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Musculoskeletal Health Problems Among the Loom Weavers of Sirajganj District, Bangladesh

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ABSTRACT

Loom industry in Bangladesh is the foremost imperative & antiquated house industry with a decentralized setup. The industry is giving vocation for millions of individuals within the nation. The target populace includes weavers over northern Bangladesh. The ponder secured a sizable number of population i.e., 208 subjects in Enayetpur and Madhabpur village, Sirajganj. To ensure representativeness, a non-probability convenience technique was utilized to choose a test estimate of 208 members. To be qualified for the study, members were chosen who had minimum two years of experience. Male were predominant (96.2%) among the respondents. Monthly income showed that major part (48.1%) of the respondents fell in 10-15thousand BDT category. Majority (63.5%) of waste disposal strategy taken after by the wok-places was landfilled. What's really interesting is that many respondents reported having musculoskeletal problems; lower back pain (59.6%) was the most frequently reported one. These health issues were connected to weaving activities because they involve lots of repetitive movements with hands, shoulders, legs, and other parts. Most health concerns in this field came from ergonomic risk factors. Future research should aim to include diverse populations and explore interventions that can mitigate these ergonomic risks, ultimately improving the well-being of this vital workforce in Bangladesh's loom industry.

Keywords: Bangladesh, Sirajganj, musculoskeletal, health, loom, weavers

INTRODUCTION

Sirajganj, is one of the biggest hubs for loom weaving in Bangladesh. [1] The whole loom industry contributes 0.10% of GDP in Bangladesh involving 9, 000, 00 people of the country making it one of the largest industries. The Bangladeshi loom industry has earned a great reputation around the world. People love its beautiful creations like Jamdani & Maslin. [2] But here's the thing: health issues faced by these weavers are not getting the attention they need. In this industry, workers are engaged in various activities such as dyeing, warping, winding, twisting, weaving, etc. All these jobs require workers to indulge in repetitive hand movement to move the shuttles, along with

repetitive leg movement to operate the pedals, elevation of arms for long periods of time. Also these operations require a sitting position without any back support with a forward head posture. Collectively all of these result musculoskeletal problems of the weavers. [3] It's really important for us to pay more attention to their well-being but unfortunately not much research work was conducted upon this topic. This study will understand the musculoskeletal health problems of loom workers in Enayetpur and Madhabpur village of Sirajganj District according to their socio demographic status and identify risk factors. The weavers deserve better awareness & care regarding their health while doing this wonderful work. Present study is thus an attempt to identify such health problems. This study could be helpful further in policy making for their better livelihood.

MATERIALS AND METHODS

STUDY AREA

Sirajganj, is one of the biggest hubs for loom weaving in Bangladesh. There are 143858 looms in Sirajgong District, which is the highest number of looms among all districts. [4] The study was conducted in Enayetpur and Madhabpur village of Sirajganj.

STUDY DESIGN

Study design was descriptive cross-sectional study. To ensure representativeness, a non-probability convenience sampling technique was employed to select a sample size of 208 participants [3]. The research was conducted from January 01 – August 12, 2024. For the eligibility criteria of the study, participants must have at least two years of weaving experience, willing to participate in this study and permanently living in Enayetpur and Madhabpur village. The survey was conducted to elicit the information regarding socio-economic status, working environment and health hazards of loom weavers of Enayetpur and Madhabpur village. An attempt is made to study the factors responsible for different types of musculoskeletal health hazards among the handloom weavers of Enayetpur and Madhabpur village through face to face interview survey method by a team of medical personnel.

STUDY POPULATION

The survey population were weavers residing in northern Bangladesh. The study covered a sizable number of populations i.e., 208 subjects in Enayetpur and Madhabpur village.

CONSTRUCTION OF THE QUESTIONNAIRE

From loom-factory to loom-factory survey is performed with a well-designed structured questionnaire for socio-demographic background and working environment along with Nordic Musculoskeletal Questionnaire for the musculoskeletal problems. The use of Nordic Musculoskeletal Questionnaire is an acceptable tool in occupational health context. [5]

INTERPRETATION OF THE DATA

The data collected from the survey was processed, synchronized and analysed by SPSS and presented in tables & graphs in reports. The above-mentioned tabulated results and discussions are presented in the results and discussions section.

It is assured that the weavers' response and information would remain anonymous and confidential, and no harm was caused during the interview and data collection process.

RESULT

The results indicate that the majority of the 208 surveyed weavers are young to middle-aged males, with a significant portion earning between mid-range income monthly. Most have secondary education, and nearly half have over 15 years of weaving experience

Details result is given below with the help of tables and graphical presentation.

