

Prevalence of Work-Related Musculoskeletal Disorders in Factory Workers in Textile Industry Faisalabad

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ABSTRACT

Objective: To determine the prevalence of work-related musculoskeletal disorders and assess the risk factors for work-related musculoskeletal disorders among textile factory workers.

Study Design: Cross-sectional study.

Place and Duration of Study: Textile factory in the industrial zone of Faisalabad, Pakistan from Jan to Apr 2024.

Methodology: A Modified form of Standardized Nordic Musculoskeletal Questionnaire was used to collect data from 300 factory workers, using convenience sampling. Working hours, gender, increasing age and increased sweating, working years, break time, were divided into groups for analysis. Chi square test was applied to determine association between these variables and musculoskeletal disorders.

Results: Out of 300 factory workers, the maximum fatigue caused by nature of work was found in 21(7%) on upper limb, three (1%) on lower limb and 276(92%) on both limbs. Forceful exertion was a work-related risk factor in 298(99.3%) respondents while high task repetition was a risk factor in two (0.7%). Working years (p -value=0.007), break time (p -value=0.001), sweating (p -value=0.0025) and age (p -value=0.001) had statistically significant association with work related musculoskeletal disorder. Total 274(91.3%) had no musculoskeletal disorder while 26(8.6%) respondents had musculoskeletal disorder.

Conclusions: Prevalence of musculoskeletal disorders in textile sector was less and significant association was found between working years, break time, sweating and presence of Musculoskeletal disorders.

Keywords: Ergonomics, Musculoskeletal disorders, Risk factors, Textile industry.

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INTRODUCTION

According to World health organization (WHO), occupational health encompasses all aspects of worker's health and safety in the workplace particularly emphasizing on primary prevention of hazards. Several risk factors at the workplace leads to respiratory diseases, musculoskeletal disease, accidents, cancers, hearing loss, circulatory disorders, stress related disorders.¹ Global textile industry is worth nearly \$610.91 billion in 2023 as compared to \$573 billion in 2022.² Pakistan is the 8th largest exporter of textile-related items, contributing approximately 8% to the GDP.³

International Accord for Health and Safety, in the garment and textile industry with more than 180 major garment brands and global trade unions ensure safer workplaces in textile industry.⁴ Increased frequency of work-related musculoskeletal disorders (WMSDs) such as lower back pain and cervical spine pain are the leading causes of years lived with disability (YLDs).⁵

Numerous researchers have found solid grounds of a causal relationship between physical straining at work and work-related musculoskeletal disorders.⁶ Some common risk factors of WMSDs involve long working hours, abnormal postures, overhead work, manual handling of machines, and lifting heavy weights.^{7,8} Various researches done in developing countries clearly stipulate that there is increased frequency of musculoskeletal disorders in textile and garments industry.^{9,10}

Hospitals treat a large number of textile workers who complain of back pain, limb numbness, trouble walking, and even paralysis. Data on overall health of any industry is lacking especially in Pakistan. The researches done in textile industry are further very feeble in Pakistan, therefore it requires in-depth research on how workers in textile industry are affected by musculoskeletal disorders. This research is an attempt to make progress in this regard and work for the wellbeing and health of workers so that not only the workers live a normal and healthy life but also to make textile industry to flourish in Pakistan. The aim of the study is to determine prevalence of work-related musculoskeletal disorders and assess the

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of risk factors for musculoskeletal disorders among factory workers.

METHODOLOGY

The cross-sectional study was conducted at a textile factory of Faisalabad, Pakistan among factory workers from January to April 2024, after approval from Ethics Review Committee (ERC/ID/331) of Army medical college, National university of medical sciences ERC.

Sample size was calculated using OpenEpi sample size calculator taking confidence level 95%, margin of error 5%, reported population proportion 200,000 and expected prevalence of lower back pain (musculoskeletal disorder) 26.6%.¹¹ The estimated sample size came out to be 300 factory workers.

Inclusion Criteria: Males and females factory workers with working routine of more than 8 hours both in sitting and standing position, ranging from 18-65 years were included in the study.

Exclusion Criteria: Factory workers having any fracture in any part of the body, any congenital or acquired disability, any psychological disorders were excluded from the study.

After taking voluntary informed written consent, data was collected in person by using Modified form of valid and reliable tool, Standardized Nordic Musculoskeletal Questionnaire to assess musculoskeletal issues in different body parts. The Nordic Musculoskeletal Questionnaire is a publicly available public tool created by the Nordic Council of Ministers project. This questionnaire is useful for assessing musculoskeletal problems across the body in epidemiological research. This questionnaire includes structured questions that can be used as an interview or filled out by respondents themselves.¹² The questionnaire was translated from English to Urdu for better understanding of workers by a linguistic expert.

