

# Associated Factors & Pattern of Musculoskeletal Pain among Male Handloom Weavers Residing in Belkuchi, Shirajganj: A Cross Sectional Study

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**Abstract-**Handloom is one of the oldest cottage based industries in Bangladesh & a significant number of rural people are employed in weaving. The present study was conducted to find out the pattern & associated factors of musculoskeletal (msk) pain among handloom weavers in a selected area. A descriptive cross-sectional survey was carried out by a self-constructed questionnaire. A 230 handloom male weavers took part in this study. The maximum age was > 30 years where more than half of respondents had >10 years of job experience. Results indicated that the prevalence of msk pain was 27.4%. Shoulder, hip/thigh/ knee, & lumbar region were the more prevalent site of msk pain. Nearly half of respondents complained sometimes present physical stress during working environment. However, there was a significant relation ( $p < 0.05$ ) was found between msk pain with age ( $p = 0.02$ ) & job experience ( $p = 0.004$ ). Therefore, msk pain is moderately high among Bangladeshi handloom weavers & some factors are responsible for msk pain. Knowledge about msk pain & its related factors must be needed among handloom weavers for prevention & controlling the occurrence of pain

**IndexTerms-** Handloom, Handloom weavers, Musculoskeletal pain, Associated factors

## 1 INTRODUCTION

Handloom weaving is a cottage based industry. It is mostly seen in the northern area of Bangladesh. It likewise has been caring a cultural inheritance of our nation. The Handloom industry is still a very significant component of the textile industry contributing to the nation's economy. It is the second biggest source of rural Employment after agriculture (Ahmed 1999). Manpower of about 1.5 million weavers, Dyers, hand spinners, embroiderers and allied artisans have been practicing their creative skills into more than 0.30 million active looms to make about 620 million meters of fabrics Annually. Work-related musculoskeletal disorders have emerged as a major health problem among workers in both industrialized & industrially developing countries (Westgard & Winkel 1997; Nag et al. 1992). Several workplace factors like repetitive work, awkward static postures were identified as being connected with upper extremity pain & discomfort (Westgard & Winkel 1997). A high prevalence of musculoskeletal problem was reported among Iranian handloom weavers due to the constraints of working positions, poor design of loom, working times, repetitive work & seat type (Choobineh et al. 2004; Choobineh et al. 2007). Weaving is recognized to be one of the oldest surviving crafts in the world (Pandit et al. 2013). During the weaving operation, handloom workers adopt awkward postures, which is one of the most important factors of their poor working efficiency and prevalence of musculoskeletal disorders. Musculoskeletal disorders (MSD) are a common

health problem and a major cause of disability throughout the world. The economic loss due to such disorders affects, not solely the individual level, but also the organizational level and the company as a whole (Kemmlert 1994). The present study focuses on the identification of musculoskeletal (MSK) pain in different parts of the body & to explore the pattern & related factors responsible for MSK pain. On that point are insufficient researches on this topic in our nation. Merely it is considered as a burning tissue. Research on this issue will help to ascertain out the related factors responsible for MSK pain among handloom weavers.

### JOB EXPLANATION

#### HANDLOOM:

Handloom is a machine used to produce woven fabric & it is made from wood and some portion of iron. Handloom works without any electrical motor & manipulated by men hand and foot combination (Khan 2013). Handloom weaving encompasses a wide range of tasks such as manual sorting of raw materials, carding and spinning in cord machine, dying by acid and chrome dyes preceding the actual weaving. Weaving processes are performed on two types of hand operated looms. One is desk-bench type workstation and the other is sitting along the floor with their branches hanging to operate the pedals at a lower point. The task of weaving demands repeated movement of upper and lower limbs to operate the pedals and shuttles, with arms raised away from the body (Nag et al. 2010).



