International Journal of Sports, Health and Physical Education
Online ISSN: 2664-7567; Print ISSN: 2664-7559; Impact Factor: RJIF 5.26
Received: 07-12-2020; Accepted: 23-12-2020; Published: 27-01-2021
www.physicaleducationjournal.in
Volume 3; Issue 1; 2021; Page No. 06-09

Effect of ergonomics rehabilitation intervention program to improve the health status of manual material handling women beedi workers of West Bengal

Ashok Kumar Sardar[1], Saikot Chatterjee[2]
[1] Research Scholar, Department of Physical Education, University of Kalyani, West Bengal, India
[2] Assistant Professor in Physical Education, Department of Physical Education, University of Kalyani, Kalyani, Nadia, West Bengal, India

DOI: https://doi.org/10.33545/26647559.2021.v3.i1a.22

Abstract
In the informal sector, beedi manufacturing industry has been classified as unorganized, falling under the small scale and cottage industries sector. Beedi working activity is largely carried out at home, which workers a large number of male as well as female also. Beedi rolling activity has became an industrial in generating supplementary income among the poor families in the west Bengal. The unorganized sector of developing countries use very little mechanical aids and therefore MMH works are common. Manual material handling is associated with severe pain, discomfort felt, injuries as well as loss in efficiency and production for employers and their families, with accompanying societal economic losses. Ciriello *et al*., 2008 [2] had shown the study is most frequent and rich cause of compensable workplace injuries loss. The main objective of this study was to investigate the MSDs problems due to the job postures they have adopted. The postures were analyzed using Rapid Upper Limb Assessment (RULA) and Rapid Entire Body Assessment (REBA).Modified Nordic Questionnaire of Musculoskeletal disorders was used to get information about the feeling of discomfort felt in different body parts. The results showed that they had musculoskeletal disorders as a result of dementia they worked on. This study indicates that the ergonomics rehabilitation intervention training has a favorable impact on the health and productivity out comes.

Keywords: manual beedi manufacturing, msd, postural analysis, rehabilitation intervention programme, occupational health

Introduction
Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interaction among humans and other Clements of a system, and the profession that applies theory, principles and method to designed in orders to optimize human well-being and overall system performance (IEA;2000). The physical interface with the work-place, the forces exerted by muscles and energy expended by the body during job can lead to discomfort, fatigue, injuries and absence due to sickness that decrease human performance. Job demands range from postural adaptation, high biomechanical and physiological demands etc. found in a diverse range of jobs, from desk jobs to mining etc.

In the United States, work-related musculoskeletal disorders account for approximately 38% of cases involving days away from work, thus making it an enormous economic and health care burden. A large component in musculoskeletal disorders is acute and chronic contraction induced skeletal muscle injury. In order to address this issue, there has been extensive studies to-date on acute contraction-induced muscle injury using both animals and humans.

Occupationally related musculoskeletal disorders have been associated with exposure to excessive physical loads, repetitive movement, and awkward postures. Occupational health and safety (OHS) or workplace health and safety (WHS) is an area concerned with the safety, health and welfare of people engaged in work or employment. The goal of occupational safety a safe and healthy work environment. OSH may also protect co-workers, employers and many others who might be affected by the workplace environment. In the United States the term occupational health and safety is referred to as occupational health and occupational non-occupational safety and includes safety for activities outside of work. Work-related musculoskeletal disorders are common causes of pain and functional decline which in turn lead to significant distress and disorders (Rempel *et al*., 1992; shaw *et al*., 2002). [14] Various risk factors are involved including biomechanical and physical workload, awkward body postures, and psychosocial factors such as time, rest, pressure and repetitive or monotonous tasks (Ariens *et al*., 2000; Bongers *et al*., 2002; Salerno *et al*., Cromie *et al*., 2002) [1, 3, 4]. Therefore, the study was conducted on women beedi workers of west Bengal, to understand the nature of job, and find out the occupational stress on the employers.

Manual materials handling and awkward working posture are one of the many risk factors that can be associated with the development of MSD. MMS is also the most frequent and rich cause of compensable postural injuries loss (Ciriello *et al*., 2008) [2]. According to the reports of Sen and Nag (1975) more than 70% of the total populations of India are engaged directly in manual material handling.