A total of 18 questions covering sociodemographic characteristics (name, sex, age, occupation, years of service), family history, nature of work causing maximum fatigue on a body part, work-related risk factors, and organizational factors (work hours, break time, shift, drinking water provision) made up the initial portion of the questionnaire. The next set of questions focused on how employees felt about the impact of things including longer workdays, growing age, changing gender and higher perspiration on musculoskeletal problems. Another set of 20 questions were asked with a labelled diagram of

human body showing different areas with respect to the musculoskeletal disorders. All the questions were assigned the score of 5 to each question such as; 1=Never, 2=1-2 times a week, 3=3-4 times last week, 4=Once every day, 5=several times every day. Total score of questionnaire came out to be 100. The answers were based on scoring on frequency of pain to identify the parts mostly affected by the nature of work in a set time period. Cut off value for MSD was set at 44(44%). Participants who scored below this cut-off value were considered as having MSD. Confidentiality was maintained as per ethical guidelines. Data access was limited to principal investigator.

Data was analyzed by using IBM Statistical Packages for Social Sciences version 25. Mean and standard deviation were calculated for quantitative data. Frequency and percentages were calculated for qualitative variables. Chi-square test and fisher exact test of association was applied to find out association between different variables. The *p*-value of <0.05 was taken as significant.

RESULTS

A total of 300 participants completed the questionnaire. Of these, 277(92.3%) were males and 23(7.7%) were females. The mean age of respondents was 31.42±9.57 years. Indoor workers were 298(99.3%), the remaining two (0.7%) were outdoor workers. About 274(91.3%) had no MSD while 26(8.6%) respondents had MSD.

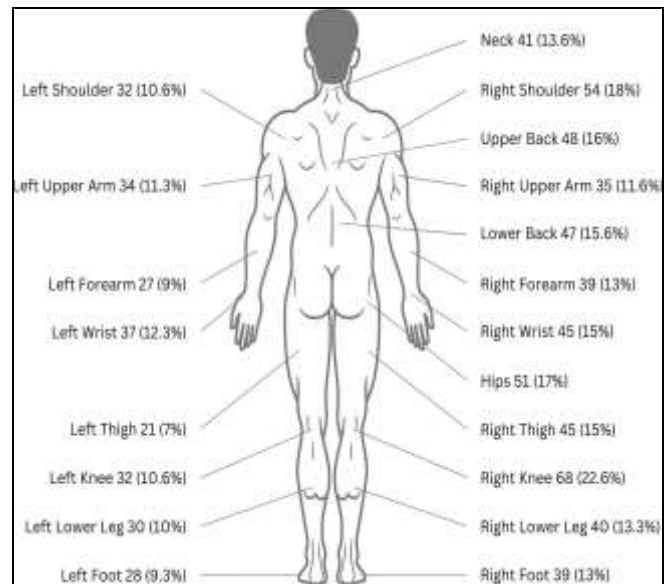


Figure: Work related musculoskeletal pain in different parts of body (n=300)

Work-Related Musculoskeletal Disorders

Maximum fatigue caused by nature of work was found in 21(7%) on upper limb, 3(1%) on lower limb and 276(92%) on both limbs. The frequency of work related musculoskeletal pain was found in different parts of body as shown in the Figure. Out of 300 participants, 68(22.6%) were having pain in the right knee, 54(18%) had pain in right shoulder, 48(16%) had pain in upper back, 47(15.6%) had pain in lower back.

Maximum of, 236(78.6%) respondents had a positive family history of MSD in parents/children and the remaining 64(21.3%) respondents had family history in grandparents. Around, 241(80.3%) had stress, 6(2%) had hypertension, 1(0.3%) had diabetes mellitus, 6(2%) had anemia (only reported in females), 25(8.3%) had more than one co-morbidity, 21(7%) had none of the co-morbid conditions.

