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Work-Related Musculoskeletal Disorders Among Shop Floor Industry Workers in Hingna, Nagpur

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Abstract

Work related musculoskeletal problems have gained major popularity from the last twenty to thirty years. Every individual works for good earning. When we talk about production-based industries they work on a time management basis and target oriented production each day. A working definition of fatigue is "inability to function at one's optimum level, because physical and mental exertion [of all walking activities, not only work] exceeds existing capacity. Many factors contribute to fatigue like Intensity and duration of work, and inadequate sleep that is required to recover. Studies show that fatigue and WMSDs have an interactive effect. Prevention of WMSDs can be done by recognizing the most important individual and excluding the causative factors from the workplace. Nordic musculoskeletal questionnaire [NMQ] is the most popular questionnaire used to evaluate WMSDs. [7].This study is conducted to check the prevalence of work-related musculoskeletal disorders among the shop floor industry workers in Nagpur. WMSDs reduce productivity at work and contribute to sick leave, accounting for approximately 34% of time lost in a year. The purpose of this study was to know the prevalence of work-related musculoskeletal disorders. Methodology: An observational study with a cross-sectional study design was carried out at tractor manufacturing unit among 260 shop floor workers for six months which included shop floor workers from 18 to 40 years, not on a probation period, and having fracture Recent trauma, Unwilling employee, An employee has medical conditions.

Conclusion: This study concludes that after data collection, 79.9% workers have experienced musculoskeletal discomfort in the past 12 months. Low back pain was found to be the highest symptom followed by knees, ankle/feet and neck. The results show that repetitive task is associated with prevalence of WMSD'S.

Discussion: The result is very important to help the industries in designing their work to improve workers productivity and at the same time reducing the risk of WMSDs. The result of this study will be used to further investigate the

relationship between the WMSDs risk and work productivity among workers performing industrial repetitive tasks.

Keywords: WMSD, Industry Workers, Musculoskeletal injuries.

INTRODUCTION

Work related musculoskeletal problems have gained major popularity from last twenty to thirty years. [1,2]
Every individual works for good earning. When we talk about production based industries they work on time management basis and target oriented production on each day. [1,2]
Target oriented production which is a need of time means every worker in that company has to work without wasting a minute.[1,3] Individual working in production based automobile industry may be at a risk of musculoskeletal injuries.[1,2]. Musculoskeletal disorders are common painful disorders affecting structures of body like bones, muscles, nerves, tendon and other soft tissues.[1,2,3]. WMSDs may be visible days, months or years after exposure to workplace risk factors.[2,3]
WMSDs result in loss of productivity at work and contribute to sickness absence. [2,7]. Risk factors for WMSDs include heavy physical work, forceful overexertion, awkward and sustained postures, repetitive movement, vibrations, work environment and psychosocial factors.[1,3]. Previous studies have stated that there is an association between WMSDs and fatigue.[4,7]. Fatigue is defined by AMA code as "tiredness that can result from physical or mental exertion".[4]. Working definition of fatigue is "inability to function at one's optimum level, because physical and mental exertion [of all waking activities, not only work] exceeds existing capacity.[4]. Many factors contribute to fatigue:Intensity and duration of work, Inadequate sleep that is required to recover.
This has a cumulative and dose dependent effect. Disturbance in the circadian cycle due to working at inappropriate times.[4]. Depending upon individual's coping strategies too much workload may result in increased neurophysiological activity level which may be associated with additional exerted effort during work.[5]. Neurophysiological system of humans is very adaptive to extreme situations which makes it possible for us to perform almost any task. However due to repeated insufficient recovery, cumulative fatigue is invoked, which leads to subjective complaints and health deterioration on long term.[5] Everyday fatigue may not be a worrying concept, but prolonged fatigue as a complaint or symptom is thought to play a major role in aetiology of work related overload.[5] Studies show that fatigue and WMSDs have an interactive effect. Some studies have found that subscales of fatigue i.e. degree and severity and distress that it causes, degree of interference with activities of daily living and timing of fatigue can influence development of WMSDs.[4]
Prevention of WMSDs can be done by recognising the most important individual and excluding the causative factors from the workplace.[4]
Nordic musculoskeletal questionnaire [NMQ] is the most popular questionnaire used to evaluate the WMSDs. It is a reliable and valid instrument to be used for assessment of WMSDs in Industrial workers. It is a self report instrument. It examines MSDs in different body regions among workers. [6]. Multidimensional Checklist individual strength questionnaire [CIS] is used for measuring fatigue in working populations. It measures several aspects of fatigue. It consists of four dimensions: the subjective experience of fatigue and reduction in motivation, reduction in activity, and reduction in concentration. [7]. this study was conducted with an aim to study the work related musculoskeletal disorders in Shop floor Industry workers.Knowing the prevalence of work related musculoskeletal disorder and work related fatigue was the main objective of the study along with the determination of risk factor for the same.
The objective were achieved by conducting a Observational study with the cross section of the population of the workers (Sample size:260) working in a tractor manufacturing industry within the duration of 6months using Nordic musculoskeletal questionnaire [NMQ] & Multidimensional Checklist individual strength questionnaire [CIS]. Workers between age group 18-40 years working in the production area and those who are not in probation period were included. Wereas workers those who are unwilling to participate in the study, workers having recent fractures or injuries were excluded.
A study was conducted on shop floor industry workers of Nagpur, permission from ethical committee was taken followed by initiation of the study. Then permission from E R and D head of industry was taken and date and time were fixed according to the availability of the workers.The aim and procedure of study was explained to the workers followed by signing of the consent form.
Then interview questionnaire sheets were distributed and explained and doubts were asked and resolved. After the

questionnaire sheets were filled they were collected. Total 270 questionnaire were filled. Data analysis was done and interpretation of the result was done.