Objectives of the Study

The present study focuses mainly on the following objectives:

1. To analyse the workplace of female beedi workers.
2. To find out the occupational disorders of women beedi workers.
3. Identify the most affected body parts of beedi rollers.
4. To find out the work-related musculoskeletal disorders of the beedi workers.
5. The impact of ergonomics postural rehabilitation program to reduce the MSDs risk.

Methodology

Subjects: The study was conducted on twenty five (n=25) women beedi workers who were selected randomly from the districts of Nadia where the dominance of this industry is more prevalent. The age of the subjects were ranged between 30 to 45 years and having minimum of 10 years of working experience. The subjects were selected with no history of acute or chronic illness, not currently swallowing any medicine and not pregnant.

Physical Parameters: The height and weight of the subjects were measured by anthropometric rod and a properly calibrated weighing machine respectively heights were measured in centimeter (cm) where as weights was measured in kilogram (kg).

Work-Related Musculoskeletal

Disorders assessment: The Modified Nordic Questionnaire was used to assess the prevalence of MSDs among study employers. (Kuorinka *et al*., 1987) was modified according to the situation and was used to interview the employers in their local dialect (Bengali) as per Sett and Sahu, 2010. This is a subjective questionnaire that includes questions about work nature, work behavior, work stress, work-related musculoskeletal disorders and discomfort felt in different parts of their body.

Workplace Assessment: Workplace postures were assessed using the Rapid Upper Limb Assessment (RULA) (Mc Atamney and Corlett., 1993) [11]. RULA is survey method developed for use in ergonomics investigations of workplaces where work-related upper limb disorders are reported. REBA is ergonomic assessment tool uses a systematic process to evaluate whole body postural MSD and risk associated with work. Using the REBA worksheet, the assessment will evaluate a score for each of the different body regions (Hignet S, Mc Atamney L. 2000) [7].

Rehabilitation Intervention: subjects were allocated to a 10 weeks intervention period (Needhammer *et al*., 2012; & Soh, J., 2018) [15] for each repeat ion there will be hold for 10 seconds and 30 seconds. Data were taken for the experimental group before and after implementation of rehabilitation training program.

Tools and Techniques of Data Analysis: In order to draw empirical evidence for the study frequency analysis has been done using (Graph Pads Quick Calcs V-6.0) hypotheses were tested using t-value test.

Results and Discussion

Table 1: Mean ± SD value of physical parameters

Sl. No.	Parameters	Mean ± Sd value
1.	Age(years)	37.6±5.34
2.	Height (cm)	148.68±7.57
3.	Weight (kg)	60.4±9.43

Table 1 shows the mean and standard deviation value age of the subjects was 37.6±5.34. The mean and SD value height of the subjects was 148.68±7.57 cm. The mean and SD value weight of the subjects was 60.4 ±9.43 kg.

Table 2: Assessment of the feeling of pain felt in different body parts of the workers

Sl. No.	Body Parts	Pre-Test (%)	Post-Test (%)
1.	Lower Back	88	16
2.	Neck	52	4
3.	Knees	52	12
4.	Wrists/Hands	44	4
5.	Elbows	32	4
6.	Upper Back	20	0
7.	Ankles/Feet	16	4
8.	Hips/Thighs/Buttocks	20	4
9.	Shoulders	8	0

Table 2 shows the amount of discomfort felt by the workers in different parts of the body before postural rehabilitation intervention program has been observed at the time of training such as 88% of women beedi workers had lower back pain before rehabilitation intervention and reduce to 16% after rehabilitation intervention training program. There are others parts of the body such as 52% of neck discomfort felt before rehabilitation intervention and reduce to 4% after intervention, 52% of knees discomfort felt before rehabilitation intervention and reduce to 12% after intervention, 44% of wrists/hands discomfort felt before rehabilitation intervention and reduce to 4% after intervention, 32% of elbows discomfort felt before rehabilitation intervention and reduce to 4% after intervention, 20% of upper back discomfort felt before rehabilitation intervention and reduce to 0% after intervention,16% of ankles discomfort felt before rehabilitation intervention and reduce to 4% after intervention, 20% of hips/thighs/buttocks discomfort felt before rehabilitation intervention and reduce to 4% after intervention, 8% of shoulders discomfort felt before intervention and reduce to 0% significantly after postural rehabilitation training intervention.