Table 1: Socio-demographic characteristics among the weavers of selected area n = 208

Variables	Category	Frequency	Percent
Age group	16-25 years	32	16%
	26-35 years	84	40%
	36-50 years	68	32%
	More than 50 years	24	12%
Gender	Male	200	96.2%
	Female	8	3.8%
Marital Status	Single	36	17.3%
	Married	172	82.7%
Monthly Income	Less than 10 thousand BDT	24	11.5%
	10-15 Thousand BDT	100	48.1%
	More than 15 Thousand BDT	84	40.4%

Table-1 indicates the socio-demographic profile of the weavers where majority are young to middle-aged (40%) males (96.2%), predominantly married (82.7%), with most earning between 10-15 thousand BDT (48.1%) or more per month (40.4%). While a small fraction earns less than 10 thousand BDT (11.5%), with very few women (3.8%) involved in weaving.

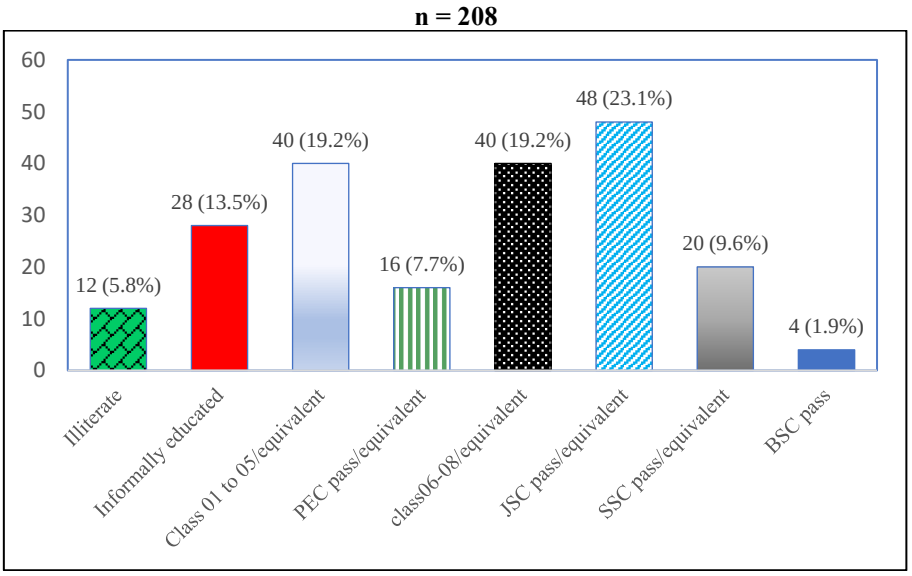

Figure-1: Educational Qualification of the weavers

Above bar diagram illustrates that the majority of individuals fall within middle levels of education, particularly secondary school (SSC pass/equivalent) (23.1%.), while very few (1.9%) reach higher education levels-BSC pass. There is also a significant portion of individuals who are either informally educated (13.5%) or have received primary education (19.2%).

Table 2: Working environment of the weavers n = 208

Variables	Category	Frequency	Percent
Years of Experience	2-5 years	36	17.3
	6-10 years	12	5.8
	11-15 years	64	30.8
	More than 15 years	96	46.2
Type of work	Weaving	168	80.8
	Winding	24	11.5
	Dyeing	8	3.8
	Warping	4	1.9

	Mechanical	4	1.9
Daily working hour	5-8 hours/day	12	5.8
	9-12 hours/day	56	26.9
	13-16 hours/day	116	55.8
	More than 16 hours/day	24	11.5
Type of machinery that is used	Electronic/ power loom	120	57.7
	Manual/Handloom	44	21.2
	Both	44	21.2
Drinking water source at work place	Tube-well water	160	76.9
	Tap water	24	11.5
	Surface water	24	11.5
Type of latrine used at work place	Water sealed	128	61.5
	Sanitary but not water sealed	80	38.5
Scope of taking rest during daily work-hour	Less than 1 hour	32	15.4
	1 hour or more	176	84.6

Table-2 insights into the working conditions and environment of the weavers in the selected area. The majority of the weavers having long working hours (13-16 hours/day) that is 55.8% and many using modern machinery such as power looms (57.7%). Most of the weavers have more than 15 years of experience (46.2%). At their workplace clean drinking water (76.9%) and sanitation (61.5%) facilities are available to most, though there is still room for improvement in terms of access to tap water (11.5), surface water (11.5%) and better sanitation (38.5%). While most workers have the opportunity to take adequate rest (84.6%) during their workday.