STATISTICAL ANALYSIS

Statistical analysis was done by using Microsoft version 2019 and software used in the analysis was SPSS version 24.0

RESULT

Average Age of the patients in the study = 42.6

Table 1: Age wise distribution of patients

Age in years	**20-30 Years**	**30 - 40 Years**	**40 - 50 Years**	**50 - 60 Years**
Number of Patients	56	48	78	78
	21.53% of patients	18.46% of patients	30 % of patients	30 % of patients

Table 2: Gender wise distribution of patients in the study

Male	**Female**
253	7

Table 3: CIS questionnaire Data Analysis

1. Average CIS Score in each age group

Age Group	**20 30 Years**	**30 - 40 Years**	**40 - 50 Years**	**50 - 60 Years**
Subjective feeling of Fatigue	14.27	14.29	14.28	14.39
Concentration	7.81	7.88	7.82	7.88
Motivation	7.18	7.12	7.21	7.23
Physical Activity	3	4.76	4.74	4.73

Table 4: Average of Total CIS score in each Age group

	Average of Total CIS score in each Age group
20 30 Years	34.01
30 - 40 Years	34.07
40 - 50 Years	34.06
50 - 60 Years	34.25

Table 5: Acute vs Chronic MSK Disorder Comparison

	Distribution of MSK disorders according to duration and part of MSK system involved							
	Acute				Chronic			
	Male	Female	Total	percentage	Male	Female	Total	Percentage
NECK	30	0	30	11.1	44	2	46	17.03
SHOULDER	24	0	24	8.8	39	2	41	15.1
ELBOWS	23	0	23	8.51	42	0	42	15.5
WRIST/HAND	10	0	10	3.7	18	0	18	6.66
UPPER BACK	6	0	6	2.22	9	0	9	3.33
LOW BACK	58	0	58	21.4	73	1	74	27.4
HIPS/THIGHS	26	0	26	9.62	34	0	34	12.5
KNEES	51	0	51	18.88	63	2	63	23.3
ANKLES/FEET	38	2	40	14.8	49	3	49	18.1

DISCUSSION

The study was conducted on shop floor industry workers in hingna and statistical analysis showed the overall prevalence of musculoskeletal disorders among the workers for the last 12 months was at a high rate with 79.9% experience pain or symptoms on any body part. The symptoms that were seen in the workers are work related and the prevalence may increase overtime due to continuous exposure. Low back pain was found to be the highest symptom followed by knees, ankle/feet and neck. The workers involved in this study perform industrial repetitive task hence the associated symptoms were seen. The risk factors included years of experience, age, static posture, repetitive movements, workplace environment, etc.

The symptoms of low back, knee, ankle/feet and neck pain is significantly related to work under short cycle time high job demand and high production volume.

Work pace is also associated with the frequency of repetitive movements and lead to the risk of developing MSDs (Andersen et al., 2003). In a repetitive task, the work-pace is usually not self-chosen, and the worker must follow a predetermined pace (Sundelin & Hagberg, 1992).

With a higher work pace, levels of muscle activity are also higher and it produces a sign of muscle fatigue and MSDs risks (Selen et al., 2006; Visser, 2004). Muscle fatigue is a stage which the muscle is not able to sustain the required force or work output level (Ma et al., 2008). Muscle fatigue is one of the main reasons causing WMSDs in the industry. The accumulation of muscle fatigue will cause functional disability and resulted as musculoskeletal disorders (Ma et al., 2009). The WMSDs problem will affect productivity because workers are not only injured when they are fatigued but they also tend to slow down (Resnick and Zanotti, 1997). A general increase in the number of musculoskeletal disorder cases was associated with the decreased of work activity (Waters, 2004). The workers experienced pain or discomfort due to musculoskeletal disorders and still at work at a reduced capacity may reduce work productivity. The WMSDs problems result in low worker productivity (Xu et al., 2012). Workers‘ productivity is an important variable in the discussion of WMSDs in the manufacturing industries. It has been used as a common subject for examination in the various studies on the musculoskeletal disorders affecting workers (Beaton & Kennedy, 2005; Hagberg et al., 2002; Lotters et al., 2005; Pransky et al., 2002).

However, there is a lack of data linking workers‘ productivity with the reduction of WMSDs risk. The specific relationship between muscle fatigue development (one of the main reasons for WMSDs) and workers‘ productivity is also vague. Therefore, there is a need to investigate the relationship between the risk of WMSDs and discomfort, associated with muscle fatigue and workers‘ productivity. The result is very important to help the industries in designing their work to improve workers‘ productivity and at the same time reducing the risk of WMSDs. The result of this study will be used to further investigate the relationship between the WMSDs risk and work productivity among workers performing industrial repetitive tasks.

The result of this study is found consistent with Hussain (2004). He found that 79% of assembly workers experience MSDs pain or symptoms on any body part.

CONCLUSION

This study concludes that after data collection, 79.9% workers have experienced musculoskeletal discomfort in the past 12 months. Low back pain was found to be the highest symptom followed by knees, ankle/feet and neck. The results show that repetitive task is associated with prevalence of WMSD’S.

It can be concluded that the prevalence of WMSDs among workers performing industrial repetitive task in the automotive manufacturing companies occur at a high rate. The WMSDs problem may reduce workers' performance. The workers are present at work but functionally limited due to work-related musculoskeletal disorders (WMSDs).

LIMITATION

- Only the workers of single industry were involved.
- Sample size wasn’t equal for males and females.
- Smaller sample size.
- Correlation between fatigue and WMSD’s.

FUTURE SCOPE

- Workers from other automobile industries can be included.
- Correlation between fatigue and WMSD's.
- Investigation of relationship of WMSD's risk on workers productivity.

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