

Prevalence of Work-Related Musculoskeletal Disorders and Its Risk Factors Among Factory Worker in Jain Irrigation System, Jalgoan

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DOI: <https://doi.org/10.52403/ijhsr.20231131>

ABSTRACT

Aim: To find out prevalence of musculoskeletal disorders in irrigation factory workers.

Background: Factory workers are at risk of developing WRMSDs as their job repeatedly involves elevation of arms, lifting heavy loads, pushing and pulling, trunk bending and twisting.

Procedure: This cross-sectional study was conducted on 400 factory workers of age group 18-50 fitting in inclusion criteria. They were recruited using convenient sampling method and were assessed with the Nordic Questionnaire.

Results: The findings from this study also revealed that 31% of the subjects had experienced MSDs over the last 12 months.

Conclusion: The study showed a high prevalence of discomfort in Lower back, Neck followed by Shoulder, Wrist. The factory workers participate in this Study were found to have high level of MSDs.

Keywords: factory workers, NORDIC Questionnaire, risk factors,

INTRODUCTION

Work-related musculoskeletal disorders (WRMSDs) are defined as “impairments of bodily structures such as muscles, joints, tendons, ligaments, nerves, bones or a localized blood circulation system that are caused or aggravated primarily by the performance of work and by the effects of the immediate environment where the work is carried out”.^[2] High- or low-intensity loads cumulatively, over a prolonged period and repeated exposure will result in most of the WRMSDs.^[2] Thus WRMSDs are known to lead to reduced productivity, sickness, absence, lower quality of life, and chronic occupational disability.^[3] Musculoskeletal disorders (MSDs) continue to be the main reason associated with people with a work-

related illness. Musculoskeletal disorders (MSDs) represent one of the leading causes of occupational injury and disability in the industrially developed and developing countries.^[3]

As we know, static work attitude potentially accelerates the onset of fatigue and pain in muscles involved. If these conditions take place every day and for a long time (chronic) pain can cause permanent damage to the muscles, joints, tendons, ligaments and other tissues. In addition, working with pain can reduce the productivity and efficiency of work and when working with this pain is continued then it will result in a disability, which ultimately eliminates the job for the worker.^[5]

The economic loss due to such disorders affects not only the individual but also the organization and the society as a whole^[5]. At the present time, MSDs are one of the most important problems ergonomists encounter in work places around the world.^[5]

Its yu et al have reported the frequency of occurrence of work-related injuries and musculoskeletal disorders among factory workers in Shenzhen, China. Among all participants, workers, 8.3% reported acute traumatic injuries in the previous 12 month. In many countries, the prevention of MSDs among the workforce is considered a national priority.^[6] In industrially developing countries (IDCs), the problems of workplace injuries are extremely serious.

The Nordic Musculoskeletal Questionnaire (NMQ) was developed by Kuorinka et al. in 1987. It is an easy, well-defined questionnaire comprising a body map describing nine functional sites revealing both sides' upper limbs, lower limbs, upper back, and lower back. It incorporates questions on symptoms felt by the individuals in the previous 12 months and the past seven days, along with constraints in activity levels in the previous 12 months. The responses to these questions are documented. NMQ can be administered either by a conversation method or can be self-administered.^[12]

Esen et al^[5] have reported that 30% of MSDs identified in the world are due to work conditions, with risk factors stated as static working postures, twisting movements, speed of work, force involved, monotony, vibrations, mental pressures and lack of support. These are further influenced by the layout of the work area and loads being handled.^[7]

Work related musculoskeletal disorders are the one of the most important health threats affecting factory employees and it is the common cause of diminish work capability of various worker. For that it is necessary to find out the risk factors of causing musculoskeletal discomfort among factory workers to reduce efficiency of work. It is also necessary to evaluate the prevalence of

musculoskeletal discomforts in different anatomical body parts.^[6]

This study helps to enhance proper intervention to prevent exposure to musculoskeletal discomfort such as ergonomic intervention in their working environment. And to make person aware of being physically active in order to minimize their health problems i.e., musculoskeletal discomfort. It also helps to ensure job efficiency and quality of life among factory workers. Thus, there is need to study the prevalence of work-related musculoskeletal disorders and its risk factors among factory workers in Jain Irrigation, Jalgaon.

