

# A Review on Work Related Musculoskeletal Disorders of the Workers Working in Different Workstations

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**Abstract:** Work is the livelihood where people get their earnings. Workers place is the environment in which he/she involves in work for longer time. Workstation is a place where work is carried out any time with the major appliances and satisfies the needs of the worker to perform the work. Workstation is the space which provides motivation to the worker to perform the work effectively. It is the direct reach of the worker and also the working fixtures at the work table. They adapt to different postures while working where continuous use of the postures lead to strain and sprain of muscles which further leads to musculoskeletal disorders. Whatever work is done with different postures lifting, holding, bending and handling materials and intensive work, workers have musculoskeletal disorders. In spite of their profession, workers experience shoulder pain, neck and upper limb, spinal symptoms, back pain, eye sight problems etc. The musculoskeletal disorder of the part of body is the result of type of posture exposed for the longer time.

**Keywords:** Work, Workers, Workstation, Posture, Musculoskeletal disorders

## 1. Introduction

A worker in an office or a factory, where people are employed need a place to work on which is known as workstation, workplace and workspace. Workplace is defined as a local area where a person or persons perform tasks for a relatively long period of time (Cushman, Weilson and Pugsley, 1983). Workplace consists of the system where information is given and the working environment. The workers work efficiency, health and safety depends on the comfort of the workstation. With an improper workstation the worker may face discomfort and which leads to the pain and musculoskeletal disorders and reduced output.

Musculoskeletal disorders (MSDs) are the major causes of work-related disabilities and lost-time illnesses and injuries and disabilities in the both developed and industrially developing countries (Pourmahabadian et al., 2005., Pourmahabadian and Azam, 2006). Work related musculoskeletal disorders are group of painful disorders of muscles, tendons and nerves. The kind of works that are hazardous and cause work related musculoskeletal disorders are floor and ground-level work, overhead work, lifting, holding, and handling materials and hand intensive work. Combined with a heavy physical workload, they result in a high frequency of work-related musculoskeletal disorders.

As early as 1968 Steidl and Bratton termed "Workplace includes several elements, which are essential to satisfy the needs of the task and the worker." These elements are the work surface, storage space and major appliance or equipment. Workstation denotes the workplace within the direct reach of the individual and includes all relevant work fixtures such as work tables, stools, chairs as well as any supply and output containers. (OSHA, 2000)

## 2. Review of Literature

Moens *et al.* (1993) explored on back pain and its correlation among workers in family care. In this study a survey among the 4,723 employees of the largest Flemish organization for family care was conducted where a self-administered questionnaire was distributed to all employees of the organization. The period prevalence (12 months) amounted to 63 per cent and the point prevalence to 18 per cent. Among the respondents suffering from back pain during the past year, 72 per cent suffered from repeated episodes of pain. The frequency of back pain was found to vary according to the regional departments to which the employees belonged.

A research study was undertaken by Cromie *et al.* (2000) on work related musculoskeletal disorders in physical therapists: prevalence, severity, risks, and responses, focused on work related musculoskeletal disorders or the injuries that were prevalent in physical therapists. In most of the young therapists studied there were the highest prevalence of work related musculoskeletal disorders and its prevalence was more. Risk factors pertaining to workload were related to a higher prevalence of neck and upper-limb symptoms and postural risk factors were related to a higher prevalence of spinal symptoms.

Arpita *et al.* (2004) studied on early signs and symptoms in computer professionals that can lead to cumulative trauma disorders, intervening with ergonomic modifications and routine exercise regime during their working hours. A questionnaire was developed which included pain assessment scale (Visual Analog Scale) and also patients were graded on Functional Assessment Scale (FAS) for 100 computer-operating professionals in their computer firms.

The result was early identification and intervention of cumulative trauma disorders with ergonomic modifications and intermittent exercises were found to decrease the pain level and hence effective in enhancing the work performance of the individuals.

A study on musculoskeletal symptoms as related to ergonomic factors in Iranian hand-woven carpet industry conducted by Choobineh *et al.* (2004) cited general guidelines for workstation design. The study identified this as an occupation where workers develop musculoskeletal disorders (MSDs) due to repetitive motions. The study identified major factors associated with MSD symptoms and developed guidelines for an ideal workstation design by collecting data randomly from 1,439 selected weavers which revealed that the prevalence of symptoms in different body regions was high. The major contributor of musculoskeletal symptoms, were the loom type, working posture, working time and seat type.

Hoy *et al.* (2005) studied on whole body vibration and posture as risk factors for low back pain among forklift truck drivers. Data collected using a validated questionnaire, was observed in respect to their sitting posture, frequency with which different positions were adopted (bending, leaning and twisting). Postural analyses were conducted using the OWAS and RULA techniques. The results showed that low back pain was more prevalent among forklift drivers than among non-drivers and driving postures in which the trunk was considerably twisted or bent forward associated with greatest risk.