Table: Association between Musculoskeletal Disorder and Study Variables (n=300)

Variables	n(%)	Musculoskeletal disorder n(%)		p-value
		Yes n=26	No n=274	
Shift				
Morning	150(50%)	9(6)	141(94)	0.101
Night	150(50%)	17(11)	133(88)	
Working Hours				
8 hours	106(35.3%)	6(5.6)	100(94)	0.171
>8 hours	194(64.7%)	20(10.3)	174(90)	
Working Years				
<5 years	162(54%)	8(5)	154(95)	0.011*
5-10 years	77(25.7%)	8(10.3)	69(89)	
10-15 years	42(14%)	9(21)	33(78)	
>15 years	19(6.3%)	1(5.2)	18(94)	
Water Provision				
Yes	64(21.3%)	5(7.8)	59(92)	0.784
No	236(78.7%)	21(9)	215(91)	
Break Time				
<30 minutes	293(97.7%)	23(7.8)	270(92)	0.016*
>30 minutes	7(2.3%)	3(42)	4(57)	
Sweating				
Mild	0(0%)	0	0	0.049*
Moderate	17(5.7%)	4(23)	13(76)	
Severe	283(94.3%)	22(7.7)	261(92)	
Age Groups				
18-27	123(41%)	1(0.8)	122(99)	<0.001*
28-37	96(32%)	13(13)	83(86)	
38-47	61(20%)	11(18)	50(81)	
48-57	19(6.3%)	1(5.2)	18(95)	
>58	1(0.3%)	0	1(100)	

*Fisher exact test of association

Forceful exertion was a work-related risk factor in 298(99.3%) respondents while high- task repetition was a risk factor in only 2(0.7%). Factors like more working hours, gender, and increased sweating had no significant contribution to MSD according to data. Working years (p -value=0.011), break time (p -value=0.016) sweating (p =0.049) and age

(p -value=0.001) had statistically significant association as shown in the Table.

DISCUSSION

This study was an attempt to assess the prevalence and risks associated with WMSD in the textile industry. This research showed that the prevalence of MSD by symptoms and related risk factors was modest. The present study found the involvement of body regions such as, right knee, right shoulder, hips, upper back, lower back, right wrist, right thigh due job load. Most of the chores in the factory are carried out manually with hand tools, and it is a very labor-intensive process. There is a considerable risk of WMSDs because of the use of hand tools.¹³

The right side of the body of participants was more afflicted in this study. It might be due to right-sided dominance in the population. According to a study conducted in USA, musculoskeletal disorder was seen in shoulder /neck region and in upper distal extremity.¹⁴ The discrepancy with our study may result because of the different study setting.

Due to a number of problems, including unsuitable seating benches, non-ergonomic designs with sharp corners, and a lack of proper footrests were significant risk factors in this setting. These elements contribute to more back and hip pain and raise the likelihood of vertebral diseases.¹³ In particular, the upper back was shown to have the highest prevalence of severe pain, followed by the knees, hips/thighs, and the lower back. The most common musculoskeletal disorders among workers in the apparel sector were back problems, hand and wrist problems, neck problems, and shoulder problems.¹⁵

Research also revealed there is a significant correlation between workers' ages and MSD. MSD is more common between the ages of 28 and 57. Researches conducted in Karachi and Taiwan found that MSD is more common among those older than 30 as compared to younger than 30.^{16,17} Stress, a history of musculoskeletal disorders in the family, and forceful exertion were the main MSD-related risk factors in this study. According to the findings of a study, workers who have a history of systemic illness are twice as likely to get MSD as compared to those who don't.¹⁴ However, Current study has not found any such association.

Due to circadian desynchronization, sleep loss, suppression of nocturnal melatonin secretion, and

exposure to light during the work shift, there was a positive correlation in this study between night shift workers and MSD. This was also demonstrated by the findings of research among nursing staff.¹⁸ The participants in this study frequently put in extended shifts without taking adequate breaks. According to study done in Lahore, these duties are the worst for working because of the improper ergonomic factors that cause increased pain in the upper back.¹³ Employees in the textile sector with greater years of service (>10 years) were more likely to develop MSDs than employees with less years of service (10 years). Comparing this research with that in Kolkata reveals the same conclusion: MSD complaints were more common among workers with longer employment histories (>10 years) than among those with shorter employment histories (<10 years).¹⁹ A study in China also revealed a correlation between increased work history and a rise in work-related musculoskeletal disorders.²⁰ This study found that employees without access to water at work were more likely to acquire MSD because dehydration lowers the perfusion pressure to the skeletal muscle, which reduces blood flow and puts the muscle at risk for ischemia-related injury. This study has established an association between sweating and MSD because it depletes salt stores, disrupts electrolytes, and induces muscle cramps that are followed by discomfort, stiffness, and decreased mobility.

CONCLUSION

It is concluded that the prevalence of MSDs is less in the textile sectors. Most likely reason being healthier or enhanced working environment in the factory in which the study was conducted. Therefore, it can be said that any program to enhance working conditions in this industry could be regulated and should concentrate on creating work stations with an ergonomic design. This would considerably increase workers' productivity and working efficiency while reducing their level of drudgery and exhaustion.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

NR & FA: Data acquisition, data analysis, critical review, approval of the final version to be published.

FTZ & MA: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

ABK: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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