as "Do you develop back pain during 12 months?"

Data entry and analysis

Data were entered using Epi Info and were further cleaned and analyzed using the IBM SPSS Version 23. Descriptive as well as inferential analysis is conducted. For this purpose, significant predictors for selected morbidities in the bivariate analysis were performed using a regression model. The odds ratios and their 95 percent CI were calculated. A P-value of less than 0.05 was considered to be statistically significant.

Ethical Clearance

Ethical approval was obtained from the Department of Economics, Chhatrapati Shahu Ji Maharaj University Kanpur. While, the research center for the study was Feroze Gandhi College in Rae Bareli, Uttar Pradesh. The respondents were given orientation concerning all relevant information about the study, and oral consent of participants was obtained. Only persons above aged 18 are included in this study with assurance about the confidentiality of individuals.

RESULTS

Weavers' age distribution was 46–60 years (40%), followed by 31-45 (34.7%) in the study sample. About 8 % of the respondents were illiterate, while 34% had received primary education, and 15% were received graduation and above qualification. Most respondents have joint families (76%) and more than five family members (85%). Nearly all of them (98%) were Muslims and belonged to the OBC caste (96%). Around 88 % of the family income of them was less than ten thousand (Table 1). Table 2 shows the distribution of study participants according to their occupational and personal attributes. The majority (77%) of workers had

more than ten years of works exposure. Concerning 300 workers, only 51% used substances, including *bidi* smoking and *pan masala*. More than 50 percent reported their workplace was congested, and about 27 % said the workplace was sufficient space, and only 18 % reported the workplace has adequate or good ventilation. Table 3 shows the self-reported morbid conditions prevalent among workers. The selected morbidities prevalence was anxiety (63.7%), back pain (56%), impaired vision (48.7%), and injury (25.7%).

Table 1: Socio-demographic profile of Powerloom weavers

Variables		n(%)
Age (in years)	≤30	35(11.7)
	31-45	104(34.7)
	46-60	121(40.3)
	60 +	40(13.3)
Education	No education	24(8.0)
	Primary	102(34.0)
	Secondary	50(16.7)
	Higher Secondary	78(26.0)
	Graduate and above	46(15.3)
Family type	Nuclear	229(76.3)
	Joint	71(23.7)
Family member	≤ 4	43(14.3)
	5 to 8	158(52.7)
	≥9	99(33.0)
Caste	OBC	289(96.3)
	Non OBC	11(3.7)
Marital status	Married	276(92.0)
	Unmarried	24(8.0)
Religion	Hindu	5(1.7)
	Muslim	295(98.3)
Residence	Rural	197(65.7)
	Urban	103(34.3)
Type of house	Kutcha	20(6.7)
	Semi Pukka	56(18.7)
	Pukka	224(74.7)
Monthly Income	<5000	165(55.0)
	5000-10000	98(32.7)
	>10000	37(12.3)
Expenditure on Medical (Monthly)	<500	43(14.3)
	500-1000	93(31.0)
	1000-2000	65(21.7)
	>2000	99(33.0)
Healthcare utilization	Government	3(1.0)
	Private	130(43.3)
	Medical store	31(10.3)
	Quacks	136(45.3)
Total		300(100.0)

Source: Primary survey.

Table 2: Occupational profile of Powerloom weavers

Variables		n(%)
Work duration (in years)	*<10*	69(23.0)
	10-20	79(26.3)
	21-30	91(30.3)
	>30	61(20.3)
Substance use	*No*	146(48.7)
	Yes	154(51.3)
Work Place	*Congested*	165(55.0)
	Sufficient	80(26.7)
	Good ventilation	55(18.3)
Total		300(100.0)

Source: Primary survey.

Table 3: Prevalence of various morbidities among the Powerloom weavers

Variables		n(%)
Impaired vision	No	154(51.3)
	Yes	146(48.7)
Anxiety	*No*	109(36.3)
	Yes	191(63.7)
Injury	*No*	223(74.3)
	Yes	77(25.7)
Low back pain	*No*	132(44.0)
	Yes	168(56.0)
Total		300(100.0)

Source: Primary survey.

Table 4 shows the association between occupational characteristics and self-reported morbidity patterns among the Powerloom weavers. The finding indicates that the duration of work was significantly associated with injury and impaired vision. Similarly, a significant association was found between the workplace with anxiety, back pain, and impaired vision. Substance use is not associated with any morbidities in present study.