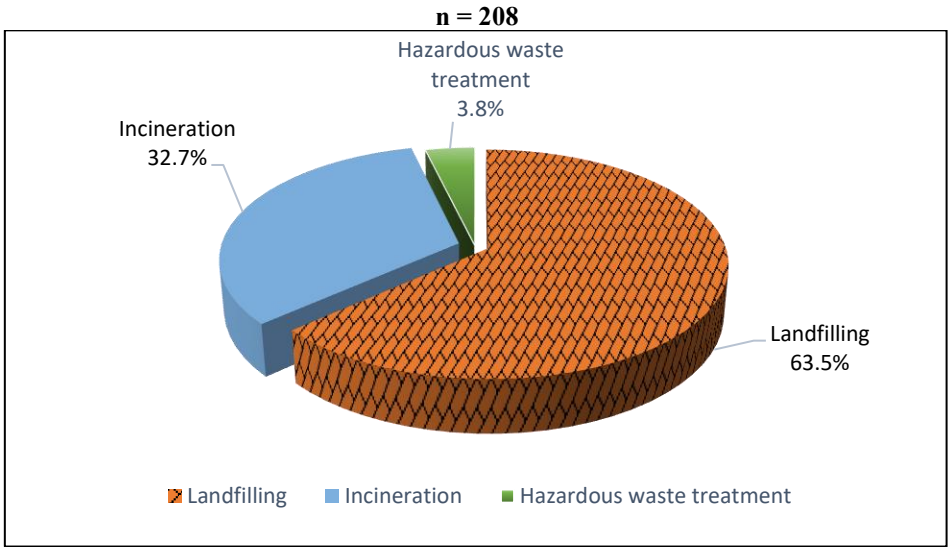

Figure-2: Waste disposal methods at workplace

Above pie chart suggests that the majority of waste is either landfilled (63.5%) or incinerated (32.7%), with only a minor focus on hazardous waste treatment (3.8%).

Musculoskeletal problems according to Nordic Musculoskeletal Questionnaire (NMQ)

Table 3: Distribution of the weavers having trouble (such as ache, pain, discomfort, numbness) in selected regions of their bodies at any time during last 12 months: n = 208

Variables	Category	Frequency	Percent
Neck	no	144	69.2
	yes	64	30.8

Shoulder	no	116	55.8
	in the right shoulder	52	25.0
	in the left shoulder	16	7.7
	in both shoulders	24	11.5
Elbows	no	164	78.8
	in the right elbow	28	13.5
	in the left elbow	4	1.9
	in both elbows	12	5.8
Wrists/Hands	no	160	76.9
	in the right wrist/hand	32	15.4
	in the left wrist/hand	4	1.9
	in both wrists/hands	12	5.8
Upper back	no	144	69.2
	yes	64	30.8
Lower back	no	84	40.4
	yes	124	59.6
One or both hips/thighs/buttocks	no	136	65.4
	yes	72	34.6
One or both knees	No	113	54.3
	Yes	95	45.7
One or both ankles/feet	No	148	71.2
	Yes	60	28.8

Table-3 shows that lower back pain (59.6%) and knee pain (45.7%) emerged as the most prevalent issues among participants, with notable discomfort also reported in the shoulders (44.2%) and hips (34.6%). In contrast, pain in the elbows (21.2%), wrists/hands (23.1%) and ankles/feet (28.8%) were less common, highlighting varying levels of discomfort across different body regions.

Table 4: Distribution of the weavers having trouble (such as ache, pain, discomfort, numbness) in selected regions of their bodies at any time during last 7 days: n = 208

Variables	Category	Frequency	Percent
Neck	no	164	78.8
	yes	44	21.2
Shoulder	no	124	59.6
	in the right shoulder	48	23.1
	in the left shoulder	20	9.6
	in both shoulders	16	7.7
Elbows	no	172	82.7
	in the right elbow	28	13.5
	in the left elbow	4	1.9
	in both elbows	4	1.9
Wrists/Hands	no	168	80.8
	in the right wrist/hand	32	15.4
	in the left wrist/hand	4	1.9
	in both wrists/hands	4	1.9
Upper back	no	148	71.2
	yes	60	28.8
Lower back	no	104	50.0
	yes	104	50.0
One or both hips/thighs/buttocks	no	160	76.9
	yes	48	23.1
One or both knees	no	136	65.4
	yes	72	34.6
One or both ankles/feet	no	168	80.8
	yes	40	19.2

Table-4 suggests in the past week, lower back pain (50%) and shoulder (40.4%) discomfort were significant issues. Other common areas of discomfort included the neck (21.2%), Upper back (28.8%), hips/thighs/buttocks (23.1%), knees (34.6%) and ankles/feet (19.2%).

