

Ergonomic Assessment of Manual Materials Handling Workers in Ceramic Factory Using REBA: An Observational Study

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Abstract: A ceramic is an inorganic non-metallic solid made up of either metal or non-metal compounds that have been shaped and then hardened by heating to high temperatures. In general, they are hard, corrosion-resistant and brittle. Tiles are thin objects, usually square or rectangular in shape. Ceramic factory workers are involved in lifting, pulling, bending and making models. Most of their working task are subjective and requires repetitive movements and static postures in them leading to musculoskeletal disorders. **Methodology:** This study was done in 100 Ceramic works in Styline factory Morbi age of workers between 25 to 34 years. In that their working posture was evaluate by using REBA scale. **Conclusion:** The study concludes that almost all of the ceramic workers fall under moderate risk of musculoskeletal disorders and require intervention and awareness about postural correction exercises to prevent further musculoskeletal injuries.

Keywords: Ceramic workers, Posture, Rapid Entire Body Assessment (REBA), Ergonomics, Musculoskeletal Risk.

1. Introduction

The ceramics manufacturing industry in Morbi (Gujarat) has been playing an important role in the growth of the national economy. To fulfill the company objectives, it is important to produce the quality products^(1, 2) Musculoskeletal disorders are described as an injury or dysfunction that commonly involves the supporting structures of the body as well as the nerves, muscles, bones and cartilages. They are collectively caused by repetitive movements or sustained poor and awkward positions.^(3, 4, 5) Various musculoskeletal disorder (MSD) symptoms are experienced by the workers performing their tasks in bad work postures which are largely static and consequently these are associated with long term risks and injuries.⁽⁶⁾ The disorder occurs when the body part is called on to work harder in bad work postures. These postures do have an adverse impact on work performance and labor productivity.^(7, 8)

Rapid Entire Body Assessment (REBA)

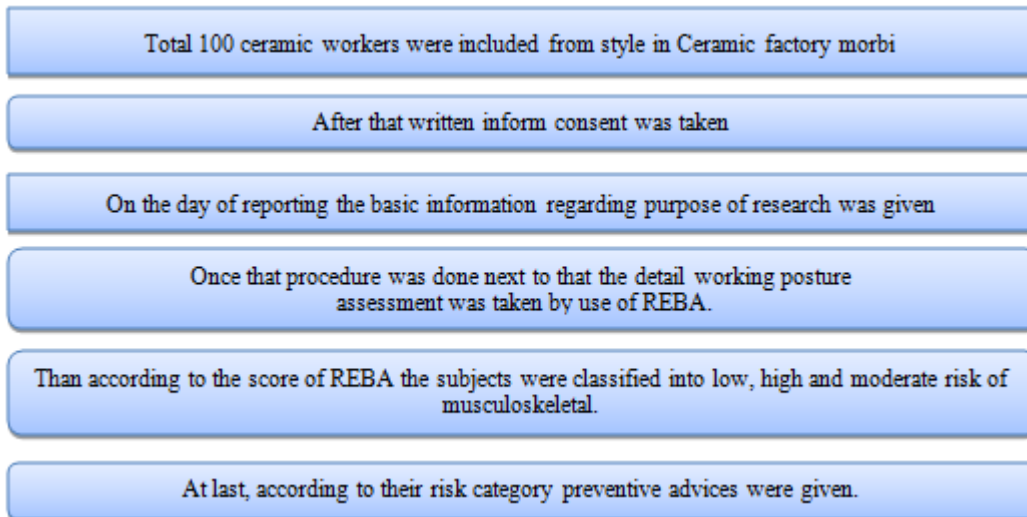
REBA (Rapid Entire Body Assessment) was developed by Hignett and MC Attamney in 2000. It is used to assess the entire body postural musculoskeletal disorders and risk

associated with the job tasks^(1, 9, 10) A single worksheet is used to evaluate the entire body posture, forceful exertion, type of movement, action and repetitive work.^(11, 12) There is no advanced degree or expensive equipment required for assessing^(13, 14) The evaluator just needs REBA worksheet and a pen. The worksheet scores for each of the following body region: wrist, forearm, elbows, shoulder, neck, trunk, back, legs and knee. The score is collected and compiled to form a single score that represents the level of musculoskeletal disorder risk.⁽¹⁶⁾