Ro-Ting and Chan (2006) examined the effectiveness of workstation design on reducing musculoskeletal risk factors and symptoms among semiconductor fabrication room workers. A prospective study was conducted to follow up 40 female fab workers over three months after intervention program which focused on reducing shoulder loads for 50 per cent workers by redesigning nine workstations and for the other 50 per cent workers using original workstations. This intervention was effective in reducing the workers shoulder flexion and abduction angles which there by increased the output of the female fab workers.

Mrunalini *et al.* (2006) studied on pain and perceived exertion of farm women in water fetching activity. The different activities performed by the farm women were listed where the women adopted different posture which affects the health and safety. Potential agricultural women were listed where the women workers aged 20-40 years were selected. Data collection was done on the water fetching activity as it was ranked high as per the drudgery index score. Women experienced the task of water fetching as heavy by the rating on perceived exertion and assessed physiological load. The result was the activity was causing stress on musculoskeletal frame of women in shoulder and lumbar regions and there is an urgent requirement to design technologies to have secured health.

A study was conducted on musculoskeletal disorders among 260 visual display terminal workers: individual, ergonomic, and work organizational factors by Bergqvist *et al.* (2007). Some major factors considered and related to the individual

were age, gender, woman with children at home, use of spectacles, smoking and stomach-related stress reactions. Organizational variables of importance were opportunities for flexible rest breaks, extreme peer contacts, task flexibility, and overtime. The ergonomic variables identified were static work posture, hand position, use of lower arm support, repeated work movements, and keyboard or VDT vertical position.

Bovenzi *et al.* (2007) had thrown light on occupational musculoskeletal disorders in the neck and upper limbs of forestry workers exposed to hand-arm vibration. They studied on neck and upper limb musculoskeletal disorders of 65 forestry operators exposed to chain saw and 31 comparable control subjects (maintenance workers) performing manual activity who were not exposed to vibration. Upper limb function and vibration exposed by the workers was evaluated. Job analysis indicated a slight excess risk of upper extremity cumulative trauma disorders (CTDs) in the forestry operators when compared with the control workers because of high exposure to vibrations. These finding and the observed dose-effect relationships suggest that vibration stress was an important contributor to the development of musculoskeletal disorders in workers using hand-held vibrating tools.

Gangopadhyay *et al.* (2007) had conducted a study to find out the prevalence of upper limb musculoskeletal disorders among brass metal workers in West Bengal, India. The study revealed that the workers who were engaged in repetitive tasks with hand had influence on the work they do over a period of time. They had suffered with the discomfort at the upper extremities like the hands, wrists, fingers and shoulder region followed by a decrease in the handgrip strength and inability in grasping objects.

Kaur and Sharma (2009) studied on the work related body disorders and health hazards faced by farm women of Punjab. The study reported that work related body disorders included pain in many parts of body followed by numbness or stiffness. Some farm women felt itching and swelling in hands while working in the fields and some felt burning in abdomen and chest especially during spraying of pesticides in the fields due to inhalation. The pain or stiffness was due to the poor body postures while performing certain farm operations and lack of awareness regarding the right body postures. The study suggested that workplace and postures need to be improved to reduce the musculoskeletal disorders among farm women.

Sharan *et al.* (2010) investigated the relationship between self reported musculoskeletal symptoms and the work style in Indian computer professionals. A questionnaire survey was conducted among 4511 Indian computer professional using a musculoskeletal survey form and the short work style form. The study concluded that the work style contributed to musculoskeletal symptoms.

The work related disorders include painful disorders of muscles, tendons and nerves due to repetitive and frequent work activities. The disorders are mainly observed in arms, hands, legs and feet depending on the repetitive work activities that were done by the worker.

From the above reviews it is clear that the workers in different working in different workstations suffer with musculoskeletal disorders due to their different postures that were adopted. So a study was conducted on Ergonomic evaluation of work and workstation design of sugarcane juice vendors by Priya and Vijayalakshmi (2013). In this study sugarcane juice vendors were evaluated on the type of work they does at different workstation in different environments where different functions were performed. Majority (72%) of respondents experienced fatigue during the third quarter of the day. Mostly middle age group respondents experienced high frequency of pain in arm, lower back followed by shoulder, wrist, fingers and neck sometimes wherever work was done. The prevalence of accidents to the respondents was very less (7%). It was revealed that as frequency of pain increases then intensity of pain also increases (correlation=0.97) for the body parts like shoulder, neck, arm, wrist, lower back, fingers as they were involved in different intensities during work.

### 3. Conclusion

Thus from the review it can be concluded that workstation used by different working professionals differ depending on the equipment used by the worker to perform the work. It is essential that worker adopts a posture to have the work done effectively. The workers in different environment with different workstations suffer with musculoskeletal disorders due to their different body postures that were frequently adopted. Irrespective of the works the workers namely computer professionals, industry workers, therapists, drivers, and even homemakers, farm women etc. face the problem of musculoskeletal disorder in some part of their life time. The tasks performed repeatedly do prioritize the prevalence of musculoskeletal disorders in the worker. The workstations of different professionals were examined.

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