Table 5: Distribution of the weavers facing limitation from carrying out normal activities (eg. Job, housework, hobbies) due to the trouble of selected regions of their body: n = 208

Variables	Category	Frequency	Percent
Neck	no	164	78.8
	yes	44	21.2
Shoulder(both/either)	no	132	63.5
	yes	76	36.5
Elbows	no	172	82.7
	yes	36	17.3
Wrists/Hands	no	180	86.5
	yes	28	13.5
Upper back	no	148	71.2
	yes	60	28.8
Lower back	no	116	55.8
	yes	92	44.2
Hips/thighs/buttocks	no	172	82.7
	yes	36	17.3
Knees	no	164	78.8
	yes	44	21.2
Ankles/feet	no	172	82.7
	yes	36	17.3

Table-5 highlights that lower back pain (44.2%) significantly impacts participants' ability to carry out normal activities. Neck (21.2%), Shoulder (36.5%), Elbow (17.3%), Wrists/Hands (13.5%) and upper back pain (28.8%) also contribute to activity restrictions. Hips/thighs/buttocks and Ankles/feet regional pain; both are responsible individually for 17.3% respondents and knee pain is responsible in case of 21.2% weavers for their limitation to normal activities.

DISCUSSION

The loom industry of Bangladesh, especially known for creating conventional materials like Jamdani, has picked up worldwide acknowledgment for its craftsmanship. In 2013, UNESCO recognized Jamdani weaving as an Intangible Social Legacy. The industry utilizes over 5 million individuals, with around 280,000 handlooms and powerlooms in operation. Bangladesh's material and attire exportation account for about 85% of the country's add up to trades, contributing over $40 billion yearly. [2] Conventional weaving center points like Sirajganj, Tangail and Narayanganj have protected centuries-old methods, mixing them with modern demands, contributing to both cultural preservation and economic growth. The handloom industry has developed a lot over a period of time.

The study shows that the majority of the weavers are young to middle-aged (under 26-35years age group) and most of them are married. The workforce is predominantly male which shows a strong gender imbalance. The majority fall in the middle-income category (10-15 thousand BDT), suggesting that weaving provides a modest income for most of these individuals. It also refers that monthly income has slightly increased in this area obtained from a previous study which was 8000-10000 BDT. [1] Educational qualifications show that most of the weavers completed secondary school (23.1%) which also gives an idea that they have completed at least a basic level of education. This result is similar to the study conducted by HOSSAIN A et al. [1] where

most of the respondents completed secondary high school.

Insights into the working environment shows the weavers in this area work in challenging conditions. The overall environment involves long and physically demanding work as most of them work for long hours (13-16 hours/day) although they are allowed sufficient rest during work hours. Nearly half (46.2%) of the weavers have working experience for more than fifteen years whereas HOSSAIN A et al. [1] shows maximum weavers had job experience for more than ten years (68.26%). Majority (80.8%) are involved in weaving and use electronic power looms. Most workplaces (63.5%) are disposing waste via landfills. But the positive sign is that maximum workplace provide tube-well for drinking water though there is a better room for providing better sanitation.

Statistical analysis indicated that weavers reporting pain in the last 12 months were prone to Lower back pain in maximum case (59.6%) whereas a similar study by Neeraja T et al. [6] revealed that Shoulder pain was significant there.

A considerable proportion of the sample experienced discomfort for the past seven days. Low back pain persisted in 50% of respondents, while 40.4% experienced shoulder discomfort. Other commonly reported issues include neck pain and upper back pain. These conditions have impacted daily activities with unable to perform normal tasks due to lower back pain in case of 44.2% respondents. This percentage is almost near to the study conducted by GOEL A et al. [7] that is 50%. The weavers' activities are also restricted due to shoulder pain (36.5%), upper back pain (28.8%), and knee pain (21.2%).

CONCLUSION

This study highlights significant health issues stemming from the physically demanding nature of the weavers' work in the selected area. It also indicates a high prevalence of lower back pain and other musculoskeletal complaints, which severely impact daily activities for many respondents. While the study's strengths include a substantial sample size and the use of validated assessment tools like the Nordic Musculoskeletal Questionnaire, its reliance on convenience sampling may limit the generalizability of the findings. It is important for future research to encompass a wide range of populations and investigate strategies to reduce ergonomic hazards. This will ultimately enhance the welfare of the essential workforce in the loom industry in Bangladesh.

Declaration by Authors

Ethical Approval: Approved

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Conflict of Interest: The authors declare no conflict of interest.

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