ORIGINAL ARTICLE

Musculoskeletal problems among workers in a garment industry, at Tirupur, Tamil Nadu

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Abstract

Background: Every occupation has its own ill effects on health. Garment workers are denied of their basic rights and less importance is given to their health. Their health status also depends on their access to treatment and availability of healthcare facilities. **Aims & Objectives:** To estimate the prevalence, health seeking pattern and associated factors for musculoskeletal problems among garment workers and to assess the level of exposure of individual workers to upper limb musculoskeletal loads. **Materials and methods**: A cross sectional study was conducted among 380 workers in a garment industry, at Tirupur over a period of two months. Interview was conducted using a structured pretested questionnaire including Nordic Musculoskeletal Questionnaire and Numerical Pain Rating Scale. Level of exposure to musculoskeletal load was assessed using RULA tool. Statistical analysis was done using SPSS 19 version. **Results:** 77.6% of the workers had musculoskeletal problems. The most common sites affected were neck (32.1%), knee (28.7%) and low back (26.6%). More than half of the workers experienced moderate pain in all body parts. 54.2% sought health care and 40% among them preferred government hospital. Only 8.7% workers had acceptable posture. **Conclusion:** Health problems among garment workers are one of the areas of public health concern in our country. Reducing the work strain and providing a supportive workplace environment will have a favorable impact on work productivity

Keywords

Garment workers; musculoskeletal problems; Nordic Questionnaire; health seeking pattern; RULA.

Introduction

Joint ILO/WHO committee defines the occupational health in 1950's as the promotion and maintenance of the highest degree of physical, mental and social wellbeing of workers in all occupations (1). India - second largest manufacturer of garment after China has carved a niche for itself in the global markets. The industry has its own reputation for durability, quality and beauty, thus forming a mainstay for nation's economy (2). Tirupur, the so called 'BANIAN CITY', is one of the major garment production hubs. Success of the garment industry has been made at the cost of worker's health. Musculoskeletal problems are the most common problem among garment workers (3). Work at a garment production

unit represents a complex multifaceted physical work environment, with interactions among the various dimensions of work place, rapid piece rate production and inappropriate non – neutral awkward postures. These exposures place them at risk of developing work related musculoskeletal disorders. As far as now, no study has been conducted among the workers of garment industries at Tirupur, determining the prevalence of musculoskeletal problems. Also a complete description of their level of exposure to musculoskeletal risks is yet to be established in our country.

Aims & Objectives

1. To estimate the prevalence and health seeking pattern of musculoskeletal problems among garment workers.
2. To assess the association between socio demographic factors, type of work, posture during work, working experience and musculoskeletal problems among garment workers.
3. To assess the level of exposure of individual workers to upper limb musculoskeletal loads due to posture, repetition and force at work

Material & Methods

A cross sectional study was done among workers in a garment industry, at Tirupur, during May and June 2013. With an estimated prevalence of musculoskeletal disorders among garment workers as 22.1% (4), limit of accuracy as 20%, non-refusal rate of 10% and at 5% level of significance, the sample size calculated was 373. 380 workers, ≥18 years of age with a minimum of one year experience were included in the study. Institutional Ethics Committee approval was obtained. After obtaining a written informed consent, interview was conducted using a structured pretested questionnaire, which gathered information about details on their demographic data, socio economic class (Modified Kuppuswamy's Classification 2012) (5), occupational history and health seeking pattern.

Prevalence of musculoskeletal problems was assessed using Nordic Musculoskeletal Questionnaire (NMQ) (6) which includes items asking about the experience of musculoskeletal trouble in the last 12 months and 7 days which has prevented normal activity. A person is said to have a musculoskeletal problem, if he/she experiences pain in one or more of the body parts in the last 12 months. In addition to this, it also has questions on detailed information about musculoskeletal problems relating to three main body areas; neck, shoulders and lower back. Numerical Pain Rating Scale was used to assess the intensity of pain (7). A score of 1-3 indicates mild pain and no further assessment needed; 4-6 indicates moderate pain; and 7-10 indicates severe pain which needs further assessment. Assessment of the workers to their level of exposure to upper limb musculoskeletal loads due to posture, repetition and force was done using Rapid Upper Limb Assessment tool (RULA) (8).

Data entry and analysis was done using Statistical Package for Social Sciences (SPSS) version 19 software. Descriptive statistics was calculated for background variables, details of work, health seeking pattern and to assess the level of exposure to musculoskeletal load. The prevalence of musculoskeletal problems was calculated with 95% Confidence Interval (CI). Odds ratio was calculated with 95% CI to evaluate the association between socio demographic variables, type of work, posture during work, years of working experience and musculoskeletal problems. Chi-square test was used as a statistical test of significance and p value <0.05 was considered to be significant.

