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Research Article

TECHNOLOGY DRIVEN MUSCULOSKELETAL DISORDER IN INDIVIDUALS USING COMPUTER

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A B S T R A C T

Background & Objective: Ergonomics is the main reason for the poor posture of the computer professional. Changes in posture is due to inappropriate ergonomics set up leading to pain in the joints like neck, shoulder etc. The worldwide trend is the daily use of computer based tasks at work as well as increased computer based leisure activities. Musculoskeletal system disorders in computer users are on increasing trend and 65 percent of them complained of neck and shoulder discomfort.
Methods: A total 30 subjects with musculoskeletal disorder in the age range of 20-40 years were assessed. Pain was evaluated by visual analogue scale and McGill questionnaire. Postural advice and exercises were taught for four weeks duration to decrease the pain and discomfort. The posture was assessed by RULA.
Result: There is an increase prevalence of musculoskeletal disorders among the computer users due to alteration in the posture. A non-significant change was obtained following the exercise regime due to limited duration.
Conclusion: Timely assessment of the posture and advise on exercises plays a key role in management of work related musculoskeletal disorders.

INTRODUCTION

The term ergonomics is derived from Greek word, 'ergon' which means work and 'nomos' which means natural law[1]. It is the scientific study which tells or describe about people and theirdaily work. International Ergonomics Association describes it as the engineering science which deals with various anatomical, physiological, psychological and engineering philosophies and their interaction with people due to MSD. A good ergonomics design not only maximizes the capability of workers by increasing productivity and job satisfaction, but it also benefits the employer by decreasing the cost for health and absenteeism. In other words, ergonomics describes as "fitting the task to the worker". Computers are now an integral part of life and no longer need specialized training for their use. In the absence of a good ergonomic design, extended work for prolonged period on computers can adversely affect not only vision, but also the muscles of neck, upper back, shoulder and arm, leading to visual and muscular fatigue and discomfort[2, 3].

Work related musculoskeletal disorders in office or company workers with intensive computer usage is worldwide and the symptoms of MSDs are growing day by day [4].

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Musculoskeletal disorder associated with occupational computer use are primarily linked to the upper limbs.They affect the body's musculoskeletal system, which include bones, nerves, tendons, ligaments, joints, cartilage and spinal disc, but researchers have found that 65 percent of subjects in the previous studies have complained of neck and shoulder discomfort.[5] Work related musculoskeletal disorder are considered as an important source of occupational morbidity. MSDs are associated with high costs to employers such as lost productivity and increase health care, disability, worker's compensation costs. MSDs cases are more severe than the any illness in the body or nonfatal injury. Beside physical, biomechanical and ergonomics stressor, they also include psychosocial and organizational risk factor, such as high occupational stress, inadequate social support, monotonous activities, anxiety and depression among others.[6] The disorders are a result from repeated motions, no rest sufficient, and forces placed on human bodies while performing various job action. [7] Musculoskeletal system disorders are also affected by physical factor such as age, gender, weight, posture and BMI. It is also known to affect the education and daily activity of the individuals.[8]

There is only limited number of ergonomics studies which have investigated the impact of ergonomics workplace intervention , and the studies have mainly primarily focused on the building design , lighting and input design on WMSDs and visual symptoms , among computer and office workers.[1] The

risk include both improper workstation design and faulty posture as prolonged sitting for extended periods leads to poor circulation, stiffness of joint and pain.[8,9] There should be proper height of the seat in the office or company and there should be good and proper,working posture, proper use of arm rest, backrest, straight alignment of the wrist and the elbow and position on keyboard can prevent various health hazards in the organization or company.[1] A significant decrease in WMSDs have been observed workers were given an adjustable/flexible work environment, and systemic designed ergonomics training workshop.

RULA (rapid upper limb assessment) is a survey method developed for use in ergonomics investigation of workplace where work related upper limb disorder are reported. This tool requires no equipment and it require only observation of the posture in providing a quick assessment for the posture of the neck, trunk and upper limbs along with muscle function and the external loads experienced by the body. A coding system is used to generate an action list which indicates the level of intervention required to reduce the risk of injury due to physical loading on the operator.[10] Standard Nordic questionnaire analyses the musculoskeletal symptom when an ergonomics or occupational health context are presented. The questions are forced choice variants and may be either self–administered or used in interviews. The reliability of questionnaires has been shown to be acceptable .[11]

The provision of control over the work environment through adjust ability and knowledge may enhance worker effectiveness as well as health.[4] To decrease musculoskeletal disorders among the computer users various exercise protocols have been advocated in the literature. The resistance or strengthening exercises combined with stretching are given to the patient with the expectation of increasing the muscle strength, tone, mass and/or endurance.[12] There is a need to assess the effect of physical exercises and posture correction advice for the computer users who are at increasing risk of developing musculoskeletal disorder.