To our best knowledge no other study has been conducted on musculoskeletal disorders in factory workers in Jain irrigation. Therefore, this study is aimed to assess MSDs in factory workers.

MATERIALS & METHODS

MATERIALS

Pen, Paper, Informed consent form, NORDIC Questionnaire.

METHODOLOGY

- Sample size- 400
- Study Design – Cross- sectional Study
- Study Type – An observational study.
- Sampling Method – Convenient sampling method
- Study population – Factory Workers.
- Study setting – Jain Irrigation System.

Inclusion criteria

1. Factory workers age between 20-50 years
2. Both male and female worker
3. Workers who are working since >1 year.

Exclusion criteria

1. Subject who will not be willing to take part
2. Congenital Postural deformity
3. Recent injury/trauma
4. Neuromuscular discomfort
5. Spinal surgery
6. Pregnancy

Outcome measures

1. Nordic Musculoskeletal Questionnaire (ICC = 0.9)^[12]

PROCEDURE

To conduct the study Permission from Institutional ethical committee & concerned factory was taken. The Subjects were selected according to the inclusion and exclusion criteria by Convenient sampling Technique. Prior to starting the study procedure was thoroughly explained to the subjects & informed consent were taken. Earlier the demographic data of each and

every individual were taken & Nordic questionnaire were evaluated for the prevalence of musculoskeletal dysfunction.

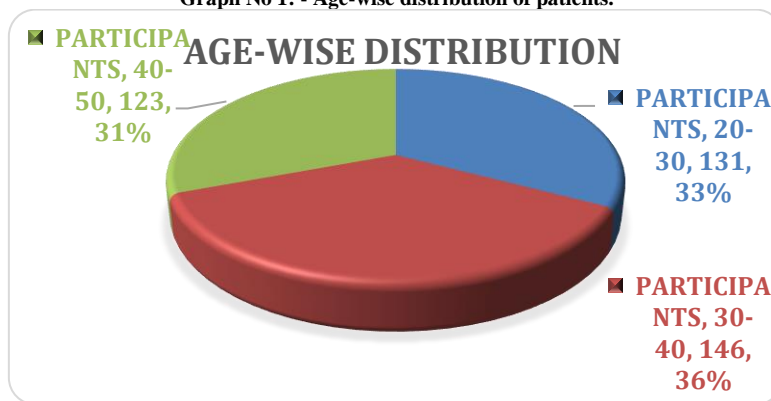
DATA ANALYSIS

Data was entered in excel spreadsheet, tabulated and subjected to statistical analysis. Data was analysed by using Graph pad InStat, checking the prevalence of pain and disability in factory workers in Jain irrigation system, Jalgoan.

Table No 1: - Age-wise distribution of patients.

AGE	PARTICIPANTS
20-30	131
30-40	146
40-50	123

Graph No 1: - Age-wise distribution of patients.

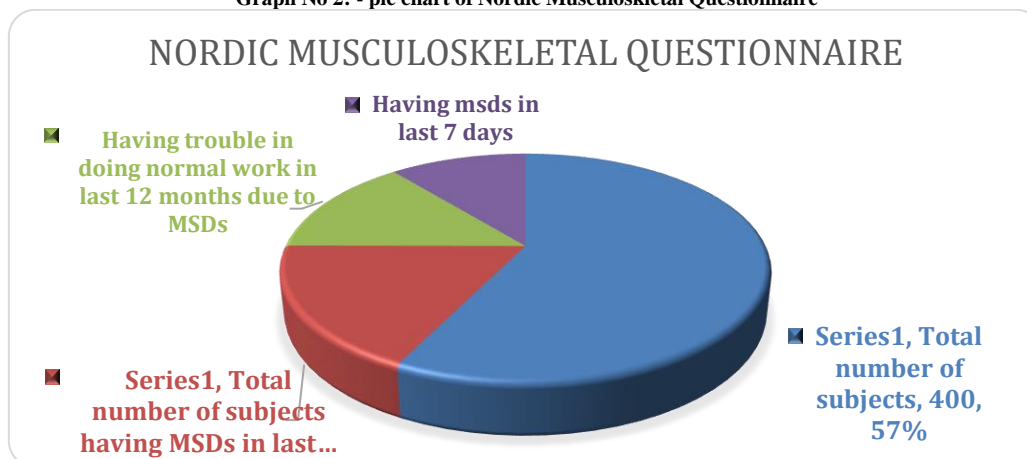


Comment: - The table and graph no 1 show age-wise distribution of male and female of which 131 patients were from age group 20-30 years old, 146 patients were from 30–40-year-old and 123 patients were from 40-50 years old.