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## 2 METHODOLOGY

It was a descriptive cross-sectional study conducted among male handloom weavers residing in different villages situated at Bekuchi Upazilla, Sirajganj district. A Study was carried out over eight months from June 2015 to January 2016. The study population consists of male handloom weavers with an age range 18-60 years old & who was experienced for at least 1 year. Total 230 data were collected through face to face interview by using an interviewer administrated structured questionnaire. Samples were selected purposively & the questionnaire was developed to obtain information on the respondents about the following factors like socio-demographic factors, work-related factors, site & pattern of musculoskeletal pain. The Numerical pain rating scale was used to assess the severity of MSK pain. The required information was collected from the patients after obtaining their due consent & the corrected data were statistically analyzed by using the SPSS.

## 3 RESULTS

The study revealed that the mean age of the respondents was 35.73 (SD=±11.602) years. Maximum respondents belong to age >30 years, followed by 39.1% in age ≤30 Years. Considering the level of education, more than one-third respondents (37.4%) belonged to illiterate & only can sign, about 43.5% were primary level and 19.1% were secondary level. The mean of monthly family income was BDT 9023.91 (SD=±2792.675). Maximum 37.8% of respondents had monthly family income BDT 8001-10000 followed by 21.7% had BDT ≤6000, 18.3% had BDT 6001-8000 and 22.1% had BDT 10001-12000 or above respectively. More than two third of (84.8%) respondents BMI was 18.5-24.9 followed by 9.6% respondents were ≤18.5 BMI and the rest of 5.7% respondent's ≥ 25 BMI.

Analysis of the work-related information and table 2 shows that almost all participants (97.4%) worked more than 8 hours where mean working hours was 13.05(SD=± 2.040). More than half (68.26%) of the participants had more than 10 years of job experience & the mean of job experience was 17.03(SD=± 10.167). Among 230 participants, above half (61.3%) of respondents spent 7-8 hours in sitting position & two-third of the participants (78.3%) spent 1 hour in standing posture.

**FIGURE 1 DISTRIBUTION OF RESPONDENTS BY PHYSICAL STRESS AT WORK**

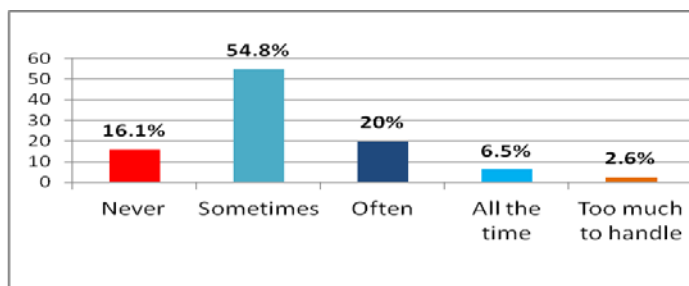


Figure 1 shows that more than half (54.8%) of respondents had sometimes present physical stress during their work.

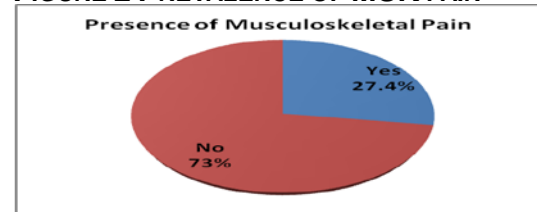
**TABLE-1 SOCIODEMOGRAPHIC & PHYSICAL CHARACTERISTICS OF THE SAMPLE (N=230).**

Variables	(n)	(%)
Age (in years)		
≤30 Years	90	39.1
>30 Years	140	60.9
Mean = 35.73; (SD=±11.602)		
Educational level		
Illiterate	18	7.8
Only can sign	68	29.6
Primary level	100	43.5
Secondary level	44	19.1
Illiterate	18	7.8
Monthly family income		
≤6000 BDT	50	21.7
6001-8000 BDT	42	18.3
8001-10000 BDT	87	37.8
10001-12000 BDT	33	14.3
Mean =9023.91;(SD=±2792.675)		
Body Mass Index (BMI)		
≤18.5 (Underweight)	22	9.6
18.5-24.9 (Normal weight)	195	84.8
≥ 25 (Overweight)	13	5.7