METHODOLOGY

A total of 30 IT company workers of both genders within the age group of 20-40 years with BMIrange (18.5 to 24.9) constituted the study sample. The computer usage time for these workers was minimum of 3 hours per day. Subjects with any neurological problem, accidental and fractured cases, sports injuries, chronic illness, pain caused by chronic disease, diagnosed rheumatic disease, physical trauma, severe systemic disease, those who underwent surgery (past 6 month), those with any fixed deformities and paralyses were excluded.

A prior consent was obtained from the respective individuals. The procedure was well explainedto the subjects. Assessment of individual's BMI was recorded. The Standard Nordic questionnaire was administered to assess the musculoskeletal disorder following which the pain was assessed by McGill. The workers were assessed while they were working on computer. The assessment of posture was done by RULA.

After the assessment of pain and the posture the subjects were given the session of physical training of 40 to 50 minutes for their musculoskeletal disorders which included a warm up session of 5-10 minutes 20-25 minutesof exercises (strengthening and stretching exercises) followed by a cool down of 10 minutes. A posture correction advice was given on the individual's basis. Reassessment of the parameters was done at the end of the training.

RESULT

Table 1 Descriptive statistics

	Mean	Standard deviation
AGE	25.80	4.239156
HEIGHT	167.2279	11.141692
WEIGHT	68.95333333	11.55757594
BMI	24.5	3.54992

Table 2 Rula Score before exercise training

Report		
Prerulascore		
Mean	N	Std. Deviation
6.2000	30	.84690

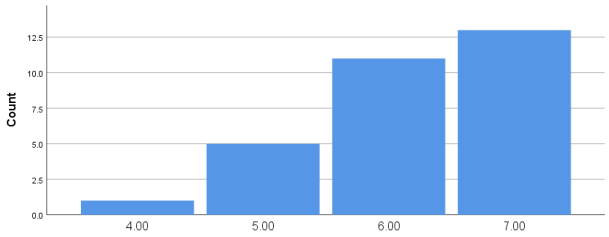

Figure 1 Rula Score before exercise training

Table 3 Rula Score after exercise training

Report		
Postrulascore		
Mean	N	Std. Deviation
4.5333	30	.77608

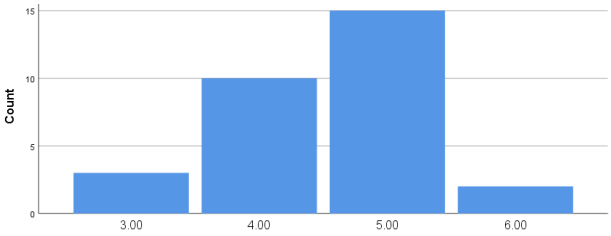

Figure 2 Rula Score after exercise training

DISCUSSION

Musculoskeletal system disorders are more common than any other illness and injury. Pain is one of the major problem which is seen in individuals who use computer together with the symptoms of musculoskeletal disorder. This study strengthens previous finding that MSDs in computer users, is a common phenomenon. In the present study pain and discomfort has been reported in the neck, shoulder and lower back as compared to any other joint. The main reason of the discomfort and muscle fatigue in the joints is unstable or unsuitable posture, over exertion forces and over exposure time. It affects the employees as it leads to decrease in working hours and it also affect the employment and productivity in the work. Ergonomics is highly advised in these working set ups to decreases the risk factors and to prevent faulty posture.[10]. The present study emphasizes the role of exercisesin decreasing the discomfort and to plan the management of these musculoskeletal system disorders. It has also been observed that individuals who were working more than 3 hours per day suffers more discomfort from musculoskeletal system disorder especially in upper limb due to the prolong sitting in one posture and continuous working on computer.[13]

A good ergonomics setup not only maximum capacity of workers by increasing productivity and job satisfaction. Proper ergonomic design in the office or working areas and intervals between the work decreases the rate of musculoskeletal system disorder and thus increasingthe productivity. There is a recommendation of proper arm rest, foot rest and back support to the individual to decrease pain and discomfort in the body especially in the joint. It has been seen that musculoskeletal system disorder leads to pain which lead to temporary disability. Now a days computer have become common in office,schools,companies , colleges and even in homes as even children work on computer with inappropriate sitting . There has been increased prevalence of lumbar and cervical spine discomfort, disc degenerative conditions, headache and psychological disturbances due to the use of computer for more than 3 – 4 hours a day which need proper management todecrease the symptoms[14].

CONCLUSION

The available literature indicates the importance of posture correction advice and exercise regime in decreasing the symptoms of these musculoskeletal disorders. The present study also emphasizes the role of exercise program in decreasing the symptoms due to MSD's. These exercises not only reduce the symptoms but also improves the quality of work an individual can perform thus in turn improving the productivity at work place. Although further studies may be undertaken to investigate the effect of long duration exercise protocols for the management of work related MSD's.Also the association of BMI with musculoskeletal disorders may be further investigated.

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