Table no 2: - Musculoskeletal Dysfunction Among Factory Workers

Total number of subjects	Total number of subjects having MSDs in last 12 month	Having trouble in doing normal work in last 12 months due to MSDs	Having MSDs in last 7 days
400	124	8	76

Graph No 2: - pie chart of Nordic Musculoskeletal Questionnaire

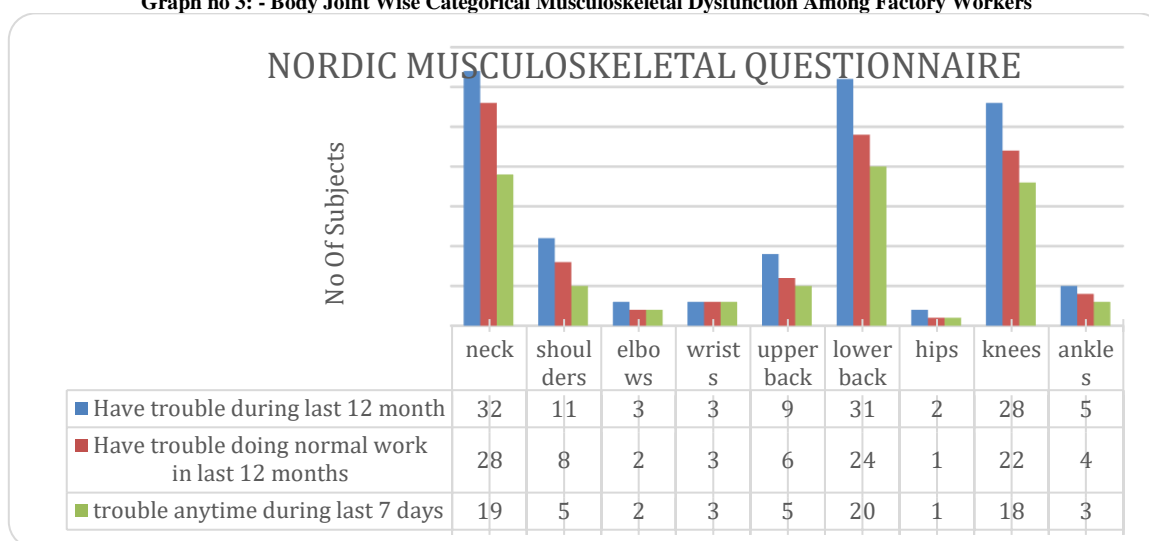


Comment: - The Pie Diagram show the total number of subjects evaluated and number of subjects having MSDs since last 12 month, who have trouble in doing normal work in last 12 month and having MSDs in last 7 days.

Table no 3: -Body Joint Wise Categorical Musculoskeletal Dysfunction Among Factory Workers

Joint Wise Categorical Musculoskeletal Dysfunction	Total number of subjects having MSDs in last 12 month	Having trouble in doing normal work in last 12 months due to MSDs	Having MSDs in last 7 days
NECK	31	28	19
SHOULDER	11	8	5
ELBOW	3	2	2
WRIST	3	3	3
UPPER BACK	9	6	5
LOWER BACK	32	24	20
HIPS	2	1	1
KNEES	28	22	18
ANKLES	5	4	3

Graph no 3: - Body Joint Wise Categorical Musculoskeletal Dysfunction Among Factory Workers



Comment: The table no 3 and graph no 3 shows total number of subjects having MSDs in last 12 months and 7 days.

RESULT

A total 400 participants responded to the survey. The highest prevalence rate of MSDs was in the lower back (25%), neck (25.8%) and shoulder (8.8%) and the lowest prevalence rate of MSDs was in elbows (2.4%) and wrist (2.4%). The findings from this study also revealed that 31 % of the subjects had experienced MSDs over the last 12 months. Table presents the results of the Nordic questionnaire.

