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Determinants of Musculoskeletal Disorders among Small-Scale Textile Workers: A Cross Sectional Study

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ABSTRACT

Introduction: Empirical evidence suggest that the workers in the garment units suffer from work related musculoskeletal disorders such as carpel tunnel syndrome, forearm tendinitis, epicondilitis, bicapital tendinitis, lower back pain, neck pain, shoulder pain and osteoarthritis of the knee. Therefore the present study was undertaken to find out the determinants leading to musculoskeletal disorders among the small scale textile workers.

Methodology: A community based, cross-sectional study was conducted among the small-scale textile workers of Meerut. The subjects were interviewed and examined as per a pre-designed, pre-tested semi-structured interview questionnaire.

Result: There was significant relation between age, years and hours of working and marital status with musculoskeletal disorders. Around 70% of workers having history of addiction developed musculoskeletal disorders.

Conclusion: A highly significant association between increasing age, more years of work experience, and more hours of work per day, addiction, marital status and musculoskeletal disorders was seen in the study.

Keywords: Musculoskeletal disorder, Textile Workers, Small Scale Industries

INTRODUCTION

Work-related musculoskeletal disorders have emerged as major health problem among workers in both industrialized and industrially developing countries[1].Industrialization and globalization has changed the occupational morbidity drastically.[2]There are around 70,000 garment manufacturing unit in the country providing employment to more than 3 million person[3]. Small –scale textile industries, sector is one of the important but unorganized part of textile industry of India and mainly run by private establishment. The small-scale textile workers hardly ever benefit from occupational health and safety provision.[4]

Various studies suggest that workers in textile industry suffer from work related musculoskeletal disorders such as carpel tunnel syndrome ,forearm tendinitis, epicondilitis,bicapital tendinitis, lower back pain, neck pain ,shoulder pain and osteoarthritis of the knee.[3]

In small scale textile industries standing work posture is maintained throughout the shift in operating looms simultaneously. After raw material are wrapped, the worker push and move iron beams weighing 75-100 kg for a distance of about 2 m and this kind of material handling are performed 6-7 times per day. The job demands high attention in observing that the threads do not break off.[5]

The ill health is compounded by various socio – economic factors such as poverty, lack of education, poor diet, addiction, poor working condition, excess working hours etc.[6, 7,8]The working environment and living condition of the small –scale textile workers are poor and pathetic and even hazardous to their health. They often do not have proper housing ,ventilation, sanitation, water

supply ,proper electricity ,natural and artificial lighting in working environment. There is no compensation for work stoppages by the employers. Many workers are weavers by caste .The small scale textile weaving are a family affairs occupation and it is a based on home industry. Woman and children are involved as co-supportive in weaving. It is important to note that it is the only sector of textile industry, which is running without research, or innovation of any kind.[9]

OBJECTIVES

Objectives of the research were to study the factors associated with musculoskeletal disorders of the small scale textile workers and to determine the significance of relationship of socio-demographic and health factors with musculoskeletal disorders of the small scale textile workers.

MATERIAL AND METHOD

The present study was a community based, cross-sectional study conducted among the small-scale textile workers of small scale industry of urban slums, namely Bunkarnagar and Kidwainagar in the city of Meerut. The study was carried out from September 2012 to August 2013 including development of study tools, compilation of data, analysis & presentation of the findings. The sample size was 325 which was calculated using the formula according to Lwanga SK, Emeshow S.[10]

Inclusion Criteria: Power loom workers of both the sexes above the age of fifteen years, who were present at the time of data collection, were included in the study.

Exclusion criteria: Small -scale textile worker who didn't consent to participate or a small -scale textile setup was found to be locked at the time of survey was excluded from the study.

The subjects were made comfortable and their co-operation was sought. The purpose of screening was clearly stated in terms of its relevance to the individual's health status, assuring the maintenance of confidentiality and written consent was obtained. The required sample was taken using purposive sampling technique. Sampling universe was around 370 small -scale textile setup (the data of which was procured from the workers) in the study area and the sampling unit was a small -scale textile worker in this study. A maximum of two small -scale textile workers were considered working in each small -scale textilesetup. Therefore the number of small -scale textile workers working in the study area becomes around 740(370*2). Around 162 small -scale textile setup were taken in order to cover the required sample size.

After defining and finalizing the methodology to be adopted during the study and designing the interview schedule, a pilot testing was done on 50 small scale workers in the study area to assess the validity of research tool and to field test the interview schedule for further refining the methodology.

For the collection of data, a personal visit was made to the small -scale textile setup and all the small -scale textile workers present at that moment in the small -scale textile setup were interviewed and clinical examination was done. Interview schedule consisted of a semi-structured questionnaire and took roughly 40 to 45 minutes to complete.

Workers suffering from pain and discomfort in neck, shoulder, upper limb (hand wrist, elbow, arm),Lower limb (leg, foot ,ankle, knee joint and hip) and back for past one month preceding the survey was considered to be having musculoskeletal disorders. The affected area was examined on spot, inspection and palpation, range of movement, neurological examination with the help of reflex hammer was done and sensation was also tested.

Status of alcohol use, smoking/chewing tobacco was taken into account. All the current drinkers and tobacco users were considered to be addicted.

Education status was also taken into account. **Illiterate:** A person who could neither read nor write including one who was capable of reading and/or writing only figures and/or his/her name was considered illiterate. **Just literate:** A person who could read and write in any language but had not passed primary school examination was considered just literate. **Primary school:** This group included those individuals who had passed primary school examination.

A General Health Questionnaire (GHQ) 12was used to find out the psychological status of the workers. The GHQ is a screening tool which was used to identify the severity of psychological distress experienced by an individual within the past few weeks. Each item on the scale has four responses from "better than usual" to "much less than usual." For the purpose of this study, the GHQ scoring method (0-0-1-1) was chosen over the simple Likert scale of 0-1-2-3.The scores were summed up by adding all the items on the scale ranging from 0 to 12. Due to the various thresholds of the GHQ-12, the mean GHQ score for a population of respondents was suggested as a rough indicator for the best cut-off point (Goldberg, Oldehinkel & Ormel, 1998)[11]. Therefore, based on the mean GHQ score workers with score ≤5 was considered having good psychological wellbeing and score ≥6 was

having poor psychological wellbeing. Approval from Ethical committee of Subharti University Meerut was obtained.

Statistics: Data was analyzed using Statistical Package for Social Sciences (SPSS) version 19.0 and Epi-info version 3.5.3 software. Chi-square test and Fisher's Exact Test were used to find the significance between the sociodemographic, health factors and musculoskeletal disorders. Data was presented as numbers and percentages in tables.

RESULTS

Total of 325 small scale textile workers were interviewed, of which 319and 6 were male and female respectively. The most common type of clinical illness was musculoskeletal disorders 204(62.8%) followed by respiratory 99(30.5%), ocular 36(11%) and auditory problems 34(10.4%).Cardio vascular problems was the least prevalent in the study population 25 (7.7%). The study revealed that most common clinical complain of the workers was weakness 54(16.6%) followed by occupational injuries 51(15.7%). On clinical examination, only 17(5.2%) had pallor followed by clubbing 5(1.5%), icterus, cyanosis and pedal edema was 4(1.2%) each. The study gives a glimpse that majority of the workers had normal BMI 250(76.9%) followed by underweight 40(12.3%).

There were few overweight workers also 23(7.1%) according to WHO criteria.[12] A total of 280(86.2%) of the workers had normal blood pressure and 20(6.2%) of the workers had hypotension. Eighteen (5.5%) workers had pre hypertension and only 7(2.2%) workers had stage 1 hypertension according to JNC VII classification.[13]

Table 1: Association of determinants with musculoskeletal disorders

Determinant	Musculo-skeletal Disorders			X^2	df	p- value
	Yes (%)	No (%)	Total (%)			
Age						
15-25	40(42.6)	54(57.4)	94(100)	35.241**3**	**3**	**<0.001**
26-35	53(59.6)	36(40.4)	89(100)			
36-45	64(71.6)	25(28.4)	89(100)			
>46yrs	47(88.7)	6(11.3)	53(100)			
Marital Status						
Married	161(65.7)	84(34.3)	245(100)	3.694	1	0.05
Unmarried	43(53.8)	37(46.3)	80(100)			
Education status						
Illiterate	167(64.2)	93(35.8)	260(100)	2.601	3	0.457
Just literate	23(57.5)	17(42.5)	40(100)			
Primary school	14(58.3)	11(41.7)	25(100)			
Type of family						
Nuclear	137(60.9)	88(39.1)	225(100)	1.106	1	0.293
Joint	67((67)	33(33)	100(100)			
BMI*						
Normal	172(62.3)	104(37.7)	276(100)	0.159	1	0.690
Underweight	32(65.3)	17(34.7)	49(100)			
Blood Pressure†						
Normal	179(60.3)	118(39.7)	297(100)	9.219	1	0.002‡
Hypertensive	25(89.3)	03(10.7)	28(100)			
Addiction Habits						
Yes	121(69.9)	52(30.1)	173(100)	8.144	1	0.004
No	83(54.6)	69(45.4)	152(100)			
Work Experience (yrs.)						
1-10	98(54.7)	81(45.3)	179(100)	16.397	2	<0.001
11-20	55(64.7)	30(35.3)	85(100)			
>21 yrs	51(83.6)	10(16.4)	61(100)			
Hours of work per day						
≥12 hrs	149(64.2)	83(35.8)	232(100)	0.734	1	0.391
<12hrs	55(59.1)	38(40.9)	93(100)			
Duty schedule						
Day duty	16(64)	9(36)	25(100)	0.018	1	0.895
Day and night duty	188(62.7)	112(37.3)	300(100)			
Psychological status						
GHQ ≤5	170(64.6)	93(35.4)	263(100)	2.062	1	0.151
GHQ ≥6	34(54.8)	28(45.2)	62(100)			

*: According to WHO Classification; †: According to JNC VII Classification; ‡: Fisher'sExact test is being used to find out the significance

Table no. 1 depicts that there was statistically significant relation between age and musculoskeletal disorders. The study showed that as the age of the small -scale textile workers increases occurrence of musculoskeletal disorders increases.

