

## Ergonomic study in Hosiery Garments under Posture Analysis

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### ABSTRACT

*The Objective of the Projects is to analyse the Garment workers in various departments such as Sewing machine, ironing and Packing. The workplace has the capability to negatively affect employee's overall performance in a whole lot of approaches, inclusive of dissatisfaction, minor or extreme injuries that limit employees capability to complete ordinary obligations, or even death in intense situations. Musculoskeletal diseases are one of the most common causes of decreased productiveness in the latest workplace. Because of high repetitive work and awkward work postures, have discovered musculoskeletal risk factors connected with the textile industries. In terms of self-reported musculoskeletal symptoms, the manufacturing employees had significantly higher symptom scores than the group with more diversified work duties for the head, neck, shoulders, and arms, but not for the low back, hips, or lower extremities. Individual parameters had intricate relationships with symptoms in the head and low back. Textile stitching machine operators are exposed to hazards and pain that accumulate over time due to prolonged activity. So, this study adopted a descriptive cross-sectional design in which textile sewing machine, Ironing and Packing operators were analysed using REBA method.*

**Keywords:-***Musculoskeletal problems, ergonomics issues, awkward work postures, repetitive work, psychological issues, prolonged activity.*

### INTRODUCTION

Musculoskeletal disorders caused by work are becoming one of the most common health problems in every business throughout the world. The most common cause of ergonomic problems among workers is a lack of awareness of one's working position.

The vast majority of industrial workers will be uneducated. Because they understand specific bodily positions such as bending, twisting, and handling, they will not recognise their working approach.

Musculoskeletal disorders are a group of ailments that affect the body's muscles, tendons, ligaments, joints, peripheral

nerves, and blood vessels. On a sewing machine, cutting, assembling, pressing, and finishing are all tasks that are repeated several times [1]. This work is done while seated, with the upper back curled forward and the head lowered to the sewing machine.

Working in this bad posture for a long time increases their chances of developing a work-related musculoskeletal ailment.

The study's goal is to determine the prevalence of musculoskeletal symptoms among sewing machine operator, ironing and packing, as well as provide recommendations for improving ergonomic of sewing machine operators.

## **ERGONOMICS**

The study of human beings in their running environment is called ergonomics. The objective is to eliminate work-related pain and injury risk. Employees will be more comfortable and productive if ergonomic solutions are implemented. What is the importance of ergonomics? Ergonomics is crucial since your musculoskeletal system is influenced while you're working and your body is strained by an inconvenient position, intense temperature, or repeated movement.

Workplace circumstances that generate wear and tear on the body and might lead to harm are known as ergonomic risk factors [2]. Repetition, awkward posture, strong movements, immobile position, direct pressure, vibration, high temperature, noise, and job stress are all examples of these.

Workplace ergonomics is the science of creating a workplace that takes into account the worker's talents and limits. An ergonomics improvement procedure in the workplace eliminates risk factors that contribute to musculoskeletal injuries, allowing for increased human performance and production.

## **WORK-RELATED MUSCULOSKELETAL DISORDERS**

Musculoskeletal diseases (MSDs) affect the muscles, nerves, tendons, joints, cartilage, and spinal discs. Work-related musculoskeletal disorders (WMSD) are situations in which the job environment and work performance play a 4 substantial role in the condition; and/or the ailment is rendered worse or lasts longer as a result of the work environment. Common musculoskeletal disorders include,

- Carpal Tunnel Syndrome.
- Tendonitis.

- Muscle / Tendon strain.
- Ligament Sprain.
- Tension Neck Syndrome.
- Thoracic Outlet Compression.
- Rotator Cuff Tendonitis.
- Epicondylitis.

WMSDs (work-related musculoskeletal diseases) are a set of painful muscle, tendon, and nerve problems. The most prevalent symptom linked to WMSDs is pain. In certain circumstances, the afflicted area may experience joint stiffness, muscular tightness, redness, and edoema. Some employees may also report "pins and needles" sensations, numbness, skin colour changes, and reduced hand perspiration.