DISCUSSION

The primary aims of this cross-sectional study was to determine the prevalence of musculoskeletal discomfort in factory workers and its association to some risk

factors in factory workers in Jain Irrigation System, Jalgoan. An awkward posture is another risk factor influencing the occurrences of WRMSDs among Factory worker in this study. This finding is in line with the study done in India showed that working in bad posture was the predictive factor for WRMSDs 40 As it is commonly known, maintaining poor posture for prolonged periods of time can result in chronic muscular fatigue, discomfort or pain. More significantly, prolonged exposure to high static muscle and joint load may lead the soft tissue to adaptively change, and with time may lead to pathological effect and permanent disability. The results of the current study showed that these computer workers had both a high level of MSDs as well as high ergonomic risks.

In this study, 31% of employees experienced MSDs at least in one extremity due to poor

posture imposed by their workstation conditions. Studies revealed that awkward posture leads to the development of musculoskeletal discomforts. In the present study, lower back was most frequently reported whereas 25.8% (n= 32) of the subjects had experience such problem in the past 12 month and 25% (n=31) of subject's complaint of neck pain. This may be due to repetitive extension and rotation stress in lumbar spine might potentially contribute to specific low back pain by spondylolysis. This 12- month prevalence value for back pain 36% corresponds closely to the findings of previous studies which reported that annual prevalence of back pain was measured as 72.4% (Fariborz et al., 2018).

Further the reported prevalence rate of neck pain in present study was considerably higher than the 38.6% value found by (Rajinder et al., 2015). The continue movements of flexion or rotation of the cervical spine can direct to discomfort in the neck and shoulders. At the level of the neck and in the trapezius muscle region, it is known that there is a positive relationship between the flexion of the neck and discomfort in this region as well as in the lumbar spine, whose combined movement of flexion and rotation of the trunk and forced movements are related to the presence of discomfort.

The prolong flexion of lower cervical region in the factory workers may lead to the forward head posture which may further lead to complication of thoracic kyphosis. This may cause the painful shortening of the muscles of the neck as well as compression of cervical vertebrae which may increase the compressive loading on tissues in the cervical spine, particularly the facet joint and ligaments. In the posterior cervical muscles there is stretching and weakness of semispinalis cervicis and over-action with ultimate shortening of semispinalis capitis. Occupations involving physical loading, lifting, carrying, pushing, pulling, manual handling in awkward positions, bending, stooping, stretching, twisting, reaching activities or being in one position for prolong time have been implicated in the casual pathway of the osteoarthritis at various

joints. Several factors influence the loads on the spine during these activities are position of the object relative to the center of motion in the spine, the size, shape, weight and density of object and lastly the degree of flexion or rotation of the spine

Therefore, employees' postures at their workstations needed to be investigated and some changes were required immediately. It is essential that ergonomic programs and workstation exercises for the computer workers in the study population be put into action immediately and medical treatment for those with high symptomatic and risk levels be provided. Our suggestions for future studies include association of different examination of risk assessment, demographic data and musculoskeletal discomfort. To obtain more accurate results, we recommend using combination of method (Pen paper observational method as well videotaping observational method) for posture analysis. We can also correlate other risk factors with musculoskeletal discomfort.

CONCLUSION

This study concluded that the factory workers are having pain and trouble during normal work with a prevalence rate of 31% with severe trouble in their low back (25.8%) and neck (25%).

Declaration by Authors

Acknowledgement: None

Conflict of Interest: None

Source of Funding: YES (Funding was received from Jain Irrigation System)

Ethical Approval: Study was approved by Institutional Ethical Committee of DUPCOP, Jalgoan

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How to cite this article: Divya Suraj Patil, Jaywant Nagulkar, Mukesh Shinde, Pradnya Mahajan. Prevalence of work-related musculoskeletal disorders and its risk factors among factory worker in Jain irrigation system, Jalgoan. *Int J Health Sci Res.* 2023; 13(11):262-267. DOI: [10.52403/ijhsr.20231131](https://doi.org/10.52403/ijhsr.20231131)