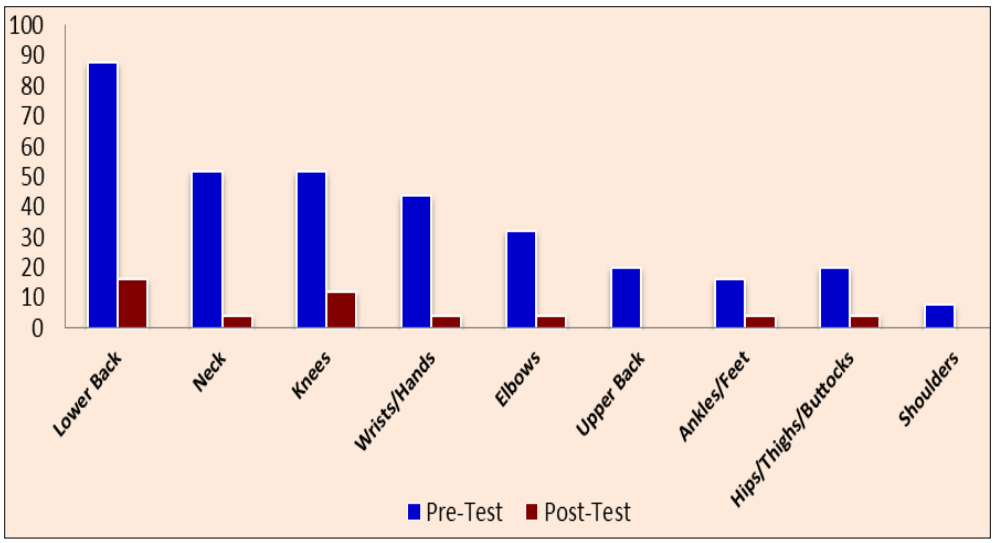

Fig 1: Assessment of the feeling of pain felt in different body parts of the workers

Table 3:'T' test for RULA Assessment (score) of the workers

Test of the subjects	Mean ± SD	Mean Difference	t-value	Level of significance
Pre-test	5.48±0.59	1.0	7.74	*p*>0.0001
Post-test	4.48±0.59			

Table 3 shows the mean value of Rapid Upper Limb Assessment (RULA) of the subjects before and after postural rehabilitation intervention programme. From the two tail t test results it was observed that the corresponding t value was found to be significant at 0.0001. Therefore the corresponding rehabilitation intervention programme has profound effects on postural rehabilitation which was confirmed in RULA Assessment as at the post intervention the RULA Score was found to be decreased.

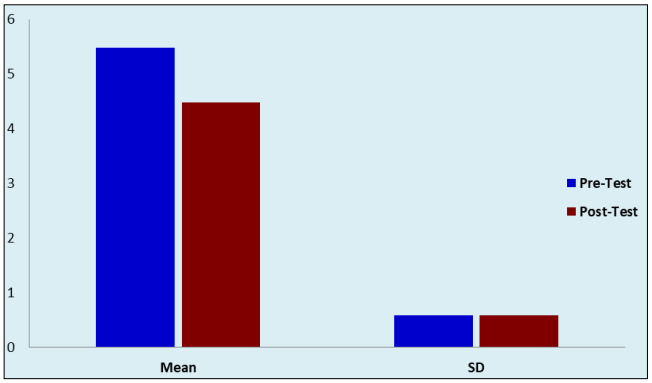

Fig 2: Rapid Upper Limb Assessment (Score) of the Workers

Table 4:'T' Test for REBA Assessment (Score) of the workers

Test of the subjects	Mean ± SD	Mean Difference	t-value	Level of significance
Pre-test	5.48 ± 0.82	1.4	5.56	p>0.0001
Post-test	4.08 ± 1.00			

Table 4 shows the mean value of Rapid Enter Body Assessment (REBA) of the subjects before and after postural rehabilitation intervention programme. From the two tail t test results it was observed that the corresponding t value was found to be significant at 0.0001. Therefore the corresponding rehabilitation intervention programme has profound effects on postural rehabilitation which was confirmed in REBA Assessment as at the post intervention the REBA Score was found to be decreased.

