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Physical Therapy Approach to Analyze Job and Ergonomic Risk Factor Among Petrol Pump Workers

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ABSTRACT

Introduction: Based on existing knowledge and theory of the biomechanics and epidemiology of distal and upper extremity disorders, a semi-quantitative job analysis methodology was developed. The petrol pump workers who have the repetitive activity of upper limb by holding and keeping the nozzle at the petrol pump station. This repetitive activity increases the tension on the muscles, ligaments, and other soft tissues of the musculoskeletal system. This activity is carried out in standing posture.

Objective: The purpose of the present study is to know the prevalence of upper limb deformity in petrol pump workers.

Methods: Samples were assessed using Rapid Upper Limb Assessment (RULA) tool.

Results: 60% of the population were found to be under medium risk, 14% of the population had a higher risk of developing a deformity and 26% had negligible or at low risk.

Conclusion: Proper ergonomic care must be undertaken in the high-risk category and appropriate ergonomic advice should be given to the workers to prevent them from becoming vulnerable to upper limb deformities.

Key Words: Petrol pump workers, Upperlimb disorder, Musculoskeletal disorder

INTRODUCTION

Human factors and ergonomics are concerned with the “fit” between the user, equipment and environment or “fitting a job to a person”. Musculoskeletal disorders are the injuries that affect the human body’s movement or musculoskeletal system (muscle, tendon, ligament, nerve, discs, blood vessel).^{1,2} Poorly designed workplace promotes reduced efficiency and productivity as well.

The improper posture of upper extremity while working can cause excessive stress on the arm, forearm and wrist. The risk factors include working with arms above shoulder level and other awkward postures such as trunk flexed laterally, hand-arm vibrations, repetitive movements, pushing and pulling and carrying loads supported by the shoulder.³ All over India nearly 55,000 retail outlets of petrol bunks are working and have 15 lakhs employees, directly and indirectly, involved in this industry. As they are exposed to repetitive activities of upper extremity the purpose of this study is to address and to find out the prevalence of upper limb musculoskeletal disorder among petrol pump workers.

MATERIAL AND METHODS

The subjects were chosen based on inclusion and exclusion criteria and a consent form was given to the participants. The entire method was explained to the subjects before the beginning of the assessment and demographic data was collected. Subjects were selected from various work cycles according to longer work period and higher workload. Around 100 samples were assessed using Rapid Upper Limb Assessment (RULA) tool at petrol pump stations in and around Chennai. RULASCALE is used to evaluate the exposure of workers to ergonomic risk factors associated with upper extremity musculoskeletal disorder which analyses body posture, force and repetition of job task then the scoring was evaluated.⁴ The output of the RULA assessment tool is the final RULA Score, which is a single score that represents the level of MSD risk for the job task being evaluated. The minimum RULA Score = 1, and the maximum RULA Score = 7 indicating the level of MSD risk.

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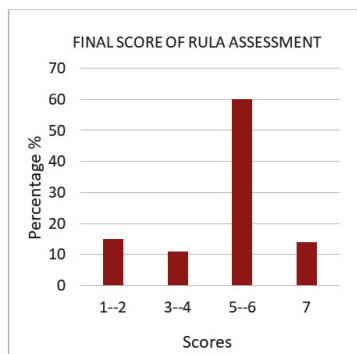
RESULTS AND DISCUSSION

Results were analyzed by using IBM SPSS version 22 software. 100 petrol pump workers were included in this study based on inclusion and exclusion criteria. This study showed that 60% of the subjects have a medium risk where the investigation is needed, 14% of them have very high risk and 26% have a low and negligible risk of upper limb musculoskeletal disorder. So the purpose of the present study is to know the prevalence of upper limb musculoskeletal disorder. Hiejn Noh et al (2013) on dentists used Strain index (SI) to measure the strain of muscles in wrist and arm in comparison to that our study did the assessment using Rapid Upper Limb Assessment (RULA) which measures the biomechanical and postural load on the whole upper limb.⁴ As of now, various researches have been done on the musculoskeletal disorder about industry and office work in which studies have only focused on shoulder pain and cardiovascular problem among petrol pump workers, hence this study focuses only upper limb musculoskeletal disorder. The objective of our study was to assess the personal and occupational factors for the onset of upper extremity disorder. After the completion of our study ergonomic advice as well as proper posture, the technique was taught to the workers to prevent the occurrence of further disorders.⁵ This study is done to evaluate the exposure of petrol pump workers to ergonomic risk factors associated with upper limb musculoskeletal disorders and thereby creating awareness among the petrol pump workers so that they can reduce the risk of the musculoskeletal disorder by opting the correct posture.

Table 1: Levels of Risk

1-2 : Negligible risk, Acceptable posture
3-4 : Low risk, Change may be needed
5-6 : Medium risk, Investigate and change soon
7 : Very high risk, Investigate and implement change

Table 2: Rural assessment



CONCLUSION

Musculoskeletal disorders play a major role in inhibiting factors among the petrol pump workers. 60% of the subjects fell under the medium risk after the assessment was done which proves that if further measures are not taken, their condition will further deteriorate. So this study concludes that with proper ergonomic advice the medium risk population can be changed to low-risk population.

Acknowledgement: None

Conflict of interest there is no conflict of interest financial disclosure for the study.

Ethical Approval At the beginning of the study, the subjects were informed in detail regarding the study and their verbal and written consents to participate were obtained. The funding source had no role in any stage of the study.

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Table 3

Final Rula Assessment Sheet					
	Fre-	Percent	Valid	Cumulative	
	quency		Percent	Percent	
Valid	1	15	15.0	15.0	15.0
	2	11	11.0	11.0	26.0
	3	60	60.0	60.0	86.0
	4	14	14.0	14.0	100.0
Total	100	100.0	100.0	100.0	