Bivariate logistic regression analysis, as reported in Table 5, reveals that weavers with work exposure of 10-20 years (AOR 0.421 (95 percent CI 0.204-0.869)) and 21-30 years (AOR 0.428 (95 percent CI 0.156-0.666)) were at low risk of injury compared to weavers with less than ten years of work exposure. Anxiety was an independent

risk factor among weavers and seen less among those working in good and adequate ventilated workplaces than those working in congested workplaces. Low back pain was higher among weavers having greater than 30 years of work exposure (AOR 2.614 (95 percent CI 1.231-5.55)) compared to those weavers whose work exposure less than ten years. Back pain was also found a higher risk factor among weavers reported adequate or good ventilation than those reported congested workplaces. Impaired vision reported higher among those reported work exposures for more than 30 years (AOR 2.332(95 percent CI 1.105-4.921)) compared to those reported less than ten years. The impaired vision was reported less among those reported adequate ventilated workplaces than those reported congested workplaces (AOR 0.291 (95 percent CI 0.144-0.588)).

DISCUSSION

The power loom industry weaves grey cotton by power-operated machines or looms and converts it into a fabric with warp assistance in the form of beam and weft directly through bobbins. Weft yarn comes from spinning mills while beams come from processing mills. Yarn thread is produced by spinning mills as raw materials and supplied to the Power loom industries. The Processing mills prepare warp in the form of the beam, and the power loom industry uses these beams for weaving cloth (Paul, 2013). Powerloom workers in India constitute a large workforce and are susceptible to several health problems due to the workplace environment.

In the present study, we try to access some of these health problems through an operational definition. The study found the prevalence of poor sight or impaired vision was 48.7 percent, which is higher from a study done in West Bengal (20 percent) (Paul, 2013), Mau (11%) (Sultana & Nisa, 2017) and Telangana (41.4 percent) (Prasad *et al.* 2015). It was found that continuous work, which is repetitive and constant visual attention to detail, severely impacted the workers vision (Hiremath *et al.* 2014). During the interview, researcher's observed lack of uniform and proper lighting facilities in the work place. The thread used in weaving is thin, and therefore

Table 4: Association between occupational characteristics and self-reported morbidity pattern among the Powerloom weavers

Variables		Anxiety	Injury	Low back pain	Low vision
Work duration	<10 years	44(23.0)	28(36.4)	36(21.4)	30(20.5)
(in years)	10-20 years	47(24.6)	17(22.1)	42(25.0)	33(22.6)
	21-30 years	54(28.3)	16(20.8)	47(28.0)	43(29.5)
	>30 years	46(24.1)	16(20.8)	43(25.6)	40(27.4)
	P value	0.174	***0.008***	0.087	***0.026***
Substance use	No	86(45.0)	43(55.8)	87(51.8)	68(46.6)
	Yes	105(55.0)	34(44.2)	81(48.2)	78(53.4)
	P value	0.095	0.144	0.223	0.480
Work Place	Congested	122(63.9)	44(57.1)	85(50.6)	84(57.5)
	Sufficient	42(22.0)	17(22.1)	42(25.0)	49(33.6)
	Good ventilation	27(14.1)	16(20.8)	41(24.4)	13(8.9)
	P value	***<0.001***	*0.537*	***0.009***	***<0.001***
Total		191	77	168	146

Table 5: Binary logistic regression showing the adjusted effects of selected characteristics on self-reported morbidities among Powerloom weavers in the Mau district of Uttar Pradesh

		Adj OR (95% C.I.)	Adj OR (95% C.I.)	Adj OR (95% C.I.)	Adj OR (95% C.I.)
Variables		Anxiety	Injury	Low Back pain	Impaired vision
Work duration	*<10*	®	®	®	®
(in Years)	*10-20*	0.79(0.395-1.578)	0.421*(0.204-0.869)	1.146(0.589-2.23)	0.849(0.431-1.674)
	21-30	0.815(0.416-1.595)	0.322**(0.156-0.666)	1.067(0.56-2.033)	1.051(0.547-2.019)
	>30	1.709(0.771-3.789)	0.578(0.27-1.237)	2.614*(1.231-5.55)	2.332*(1.105-4.921)
Substance use	*No*	®	®	®	®
	Yes	1.527(0.925-2.52)	0.708(0.412-1.217)	0.693(0.428-1.121)	0.996(0.614-1.616)
Work Place	*Congested*	®	®	®	®
	Sufficient	0.354**(0.199-0.631)	0.805(0.419-1.548)	1.041(0.602-1.801)	1.488(0.854-2.593)
	Good ventilation	0.333**(0.175-0.635)	1.067(0.534-2.134)	2.831**(1.422-5.637)	0.291**(0.144-0.588)

Notes: *®Reference group. ** ,* Significant at 5 and 1 percent levels, respectively;* **Source:** *Primary survey.*

continuously working for long hours may affect their vision.