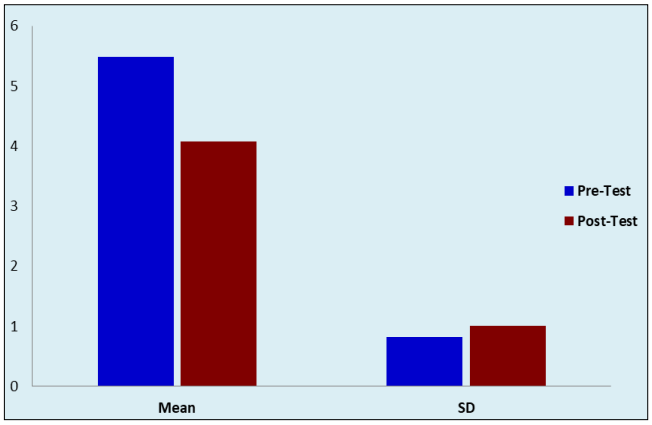

Fig 3: Rapid Entire Body Assessment (score) of the workers

Conclusion

The work posture adopted during this manual materials handling job is awkward and ultimately leads to the development of musculoskeletal disorders among them. This study indicates that the postural rehabilitation intervention program has a favorable impact on the health and productivity outcomes.

All workers attempt should be made to increase postural rehabilitation program adherence to ensure a significant improvement in health status for their women beedi workers. Furthermore the scope to apply and design engineering controls to reduce pressure on the musculoskeletal disorders can be explored as a further research direction.

References

1. Ariens GA, Van Mechelen W, Bongers PM, Bouter LM, Van Der Wal G. Physical risk factors for neck

pain. Scandinavian journal of work, environment & health, 2000, 7-19.
2. Ciriello VM, Dempsey PG, Maikala RV, O'Brien NV. Secular changes in psychophysically determined maximum acceptable weights and forces over 20 years for male industrial workers. *Ergonomics*. 2008; 51(5):593-601.
3. Cromie JE, Robertson VJ, Best MO. Work-related musculoskeletal disorders and the culture of physical therapy. *Physical therapy*. 2002; 82(5):459-472.
4. Cromie JE, Robertson VJ, Best MO. Work-related musculoskeletal disorders and the culture of physical therapy. Physical therapy. 2002; 82(5):459-472.
5. Freivalds A. Musculoskeletal disorders of the upper extremity and ergonomics interventions. In Ergonomics for Rehabilitation Professionals CRC Press, 2009, 273-472.
6. Higneet S, Mc Atamney L. Rapid Enter Body Assessment (REBA).In Handbook of Human Factors and Ergonomics Methods CRC Press, 2004, 97-108.
7. Higneet S. Mc Atamney L. Rapid Enter Body Assessment (REBA). Applied ergonomics. 2000; 31:201-205.
8. International Ergonomics Association. Congress, Human Factors, & Ergonomics Society. Meeting. Ergonomics for the New Millennium: Proceedings of the XIVth Triennial Congress of the International Ergonomics Association and the 44th Annual Meeting of the Human Factors and Ergonomics Society, July 29 Through August 4, 2000, San Diego, California, USA (Vol. 3). Human Factors and Ergonomics Society, 2000.
9. International labor organization Beedi sector in IndiaA note (Updated 2003 apr30; cited 2005 June 29) New Delhi: ILO, 2003. (Retrieved from: http:/www.ilo.orga/ public/English/Regionasro/New Delhi download/note beedi.pdf).
10. Kourinkai, Jonsson B, kilbom A, Vinterberg H, Biering-sorensen F, Andersson G, Jorgensen K. Standardised Nordic Questionnaires for the analysis of musculoskeletal symptoms. Applied ergonomics. 1987; 18(3):233-237.
11. Mc Atamney L, Corlett EN. RULA: a survey method for the investigation of work related upper limb disorders. Applied ergonomics. 1993; 24(2):91-93.
12. Middles worth M. Rapid Upper Limb Assessment (RULA), 2000.
13. Niedhammer, 2012.
14. Rempel DM, Harrison RJ, Barnhart S. Work-related cumulative trauma disorders of the upper extremity. *Jama*. 1992; 267(6):838-842.
15. Soh J. How to Improve Bad Posture, 2018.