Results

The mean age of the study participants was 30.53 years. Majority (60.8%) were males and 42.1% had completed their high school education. It was found that 78.9% belonged to a nuclear family and 44.2% belonged to Class II socioeconomic status. It was found that 33.1% were tailors and 65.8% of the workers were working in those sections which involved prolonged hours of standing. Among them, 60.2% had less than 4 years of total experience in the garment industry. The workers had a leisure time of 1 hour and 30 minutes and the mean duration of working hours was 8 hours per day.71.1% had no history of tobacco use.

Musculoskeletal problems were found to be present among 77.6% of the workers. The most common sites affected were neck (32.1%), knee (28.7%) and low back (26.6%). Among the 295 workers, who had any one musculoskeletal problem during the last 12 months, 236 (80%) had problems during the last 7 days. Among them low back pains (78.2%) were found to be more common, followed by ankle / feet pain (76.3%) and neck pain (73.7%) during the last 7 days. Proportions of workers with musculoskeletal

pain during the last 12 months and 7 days are shown in table 1.

Among the 122 workers with neck pain, 49 (40.16%) experienced pain for more than 30 days. 45.9% workers with neck pain perceived reduced work activity during the last 12 months and it was more than 30 days in only 19.6% workers. 42 workers had shoulder pain for 8 - 30 days in the last year and 22.2% workers perceived reduction in their leisure activity during the last 12 months. Among the study subjects with low back pain, 47 (46.5%) workers had a perception of reduced work activity in the last 12 months. Out of which, 31 (66%) and 4 (8.5%) workers had reduced work activity for 1 – 7 days and more than 30 days respectively. Particulars of neck, shoulder and low back pain are described in Table 2. 37.3% of the workers were unable to attend work regularly in the last one year.

More than half of the workers experienced moderate pain in all body parts. 26 (25.8%) workers had severe low back pain and knee pain was severe among 26 (23.9%) workers. The severity of various pain experienced by the subjects as per the numerical pain rating scale are given in table 3.

It was observed from table 4 that musculoskeletal problems were more common among workers among workers aged 35 years and above (95%) compared to workers with age less than 35 years (71.4%); in subjects having 5 or more years of work experience (92.4%) compared to those with less than 5 years of experience (70.9%); among workers who require changes in their posture very soon (90.5%) and workers who may require change in their working posture (78.9%) when compared to workers who had acceptable postures (42.4%). All these differences were found to be highly statistically significant ($p < 0.001$).

It was noted that health care was sought by 54.2% workers. Among 160 workers, who took treatment for musculoskeletal problem in the last one year, majority 64 (40%) sought health care from government hospital followed by private clinics 53 (33.1%) and pharmacy 38 (23.8%). Among the 135 workers who had musculoskeletal problems in the last one year, but did not seek health care, 87 (64.4%) reasoned that they were able to manage since it was a normal phenomenon due to work, while 44 (32.6%) reported lack of time.

Among the study participants, only 8.7% workers had an action level 1, which indicates that their posture is acceptable if it is not maintained or repeated for prolonged periods. Majority of workers, 284 (74.7%) had an action level 2, which needs further investigation for change in their working posture. 63 (16.6%) workers had an action level 3, which demands changes in their posture soon.

Discussion

The present study revealed that garment industry employs more workers in the productive age group (18 – 58 years) and shows a growing trend of more women joining the garment industry, which is comparable with a study by Saha *et al* in Kolkata (3). In spite of the availability of technically advanced tools, this labour intensive sector plays a major role in employing people from lower socio economic class. Majority of the participants (65.8%), in our study were employed in sections which involved prolonged hours of standing. These results are comparable with a study done by Tiwari RR *et al*, where 60.7% of the study subjects adopted a standing posture during majority of their working hours (9). They were advised to take rest in between long periods of work to reduce postural strain.

Musculoskeletal problem was more common health problem reported in our study population with the most common sites affected being neck, knee, low back and shoulder. This could be explained by the awkward postures such as bending of neck, prolonged sitting without back rests, repetitive and static muscular work and lack of awareness about ergonomic factors. These results are comparable with the study done by Ozturk N *et al*, in Turkey where 65% of the women had musculoskeletal pain / discomfort and the prevalence rates were higher for the trunk (62.5%) followed by neck (50.5%) and shoulder (50.2%) (10). The observation from our study is also in accordance with the study done by Saha *et al* in Kolkata where musculoskeletal problems were present among 69.64% of the worker with the neck being the most common site affected (64.10%), followed by low back pain (41.03%) and pain in the shoulder (3). Arumugam B *et al*, in his study in a garment manufacturing unit at Chennai showed that 22.1% had musculoskeletal disorders (4). It is observed that the percentage of workers with musculoskeletal problem is higher in our study compared with other studies. This could have resulted from the variation in the study population, assessment of musculoskeletal problems by different methods and the lack of awareness about the ergonomic measures among the workers, which

in turn may be related to their literacy level and ignorance.

The other commonly reported musculoskeletal problem in our study was the low back pain (26.6%). A study done by Tiwari RR *et al* in Wardha showed that 11.1% of the workers had low back pain. (9) Low back pain in garment workers may be due to prolonged sitting in seats with no back rests with their trunk bent. The current study also confirms that musculoskeletal problems results in reduced work activity and performance.

In the present study, workers with age ≥ 35 years are 7.6 times at higher risk for musculoskeletal problems compared to workers with age <35 years, which may be related to the decrease in the flexibility of the ligaments with increasing age. Higher risk among sewing machine operators could be explained by their nature of work which generally requires prolonged sitting, leaning forward from the waist and static work. In our study, musculoskeletal problems were found to be 1.654 times more common in workers whose working position involves prolonged hours of sitting (83.1%) compared to those who perform work in standing posture (p value = 0.066). Tiwari RR *et al* also showed that prolonged sitting is a risk factor for low back pain with an odds ratio of 1.93 (p <0.05). (9) This may be due to the fact that prolonged sitting results in non-neutral awkward posture subjecting to undue stress leading to musculoskeletal problem. In the current study, workers who require changes in their posture very soon were twelve times at higher risk of developing musculoskeletal problems and workers who may require change in their working posture were five times at increased risk for musculoskeletal problem compared to workers who had acceptable postures. These estimates stays in line with the fact that improperly designed furniture at the workplace, coupled with excessive work load results in work related musculoskeletal disorders. Similar to a study done by Saha *et al* (3), our study also showed a positive association between tobacco use and musculoskeletal problem. The possible explanation could be due to the effect of nicotine in the bone metabolism resulting in bone mineral loss and various musculoskeletal problems. (11)

Health care seeking behaviour is critical in developing countries for both work related and other health issues due to various reasons like ignorance, misconceptions, distance to health facility, lower affordability, lack of time, gender discrimination, self-treatment, local healers and traditional methods of treatment. Garment workers mainly access health care from the primary health centre, which serve as a link between them and medical system. Health care seeking pattern in our study is much better when compared to the other studies (12,13,14) as the health facility is available and access to treatment is adequate.

Surprisingly, in our study only 8.7% of the workers had acceptable posture at the workplace. These data stress the need for immediate attention in the ergonomic measures at the workplace, which in turn may prevent further risk of developing musculoskeletal problems. The workers with unacceptable postures should be targeted by the occupational health professionals to create awareness about their risk of developing musculoskeletal disorders due to inappropriate posture. Awkward postures may also be explained to the use of poorly designed furniture's which are either above or below the recommended level like cutting table too high, sewing machine operators stool too high, ironing table too low etc. Also the employee of the company was instructed to rectify the gaps in the working tools and equipment that may affect the health of the workers.

Conclusion

The musculoskeletal problems as observed in this study make it imperative for the garment workers to take a serious note of it. Majority of workers had musculoskeletal problem with neck being most affected. Age ≥ 35 years and > 5 years of working experience was observed to be potential risk factors. Unacceptable postures among 91.3% of the workers were quite alarming and demands immediate modification to be made in the working conditions. The long-term effects of these problems among garment workers are substantial and pose a great problem to the family, community and the country as a whole

Recommendation

Musculoskeletal problems among garment workers are one of the areas of public health concern. Reducing the strain at work and providing a supportive workplace environment will have a favourable impact on work productivity. The organizations and the workers entering a garment sector need to be sensitized regarding the importance of regular periodic medical examinations and proper working conditions

Limitation of the study

In the present study only musculoskeletal problems was taken into account excluding other common health problems among garment workers like visual and respiratory problems.

Relevance of the study

Musculoskeletal problems and their level of exposure at workplace are one of the major concerns among garment workers. Hence this study was conducted as scarce information is available on this issue especially in our region.