## **PROCESS IN HOSIERY INDUSTRY**

Product design, fabric selection and testing, pattern making, grading, marking, distribution, cutting, folding, sewing, compression or folding, finishing and specifying, dyeing and washing, quality control, and so on are all part of the garment manufacturing process.

### **Hosiery Sewing**

Sewers stitch fabric pieces together and a garment is constructed during this step of the manufacturing process. Zipper-setting, embroidery, and other hand sewing skills may be specialised by sewers.

### **Hosiery Ironing**

Ironing is the process of removing wrinkles from cloth using a machine, generally a heated tool (an iron). Depending on the cloth, heating is usually done at a temperature of 180–220 °Celsius [3-4]. The bonds between the long-chain polymer molecules in the fibres of the material are released by ironing.

### **Hosiery Packing**

Packaging means wrapping, compressing, filling or creating of goods for the purpose

of protection of goods and their convenient handling.

### **Rapid Entire Body Assessment**

REBA – Rapid Entire Body Assessment become first advanced via Hignett, s and McAtamney, L. Within the 12 months 2000. The posture evaluation device gives a brief observational evaluation of the entire-body parts sports (static and dynamic giving musculoskeletal threat action degree). REBA also gives the score level of each role body element indicating

the urgency for converting the worker's frame postures. The development of REBA aimed to divide into body segments institution A and group B. Group A includes truck, neck, and legs. Group B consists of the upper and decrease arm and wrists. Other gadgets are covered load-treated couplings with the load and bodily hobby is detailed within the assessment tool. The danger stage and motion required are proven within the table 1. The risk level and action required are shown in the Table 1.

*Table 1:-Classification of Risk According to REBA*

<b>REBA Score</b>	<b>Action Required</b>
1	Acceptable posture
2-3	May be necessary
4-7	Change Necessary
8-10	Change soon
11-15	Change immediately

### **METHODOLOGY**

The study changed into performed analyses the ergonomic hazard worried in stitching system operators, Ironing operators, Packing workers in each department 20 employees can be analyzed. At the time of the operations running with day by day 6-7 hours. The awkward postures like bending, twisting and many others., lead to extreme health issues which includes neck pain, shoulder ache, and so on.,

At the time of the survey, all of the jobs have been located thoroughly earlier than starting the work and exact records will be collected from the employees to ensure the final touch of ergonomic hazard assessment tools.

A video recording and snap shots have been taken to file the unique actions of employees and working postures. The

photographs are used to research to fill the rankings like REBA. To examine the risk evaluation of a job or project use REBA. The REBA evaluation device used for studying such activities including entire body and movement of limbs. Similar to RULA in REBA also body components could be divided into exceptional segments and every component can be analyzed to the risk level rankings could be assigned.

In such frame components, excessive ratings are allotted the postures can have more chance elements, and coffee rankings are allotted the posture will have low-hazard factors. The score is categorized into specific stages inclusive of negligible, low threat, medium danger, excessive risk, and really high risk.

### **OBSERVATIONAL METHODS**

The observational methods, maximum generally used method, may be apply to

assess the ergonomic hazards at place of business, screen the ergonomic upgrades, and behavior research on ergonomic issues [5]. It is a quantitative dimension of the exposure of ergonomic danger. In this technique, records may be easily song. Due to low assessment value brief and clean assessment procedure, the observational methods have very fine appearances in identifying ergonomics risk in the place of business. In the workplace, a easy observational method is need to recognize risk and control the ergonomic hazards.