The present study found anxiety among 63.7 percent weavers. Individuals from low socio-economic status are more likely to be depressed or anxious than from high socio-economic status (Rai *et al.* 2013). Handloom weavers were getting ₹ 70 to 100 per sari, which is the rate for many years. Suffering from any health problem was also one reason for psychological health among workers (Ahmad, 2017) because they spent a considerable amount of their income on health.

The present study found the prevalence of injury during the last 12 months which was 25.7 percent among weavers. A previous study also finds the prevalence of injury among weavers in the Nalgonda district (27.8%) (Prasad *et al.* 2015) and Guntur District (2.75%) (Yerpude & Jogdand, 2010) in Telangana. People are working in this industry without any formal training, which resulted in accidents. The reason for it may be because weavers were not taking adequate preventive. Lack of any dress code was another reason. The Male were working with loose *Kurta-Pajama* and the females in *sari/dupatta*, which is hazardous while working with Powerloom machines.

The prevalence of low back pain found was 56 percent among weavers. A previous study affirmed

the prevalence of low back were in Nalgonda district (57.6%), Telangana (Prasad *et al.* 2015), Ahmedabad (45 %) (Nag *et al.* 2010), Wardha (11.1%) (Rajnarayan R Tiwari *et al.* 2003), and Mau (21%) (Sultana & Nisa, 2017). Consequently, working posture, Improper loom design, working hours and duration, repetitive work, and type of seating (Choobineh *et al.* 2007) were responsible for back pain. Further, high physical demands and insufficient recovery time also contribute to developing low back pain (Singh *et al.* 2005).

The bivariate analysis shows that anxiety was significantly associated with the workplace environment. Additionally, the multivariate analysis also indicates that weavers working at a sound or adequate workplace have lower stress. Physical work environment such as temperature, indoor air quality, less light, and non-presence of windows affect workers' psychological health (Shea *et al.* 2011). The injury was significantly associated with work exposure duration, and multivariate analysis shows that more experienced weavers were lesser injuries. It may be because older workers are experienced, mature, and are mindful of workplace hazards. On the other side, younger workers are reckless and first-hand to workplace hazards (Root, 1981).

Multivariate analysis found that those who have more years of experience were more likely to back pain. Similar findings were found in a study conducted in the city of Ahmedabad (Nag *et al.* 2010). The occupation that required a person to lift heavy objects, pushing or pulling items involves twisting or vibrating one's spine, resulting in injury to the spine and back pain. Likewise, working in Powerloom that required bending posture result in pain. The lower back incidence increases with age because of bone loss that can lead to fractures. Concurrently, a person may suffer from reduced muscle elasticity and tone decrease (*NINDS*, n.d.).

In bivariate and multivariate analysis, the impaired vision was associated with the duration of work. Those who have a higher employment span were more likely to affect vision. Weaving is precise, which used very thin threads that required significant visual and mental attention. Weaving activities also need a long duration of exposure; the extra-ocular muscles may get tired. The above conditions may be the reason for impaired vision among weavers (Salve, 2015).In bivariate analysis, the impaired vision was also associated with the workplace environment. Weavers working in a well-ventilated workplace were less likely to affect vision. A sufficient amount of light for a healthy eye has become a matter of great concern for increased efficiency in work and the prevention of accidents (Divatia, 1968).

The study, too, has certain limitations. The research is part of a Ph.D. attempted on the socio-economic situation of power loom weavers. Only a few self-reported morbidities related information was sought from weavers during the study. The cross-sectional approach and the possibility of selection bias are the possible major weaknesses of this study. There is a scope of more extensive research among Powerloom weavers in Mau district in Uttar Pradesh.

CONCLUSION

The present study found a high prevalence of selected morbidities like Low vision, low back pain, stress, and injury among power loom weavers. This study also remarked that the possible solution for decreasing the problem would be a constant flow of work with apt wages, augmented ventilation and lighting system, periodic medical check-ups, adequate rest time, and job rotation. This research focussed on the health of the power-loom workers in the Mau district. Henceforth, there is a need for an awareness program on occupational hazards and periodic medical examinations to be done by the doctor. It would help in early diagnosis and treatment of morbidities prevailing among the weavers.

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