Authors Contribution

Sreesupria.PR & Abinayaa.PR has conceived the idea, designed the methodology and did the data collection, data analysis, interpretation of data for the work and final approval of the version to be published. Pankaj. B. Shah & Kannan L has refined the research questions, revising methodology and contributed for data analysis and report writing

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Tables

TABLE 1 PROPORTION OF MUSCULOSKELETAL PROBLEMS DURING THE LAST 12 MONTHS &7 DAYS

S. no	Musculoskeletal problem	Last 12 months n (%)	Last 7 days* n (%)
1	Any one problem	295 (77.6%)	236 (80%)
2	Neck pain	122 (32.1%)	90(73.7%)
3	Shoulder pain	99(26.1%)	66(73.7%)
4	Elbow pain	52(13.7%)	22 (42.3%)
5	Wrist / hand pain	84 (22.1%)	50 (59.5%)
6	Upper back pain	88(23.2%)	58 (65.9%)
7	Low back pain	101(26.6%)	79 (78.2%)
8	Hip / thigh pain	69 (18.2%)	28 (40.6%)
9	Knee pain	109 (28.7%)	75 (68.8%)
10	Ankle / feet pain	97 (25.5%)	74 (76.3%)

**Among those workers who had pain during the last 12 months.*
† Vertical total will not tally 100%, since the workers may have pain in more than one body parts

TABLE 2 PARTICULARS OF NECK, SHOULDER, LOW BACK PAIN DURING THE LAST 12 MONTHS

S.no	Particulars	No of workers		
		Neck pain n = 122(%)	Shoulder pain n = 99(%)	Low back pain n = 101(%)
1	Hurt in an accident	2 (1.63)	5 (5.1)	3 (3)
2	Change in job because of the pain	2 (1.63)	1 (1.01)	6 (5.94)
3	Duration of pain during last 12 months			
	1 – 7 days	12 (9.83)	12 (12.1)	11 (10.9)
	8 – 30 days	43 (35.25)	42 (42.4)	39 (38.6)
	>30 days, not everyday	49 (40.16)	39 (39.4)	40 (39.6)
	Every day	18 (14.7)	6 (6.1)	11 (10.9)
4	Perception of reduced leisure activity in last 12 months	35 (28.6)	22 (22.2)	31 (30.7)
5	Perception of reduced work activity in last 12 months	56 (45.9)	27 (27.3)	47 (46.5)
6	Duration of normal work affected			
	1 – 7 days	35 (62.5)	15 (55.5)	31 (66)
	8 – 30 days	10 (17.9)	10 (37)	12 (25.5)
	>30 days	11 (19.6)	2 (7.4)	4 (8.5)

TABLE 3 MUSCULOSKELETAL PROBLEMS ACCORDING TO SEVERITY*

S.no	Musculoskeletal problem	No of workers		
		Mild ,n (%)	Moderate n (%)	Severe n (%)
1	Neck pain (n= 122)	9 (7.4)	91 (74.6)	22 (18)
2	Shoulder pain (n= 99)	10 (10.1)	77 (77.8)	12 (12.1)
3	Elbow pain (n= 52)	10 (19.2)	40 (76.9)	2 (3.9)
4	Wrist/hand pain (n= 84)	14 (16.7)	64 (76.2)	6 (7.1)
5	Upper back (n= 88)	9 (10.2)	70 (79.6)	9 (10.2)
6	Low back (n= 101)	8 (7.9)	67 (66.3)	26 (25.8)
7	Hip/thigh (n= 69)	19 (27.5)	40 (58)	10 (14.5)
8	Knee (n= 109)	13 (11.9)	70 (64.2)	26 (23.9)
9	Ankle/feet (n= 97)	15 (15.4)	60 (61.9)	22 (22.7)

TABLE 4 ASSOCIATION BETWEEN VARIOUS FACTORS AND MUSCULOSKELETAL PROBLEMS

Particulars	N	Musculoskeletal problems	Odds ratio	95% CI	Chi square	p value
Age group in years						
≥ 35 years	100	95 (95%)	7.600	2.981 - 19.377	23.576	.000
<35 years	280	200 (71.4%)				
Sex						
Male	231	179 (77.5%)	0.979	0.597 - 1.606	0.007	0.934
Female	149	116 (77.9%)				
Type of work						
Tailor	126	105 (83.3%)	1.684	0.974 - 2.912	3.529	0.060
Others	254	190 (74.8%)				
Posture during work						
Sitting	130	108 (83.1%)	1.654	0.964 - 2.838	3.374	0.066
Standing	250	187 (74.8%)				
Details of work experience in garment industry						
≥ 5 years	119	110 (92.4%)	5.021	2.419 - 10.420	21.870	0.000
<5 years	261	185 (70.9%)				
Exposure to musculoskeletal load						
Action level 3	63	57 (90.5%)	12.893	4.343 - 38.279	25.963	0.000
Action level 2	284	224 (78.9%)	5.067	2.401 - 10.692	20.992	0.000
Action level 1	33	14 (42.4%)				
Tobacco use						
Yes	110	90 (81.8%)	1.427	0.816 - 2.496	1.563	0.211
No	270	205 (76%)				