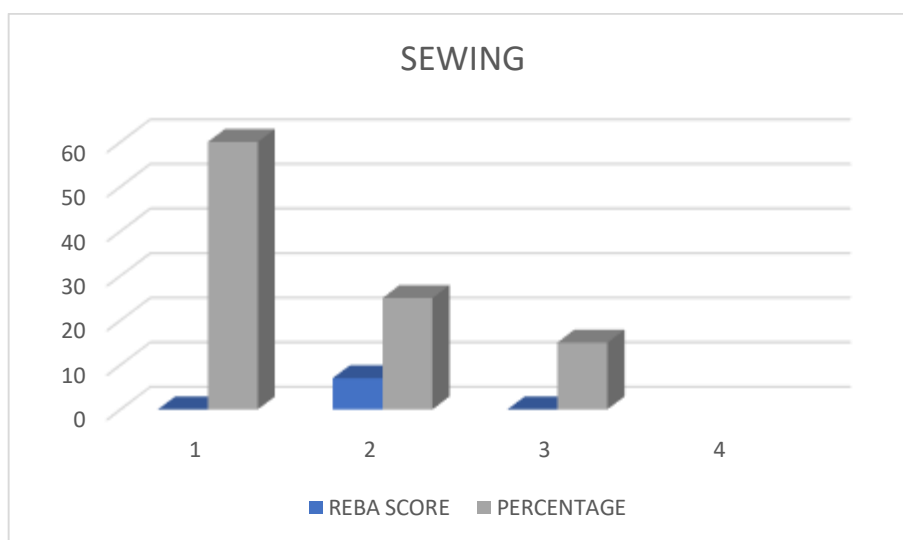
Therefore, observational method can genuinely look into the ergonomic dangers and their severity inside the paintings area.

In REBA, at the side of postural score the static pressure or load rating coupling score and interest rankings are don't forget to achieve final score. The ironing workers at the same time as conducting their tasks flow their trunk, neck, leg, arm and wrist [6].

**RESULTS AND DISCUSSION**

**REBA scores for sewing machine operators**

REBA SCORES	NO.OF PEOPLE	PERCENTAGE (%)
7	8	40
8	8	40
9	4	20



**PROBLEM DEFINITION**

**Problems that are identified in sewing**

- Long usage of trimmers causes fingers pain.
- Chair without back rest causes back pain
- Foot pain without footrest

**Problems that are identified in ironing and pressing**

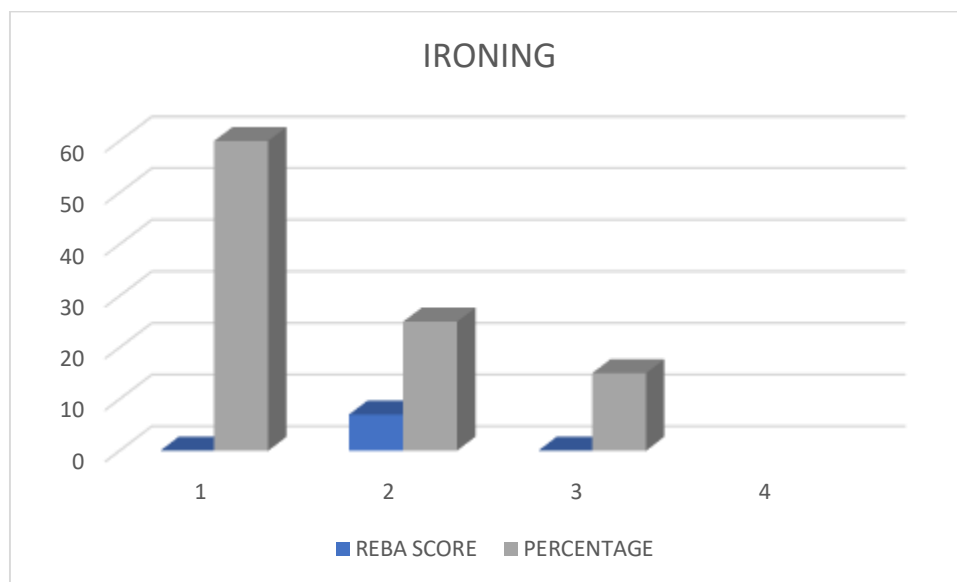
- Due to working height shoulder pain causes.
- Due to pressing operations cause calf pain
- Bad posture causes back pain
- Folding of cloths causes wrist pain
- Long standing causes knee pain

**Problems that are identified in packing**

- Neck pain due to long bending.
- Back pain due to prolonged standing

**REBA scores for Ironing**

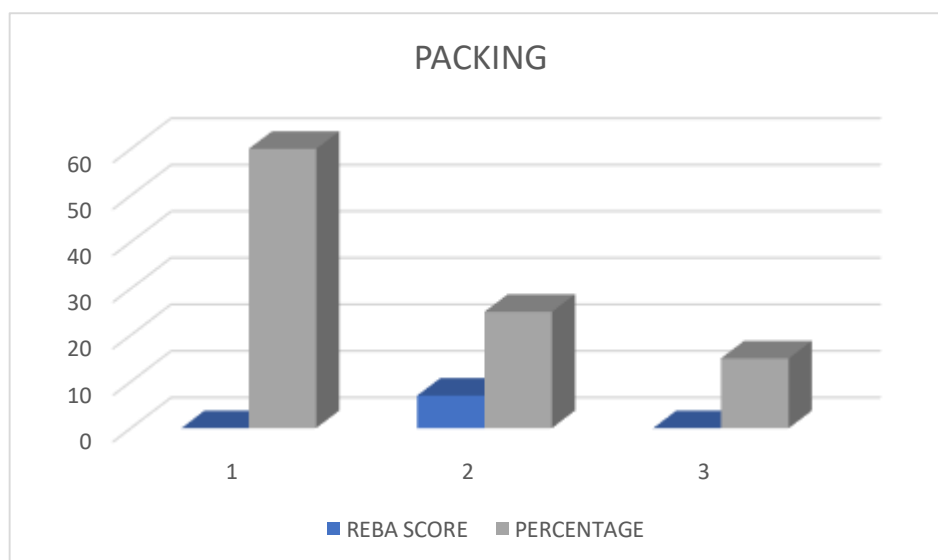
REBA SCORES	NO.OF PEOPLE	PERCENTAGE (%)
8	3	15
9	7	35
10	8	40
11	2	10



REBA SCORE PERCENTAGE

**REBA scores for Packing**

REBA SCORES	NO.OF PEOPLE	PERCENTAGE (%)
4,5,6	12	60
7	5	25
8,9	3	15



REBA SCORE PERCENTAGE

### **SOLUTION**

Ergonomic hazards can be controlled step by step with engineering control, administrative and work place control and use of PPE (personal protective equipment).

- As person working in work station equipment should be kept easy reach to the person.
- Hand position should be 90 degree to 110 degree which reduces the ergonomic hazard.
- While working in sitting position leg should maintain 90 degree to 110 degree.

### **WORKING IN SEWING**

Back pain may be reduced by using back supported chair.

### **WORKING IN IRONING**

### **HEIGHT OF DESK FOR STANDING WORK**

Height of Person(Feet)	Height of Desk(cm)
5.5	101
5.6	102-110.5
5.7	104-112.5
5.8	106-114.5
5.9	107.5-116.5
5.10	109.5-118.5

### **CONCLUSION**

Even if the majority of employees do not have a severe postural problem while using the REBA strategies for ergonomics, it needs to be mentioned that this end result may be dangerous.

There is no opportunity to use this as a manual to the hazards related to postural or paintings-related musculoskeletal illnesses [10]. If you want to research more approximately occupational ergonomics, there are some things you may do; choices have to be made based on the records to be had.

The incidence of musculoskeletal issues is high in this examine. It is important that

- Cloths are kept distance away from the workers, it should be easy reach.
- As calf pain is more in industrial ironing because they are using vacuum iron machine in that they need to press the machine in leg, if the pressing system has change as a liver system and given hand calf pain may get reduced [7-9].
- As workers working for 12 hrs without sitting they need some stretches and exercise for 30 second after 15min of continuous work.

### **WORKING IN PACKING**

- Table height where the people working in packing were 106cm, it should be design according to the person's height.
- As workers working for 12 hrs without sitting they need some stretches and exercise for 30 second after 15min of continuous work

awkward posture, uncomfortable actions, extended status, and different elements contributed to an increased in worker danger specially in India. In order to ameliorate the current catastrophic scenario amongst employees a few answers are given to lessen their ergonomics risks.

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