**TABLE-2 DISTRIBUTION OF RESPONDENTS BASED ON WORK RELATED INFORMATION (N=230).**

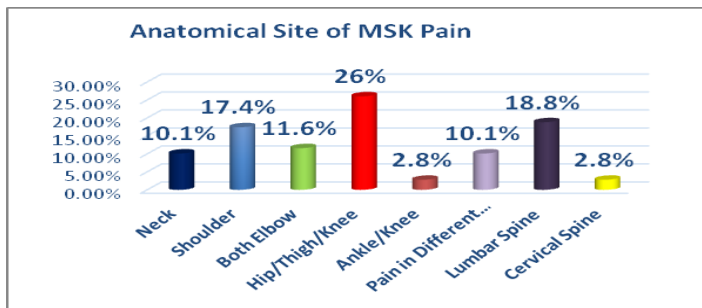
Variables	(n)	(%)
Working hours		
≤8 hours	6	2.6
>8 hours	224	97.4
Mean =13.05; (SD=± 2.040)		
Job Experience		
≤ 10 Years	73	31.73
>10 Years	157	68.26
Mean =17.03; (SD=± 10.167)		
Spend sitting (in hours)		
7-8 hours	141	61.3
9-10 hours	89	38.7
Spend standing (in hours)		
No standing	24	10.4
1 hour	180	78.3
2 hours	26	11.3

**FIGURE 2 PREVALENCE OF MSK PAIN**



The current study found 27.4% prevalence of musculoskeletal pain.

**Figure 3: Distribution of respondents by anatomical site of Musculoskeletal Pain**



**TABLE 3 PATTERN OF MUSCULOSKELETAL PAIN (N=63).**

Pain in body parts	Nature of pain	%	Severity of pain	(%)
Neck	Temporary	42.9	Mild	32.4
	Continuous	31.4	Moderate	41.2
	On movement	25.7	Severe	26.5
Shoulder	Temporary	22.2	Mild	20.0
	Continuous	44.4	Moderate	40.0
	On movement	33.3	Severe	40.0
Ankle/Feet	Temporary	30.0	Mild	32.4
	Continuous	40.0	Moderate	31.0
	On movement	30.0	Severe	55.2
Hip/Thigh/Knee	Temporary	32.4	Mild	35.2
	Continuous	40.2	Moderate	30.6
	On movement	27.4	Severe	34.2
Pain in different part	Temporary	38.9	Mild	13.8
	Continuous	27.8	Moderate	27.8
	On movement	33.3	Severe	50.0
Lumbar spine	Temporary	39.8	Mild	12.9
	Continuous	46.2	Moderate	55.9
	On movement	14.0	Severe	31.2
Cervical spine	Temporary	11.5	Mild	16.0
	Continuous	42.3	Moderate	40.0
	On movement	46.2	Severe	44.0

Considering the pain in different parts of the body, nearly 26% respondents complained pain in the hip/thigh/knees followed by neck pain (10.1%), shoulder pain (17.4%), both elbow (11.6%), lumbar spine (18.8%), & cervical spine (2.8%).

Regarding the pattern of musculoskeletal pain & table 4 shows that in neck pain, the majority (42.9%) suffered from temporary with moderate pain. Most of them (44.4%) suffered from continuous with a moderate degree of shoulder pain. Some 40.0% experienced a continuous and a moderate degree of ankle pain, whereas maximum (38.9%) suffered musculoskeletal pain in different portions of the body with temporary in nature. Most of them (40.2%) suffered continuously with a mild degree of pain in Hip/Thigh/knee region. In the lumbar spine, maximum (46.2%) respondents had continuous with a moderate degree of musculoskeletal pain. However, a greater percent (46.2%) of cervical pain during movement to severe in pain rating scale.