2. Methodology

Study Type: Observational Study
Study Setting: Stylein Factory Morbi
Study Population: Ceramic Factory Worker
Sample Size: 100
Sampling Technique: Convenient Sampling
Study Duration: 6 Months

3. Method



Material Used:

- 1) REBA Worksheet
- 2) Pen/pencil
- 3) Laptop (Acer)

4. Result

Data was collected on a data sheet and encoded for computerized analysis. Tables were made using Microsoft Word and Figures were plotted using Microsoft Excel window-10.

In this study, 100 subjects both male and female were included.

Components of REBA sheet

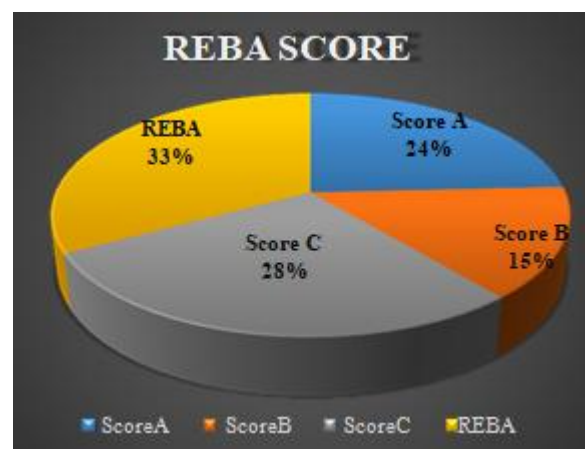


Figure 1.2

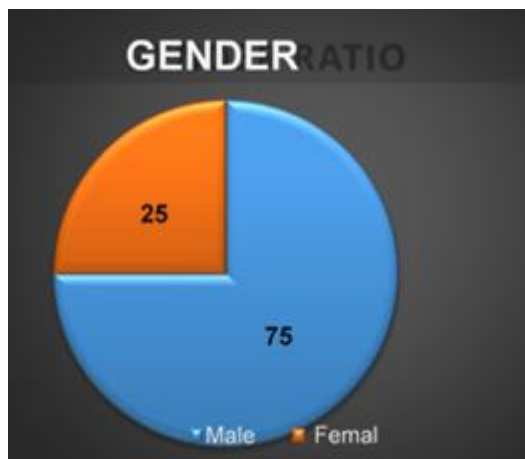


Figure 1.1

Interpretation:

The above pie chart shows that out of 100 workers, 75 were Male and 25 were Female.

Therefore, majority of working population in ceramic factory are male.

Interpretation:

The above chart shows that total REBA score is 33% of 11, for score A it is 24% of 12, for score B it comes 15% of 11, score C it comes 28% of 12.

Risk factors prevalence:

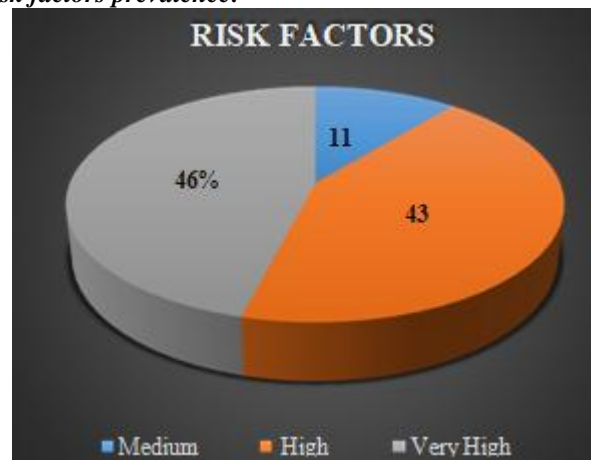


Figure 1.3

Risk Factors

Interpretation:

Above graph shows that the highest number of workers i.e. 46% comes under very high risk. 43% of workers come under high risk and only 11% workers come under medium risk.