Among the workers who had history of addiction, around 70%developed musculoskeletal disorders in comparison to the 55% of workers with no history of addiction. This association was found to be statistically significant. The table depicts that as the years of working experience and number of work hours increase, prevalence of musculoskeletal disorders increases. Among workers with working experience of 31-45 yrs., 89.5% of them developed musculoskeletal disorders as compared to workers with working experience of 1-10yrs in which 54.7% had developed musculoskeletal disorders. The association between work experience, number of work hours and musculoskeletal disorders was significant statistically. However the relationship between psychological status and musculoskeletal disorders was not significant which was found by the help of GHQ (General Health Questionnaire).

DISCUSSION

Our study shows that 63% of small scale textile workers are suffering from MSD. The main complaints of these participants were pain and stiffness of neck, shoulder joints, hands, wrists, elbows, back, hip joints, knee joints, ankle joints and feet similar to study done by Tushar et al that observed majority (69%) of such workers are having MSD and commonly involved areas are neck, low back, hands, wrist and shoulders.[14] In another study done by How-Ran Guo, workers complained of musculoskeletal disorders of mainly neck, back, shoulders, hands, and wrists.[15]Power loom workers have to stand for long hours causing lumber extensor muscle fatigue, ankle and knee pain. Repetitive work, awkward and static postures have been identified as being associated with upper extremity pain and discomfort[16, 17, 18].

The results of the present study revealed that, as the age of the small -scale textile workers increases, occurrence of musculoskeletal disorders increases. Similar study found that musculoskeletal morbidities was more common among older (> 45 years) workers than in younger (<45 years) ones (77.27% vs. 67.78%).[15]Another study done by Jaspeet Singh et al[19](2012)on small-scale worker of forging industries found that as age and work experience increased the musculoskeletal disorder also increased. This can be explained as from about age 30, the density of bones begins to diminish as a result; bones become more fragile and the cartilage inside a joint becomes thinner which may make the joint less resilient and more susceptible to damage. Additionally, joints become stiffer because the connective tissue within ligaments and tendons becomes more rigid and brittle. This change also limits the range of motion of joints. With age the amount of muscle tissue and the number and size of muscle fibers gradually decrease resulting in a gradual loss of muscle mass and muscle strength. The numbers of muscle fibers that contract faster decrease much more than the numbers of muscle fibers that contract slower. [20]Thus, muscles are not able to contract as quickly in old age causing more pain and stiffness with reparative, jerky movements in looms.

We also observed MSD have direct relationship with number of years of working and number of hours spent per day on the looms similar to the finding of other studies.[14, 5]Repetitive work for long period cause strain in the muscle system causing fatigue and decreasing the opportunity for tissues to recover hence leading to pain and stiffness.

The present study is in confirmation with another study [14]and substantiates the risk of developing MSD among small scale textile workers who had addiction of tobacco and or alcohol. Most people adopt substance addictions to counter stress of daily life. Evidences indicate that the psychosocial stresses related to the job and work environment have bearing on the development of MSDs.[21, 22] Pain has often been associated with physical and psychosocial co-morbid features such as low levels of job satisfaction and high levels of boredom in work, perception of intensified workload, monotonous and repetitive work, limited job control and low social support might be associated with the occurrence of MSDs.[15]

The present study shows inverse relation with education status similar to the finding of other study[5]. Illiteracy makes the workers vulnerable to exploitation, accepting the hazardous working conditions and long working hours, thereby compromising their health.

In this study it was observed that there is statistically significant relation of marital status with MSDs. Married workers had to perform their household activities and have many social responsibilities in addition to their job. They have little time to take rest, to attend to personal health problems, more physical, mental and social stress which makes them more prone to MSDs than their unmarried counterparts. Similar justification is for workers living in joint families having more prevalence of MSDs.

Our study shows a significant association of MSD and hypertension similar to the findings of other study.[23]

CONCLUSION

The high prevalence of musculoskeletal problems among small scale textile industry worker is alarming. Counselling against alcohol and tobacco addiction is recommended. Periods of rest in between long hours of work and seats with adjustable backrests that provide support for the lumbar region would reduce postural strain. The idea should be to fit job to the worker to improve efficiency and wellbeing. The responsibility for improving the working environment and safety conditions of workers lies with the government and nongovernmental agencies as well as the employers. Legal standards laid down in various acts of occupational health should be strictly enforced.

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