**TABLE 4 RELATIONSHIP BETWEEN MUSCULOSKELETAL PAIN WITH VARIABLES OF INTEREST.**

Age group	Musculoskeletal disorder				Total (%)	OR	$\chi^2$	P-Value
	Yes		No					
	n	%	N	%				
≤ 30 years	17	18.9	73	81.1	90 (100.0)	0.47	5.374	0.02*
> 30 years	46	32.9	94	67.1	140 (100.0)			
Job Experience								
≤ 10 years	11	15.1	62	84.9	73(100.0)	0.358	8.165	0.004*
> 10 years	52	33.1	105	66.9	157(100.0)			
Working Hours								
≤ 8 hours	3	50.0	3	50.0	6(100.0)	2.73	1.58	0.20
> 8 hours	60	26.8	164	73.2	224(100.0)			

p-value reached from chi-square. Mark (\*) represents a significant association of MSK pain with Age group (p-value 0.02) & Job Experience (p-value 0.004).

**4 DISCUSSION**

The cross-sectional study is done from Belkuchi Upazilla, Sirajganj. Among age range 18-60 years, a majority of handloom weavers were performing more than 8 hours per day, which is a vital issue for developing MSK pain. The aim of the study was to find out the pattern & associated factors of MSK pain. Among the male handloom workers, a sum of 230 respondents was interviewed with a structured questionnaire as per objectives. The current study found less than one third (27.4%) of the participants were suffering from MSK pain. Maximum participants of >30 years complained MSK pain

and the association between age and MSK pain were significant ( $p=0.02<0.05$ ). A previous survey found a higher prevalence of MSDs among weavers & significant relation was found between age >25 with MSDs ((Nag et al. 2010). This survey disclosed that most of the respondents completed primary & secondary high school story of education & monthly income was BDT 8001-10000 found most of the weavers in this study. Some other survey found about more than two-third (79%) of weavers was educationally qualified. A study observed that long working hours (>5hours) and long duration (>10yrs) of job involvement had a positive impact on the occurrence of MSDs among women as observed in the previous study (Costa et al. 2006). The Study also revealed that most of the handloom weavers had more than ten years of job experience & The relation between Job experience & MSK was significant ( $p=0.04<0.05$ ). Another study found that the mean job years was 22 ( $\pm 11.5$ ) & average working hours per day was 9.7 ( $\pm 2.3$ ). A high percent of handloom weavers were working in a sitting position compared to other position in this study. Nearly half of the weavers experienced sometimes physical stress at workplace. A high prevalence of MSK pain were found in hip/thigh/knee, shoulder & lumbar spine. On the other hand, an Iranian study showed that MSDs among weavers brings in different parts of body from last 12 months were Neck (35.2%), shoulders (47.8%), wrists (38.2%), upper back (37.7%), lower back (45.2%), & knees (34.6%) (Sobhan 1989). Considering the pattern of MSK pain, the current study addressed most of the weavers complained temporary pain in the neck with a moderate level of severity, Shoulder was continuous in nature with the moderate & severe levels of pain, ankle was continuous with sever level, lumbar was continuous with moderate, & cervical was on movement with sever level of pain. All MSK pain was assessed by a numerical pain rating scale. A study in India by Pandil et al. (2013) stated that severity of pain in Neck 88%, shoulder 76%, wrist 46%, elbow 60%, lower back 86%, hips 78%, knee 42% and ankle 58%. Evidence indicated that the psychological stresses related to the job & work environment have a bearing on the development of MSDs (Fredriksson et al. 2001; Faucett 2005). Pain has often been associated with physical & psychological co-morbid features such as low levels of job satisfaction & high levels of boredom at work (Hopkins 1990). On the other hand, more than half of the respondents had physical stress during their work found in this study.

## 5 CONCLUSION

It was noted that fair prevalent of MSK pain was seen among handloom weavers & it was found more in bigger chronological age. The Hip/Thigh/knee, shoulder, & knee were the more prevalent site of MSK pain. There was a significant relationship found between MSK pain with age & job experience. The Pattern of pain was different in different body parts, but the relation was insignificant. Some important factors like working hours, sitting & standing posture were in accuse of MSK pain. Knowledge about ergonomics & some related factors might help to prevent & control the incidence of MSK pain.

## CONFLICT OF INTEREST

Authors of the article declare that there is no conflict of interest.

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