5. Discussion

Work posture is the position and condition of the body or body parts during the performance of work. Good work posture is as important for the performance of tasks as it promotes health and minimizes stress and discomfort during work. Ergonomics design of work system is pre-requisite for better health, safety and productivity. It is important to analyse working postures for detailed understanding of relationship between the working posture and work related musculoskeletal disorders. The analysis on the other hand also helps in identifying the awkward working postures which leads to discomfort, inconvenience and risk of injuries and illness to workers.

Muscular work in occupational activities can be roughly divided into four groups: heavy dynamic muscle work, manual materials handling, static work and repetitive work. Ceramic workers fall under the category of manual material handling as they have a significant role in lifting, shifting, bending on the field and also they fall under the category of heavy dynamic muscle work.

Activities like lifting and bending leads to workers acquiring faulty postures. Also sitting for prolonged period of time has caused them to attain low back pain. Excessive strain is put on their back during lifting and bending activity while working. It was found that constant bending with flexed spine and neck over a period of time might cause a forward head posture in these workers leading to stretching of the anterior neck muscles and weak neck extensors to become short and go into spasm hence altering the neck biomechanics and later on causing neck pain. The muscles around the shoulders have to work to its maximum capacity in order to stabilize the shoulder when the upper limb is not supported so that fine movements can be carried out with the wrist and fingers. Improper rest between the work and constant repetitive movement and stress on the body can lead to muscle fatigue, discomfort and decreased muscle performance.

This study was carried out to assess the posture related musculoskeletal disorders in the ceramic factory workers. Among MSD's reported study population the highest risk reported area were neck, wrist and trunk.

Prolong bending and twisting movements over a long period was observed which implies increase in the work of muscles and ligaments and also stretches the elastic disc between the vertebrae to maintain upper body in balance and therefore also, increases stress in lower back. Corrective actions and ergonomic intervention are recommended.

It was found that almost all workers were at high risk if they continue to work in the posture, which may lead to

musculoskeletal disorder risk in future.

6. Limitations of the study

- This study has been performed only on 100 workers.
- The effectiveness of the method on other age group may vary.

7. Conclusion

This present study concluded that REBA scale can use as an evaluation of musculoskeletal disorders for work posture evaluation in ceramic workers. Further information comes under this study is that the majority of ceramic workers are susceptible to development of musculoskeletal disorders so there is a need to give more focus in this area.

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Consult Form:

સહમતિ પત્ર

STUDY TITLE: - ERGONOMIC ASSESSMENT OF MANUAL MATERIAL HANDLING WORKERS IN CERAMIC FACTORY USING REBA: AN OBSERVATIONAL STUDY.

હું આ અભ્યાસ અને સંશોધન માટે બાંહેધરી મારી મરજી થી આપું છું. મને આ સંશોધન વિશે વિગતવાર મારી ભાસા માં સમજાવેલ છે, અને આ સંશોધન દરમિયાન મને ગમે ત્યારે બાકાત થઇ જવાની સ્વતંત્રતા આપવામાં આવી છે. તેમજ આ સંશોધન માં મારી ઓણખાણ કોઈ પણ જગ્યા એ દર્શાવામાં નહિ આવે એની ખાતરી આપેલ છે. હું સ્પષ્ટ સમજ સાથે તપાસકર્તા દ્વારા મળતી માહિતીને સમજી ગયો/ગઇ છું. હું મારા પોતાના જોખમે આ અભ્યાસમાં ભાગ લેવા તૈયાર છું અને ફોર્મની નીચે મારી સહી સૂચવે છે કે હું મારા પોતાના હિતમાં આ સંશોધન માં ભાગ લઈ રહ્યો/રહી છું, નહિ કે કોઈની મજબૂરી નથી.

તારીખ

સહભાગીની સહી:

તપાસકર્તાની સહી:

માર્ગદર્શિકાની સહી: