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IDENTIFICATION OF RISK FACTORS IN MUSCULOSKELETAL DISORDERS IN WORKERS IN AN INDUSTRY IN AHMEDNAGAR DISTRICT, MAHARASHTRA

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ABSTRACT

Introduction: The workers in industrial sector are affected by Musculoskeletal disorders, which is a very important occupational hazard. The present study was undertaken to identify risk factors related to musculoskeletal disorders in workers of Larsen and Tubro Ltd. (Automation & Electrical) industry at Ahmednagar. **Methodology:** This cross sectional observational study was carried out in 60 workers of the Adon Block department workers of Larsen & Toubro (Electrical & Automation) Industry, Ahmednagar. Ethical clearance was obtained from Institutional ethical committee, PDVVPF College of Physiotherapy. Written Informed consent was taken from all the participants. Pre structured occupational Performa was filled by asking questions in worker's local language. The Nordic pain Questionnaire was filled by asking the subjects to mark the sites of pain on body chart paper. The risk factors for work related musculoskeletal problems were assessed by working posture of workers and repetitive movements in industrial set up. **Results:** In the present study, 60 workers were selected, of which number of females were 39 (65%) while males were 21 (35%). The Neck (20.2%) followed by shoulder (14.9%), elbow (14.4%) and knee (14.4%) were most commonly involved. There was statistically significant variation in the number of workers involved according to the posture (sitting vs standing) and part of MSK system involved. **Conclusion:** The WMSD's are common in Larsen & Toubro Company's Adon block department workers. The posture of the workers is directly correlated with part of Musculoskeletal system involved. The musculoskeletal disorder affects workers irrespective of gender and duration of disorder.

KEYWORDS: Musculoskeletal disorders, occupational hazard.

INTRODUCTION

''Musculoskeletal disorders'' include a wide range of inflammatory and degenerative conditions affecting the muscles, tendons, ligaments, joints, peripheral nerves, and supporting blood vessels. Musculoskeletal disorders (MSDs) are widespread in many countries, with substantial costs and impact on quality of life.[1]

MSDs occur in certain industries and occupations with rates up to three or four times higher than the overall frequency. High-risk sectors include nursing facilities; air transportation; mining; food processing; leather tanning; and heavy and light manufacturing (vehicles, furniture, appliances, electrical and electronic products, textiles, apparel and shoes).[2]

High-risk sectors include nursing facilities; air transportation; mining; food processing; leather tanning; and heavy and light manufacturing (vehicles, furniture, appliances, electrical and electronic products, textiles, apparel and shoes).[3]

Workers in many different industries and occupations can be exposed to risk factors at work, such as lifting heavy items, bending, reaching overhead, pushing and pulling heavy loads, working in awkward body postures and performing the same or similar tasks repetitively. Exposure to these known risk factors for MSDs increases a worker's risk of injury.[4]

Upper extremity musculoskeletal disorders are also highly prevalent in manual-intensive occupations, such as clerical work, postal service, cleaning, industrial inspection and packaging.[5,6] Back and lower limb disorders occur disproportionately among truck drivers, warehouse workers, airplane baggage handlers, construction trades, nurses, nursing aides and other patient-care workers, and operators of cranes and other large vehicles.[7,8] MSDs are the single largest category of work-related illness, representing a third or more of all registered occupational diseases in the United States and Japan.[7,9,10]

MSK disorders cause pain, loss of physical function, and decline in mental health, all of which adversely affect a person's ability to pursue gainful employment.[11,12,13]

The Standardized Nordic Musculoskeletal Questionnaire has been used extensively for a wide range of occupational groups to evaluate WMSDs problems in various industries.[15] Therefore this study was undertaken to identify risk factors related to musculoskeletal disorders in workers of Larsen and Tubro Ltd. (Automation & Electrical) industry at Ahmednagar.

MATERIALS AND METHODOLOGY

The present study was a descriptive cross sectional study undertaken in the workers of Larsen & Toubro Industry, Ahmednagar. The study was carried out during the period of October 2013 to January 2014. A total of 60 workers were selected from the workers by simple randomized sampling.

Ethical clearance was obtained from Institutional ethical committee, PDVVPF College of Physiotherapy.

The workers were subjected to inclusion and exclusion criteria before involving them in the study. Permanent workers of both gender of the age group between 21-60 years, willing to participate in the study were included in the study. Workers with previous history of trauma or surgery, congenital deformity and those suffering from systemic illness like rheumatoid arthritis were excluded from the study.

Written Informed consent was taken from all the participants. Pre structured occupational Performa was filled by asking questions in worker's local language. The Nordic pain Questionnaire was filled by asking the subjects to mark the sites of pain on body chart paper. The risk factors for work related musculoskeletal problems were assessed by working posture of workers and repetitive movements in industrial set up. The data collected were interpreted and analyzed.

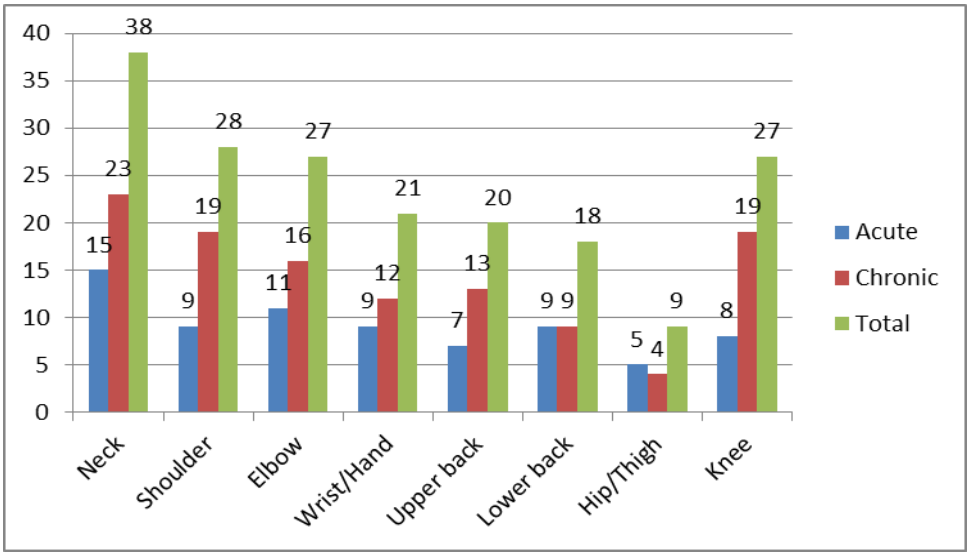
RESULTS

Table no. 1: Working postures of workers according to gender.

	Females	Males	Total
Sitting	29	7	36
Standing	10	14	24
Total	39	21	60

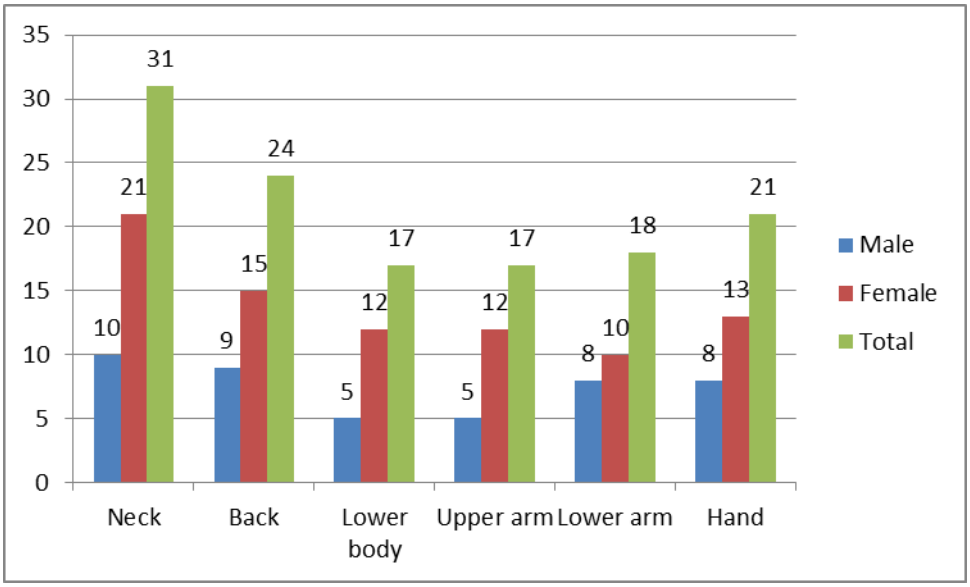
P= 0.005, Fisher's Exact Test.

The number of females and males included in the study were 39 (65%) and 21 (35%), respectively. Table no.1 shows working posture of workers, in that 40% workers were working in standing posture & 60% workers were working in sitting posture. There was statistically significant difference between the working postures among males and females.



Graph no. 1: Distribution of MSK according to duration and part of the MSK system involved.

Graph no. 1 displays distribution of MSK according to duration and part of the body involved. The Neck (20.2%) followed by shoulder (14.9%), elbow (14.4%) and knee (14.4%) were most commonly involved. There was no statistical difference between distribution of duration of disease (acute vs chronic) and part of musculoskeletal system involved (P= 0.80, Chi-squared Test for Independence).



Graph no. 2: Distribution of workers according to Awkward posture.

Graph no. 2 shows Distribution of workers according to Awkward posture while working, in which most predominant was neck (24.2%) followed by back (18.8%), hands (16.4%). There was no statistically significant difference between the gender of the workers and the part of MSK system involved (P= 0.92, Chi-squared Test for Independence).

Table no. 2 displays distribution of MSK disorders according to work Repetitions in workers. The number of occasional (43.3%) repetitions were more as compared to repetitions done rarely (33.3%) and often (23.3%). There was no statistically significant difference between the repetitions and gender of workers.

Table no. 2: Distribution of MSK disorders according to work Repetitions in workers.

	Repetition		
	Male	**Female**	**Total**
Rarely	8	12	20
Occasionally	8	18	26
Often	5	9	14
Total	19	39	60

P= 0.80, Chi-squared Test for Independence.

Table no. 3: Distribution of workers according to their posture while working and part of MSK system involved.

	Sitting	**Standing**	**Total**
Neck	24	14	38
Shoulder	21	7	28
Elbow	11	16	27
Wrist/Hand	16	5	21
Upper back	7	13	20
Lower back	12	6	18
Hip/Thigh	4	5	9
Knee	10	17	27

P= 0.0062, Chi-squared Test for Independence Sitting vs Standing.

On comparing the workers according to their posture while working and part of MSK system involved (Table no. 3), statistically significant difference was observed. This implies that the involvement of a part of a MSK system is related to the posture acquired by workers.

DISCUSSION

The present study was aimed to find presence of the risk factors in Larsen and turbo industry workers.

Among the 60 workers included in the study, the number of males was less as compared to females. Among the males, more workers worked in standing position as compared to females (Table no. 1). The Neck (20.2%) followed by shoulder (14.9%), elbow (14.4%) and knee (14.4%) were most commonly involved. However, when the distribution of MSD was compared with respect to gender and awkward posture, no statistically significant difference could be observed (P= 0.92, Chi-squared Test

for Independence). This implies that the MSD was directly correlated to the awkward posture, irrespective of gender of workers.

On comparing the duration of disease and involvement of MSD, there was no statistically significant difference observed. This might be because the symptoms of MSD develop uniformly in all parts of musculoskeletal systems irrespective of the duration of exposure to awkward posture. These awkward postures places high demands on musculoskeletal system which is consistent with daily work and results in musculoskeletal disorders.

In the present study, the number of workers doing occasional repetitive work was more common as compared to those doing repetitive work more often or rarely. There was no difference seen among the workers with respect to frequency of work. This might be due to a small sample size. On comparing the posture of work with the involvement of MSK system, statistically significant difference was seen. Therefore, neck, shoulder, lower back and wrist/hand were commonly involved in workers working in sitting position. Similarly, elbow, upper back and knee were more commonly affected in standing position.

Poorly designed workstation promotes unnecessary physical efforts, which reduces efficiency and productivity also. Sustaining any static posture, such as sitting, increases the demand on the muscles, ligaments, and other soft tissues of the musculoskeletal system. It is not surprising then that overall discomfort and pain in the back, neck, and shoulders are common symptoms reported by workers who sit for most of their workday. Sitting alters the normal curvature of the spine and puts pressure on the discs. With prolonged sitting this pressure can cause compression of the discs. These resulting chronic back pain and possible nerve damage causes impact on workers ability.[15]

Similar studies done by Roquelaure *et al*. On clinical diagnosis and epidemiological study of the musculoskeletal disorders of the upper extremities among a sample of employees in France, and reported that the prevalence rate of musculoskeletal disorders of the upper extremities among male employees in steel manufacturing was 14.8%, which was the second highest following automobile manufacturing (20.0%).[14] Moussavi-Najarkola *et al*. examined the upper extremities in terms of musculoskeletal symptoms and diseases among the employees of a steel company in Tehran who were exposed to high force exertion, repetition, and awkward postures, using a standardized Nordic Musculoskeletal Questionnaire and clinical examinations. According to their results, the symptom prevalence was 66–88% and disease prevalence was 5.4–18.7%.[16] There is a report that employees with repetitive tasks, such as those found in automobile manufacturing or assembly of electronic components, have symptoms in the neck and shoulder area most frequently, followed by symptoms in the wrist and hand, and elbow and arm. However, the symptom prevalence differs across many studies, according to the evaluation method and case definition of subjective symptoms.[17,18,29]

Performing the same task repeatedly was related to the presence of symptoms in many areas and calls into question the wisdom of practicing in such a way. Concepts such as job rotation and variety in work are commonly applied in industry to avoid overloading any particular anatomical area, either by sustained posture or repetitive actions. Repeated muscle contractions and static loading are known to be risk factors in the development of cumulative trauma disorders and this could be the major reason in the participants of present study to have a high prevalence of work related musculoskeletal disorders.

CONCLUSION

The Work related MSD's are common in Larsen & Toubro company's Adon block department workers. The posture of the workers is directly correlated with part of Musculoskeletal system involved. The MSD affects workers irrespective of gender and duration of disorder.

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