

Prevalence of Work-related Musculoskeletal Disorders and its Correlation with Ergonomic Risk Assessment among Tailors: A Cross-sectional Study

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Abstract

Background: The most significant factor contributing to discomfort at work for tailors is musculoskeletal disorders. Once musculoskeletal discomfort manifests in any area, it often lasts for a year or more. Implementing ergonomics research can boost productivity while giving workers a better, more pleasant working environment. A tool called REBA is used to evaluate a person's ergonomic risk factors. Its goal is to construct a posture analysis system to identify musculoskeletal concerns in a range of tasks by segmenting the body and separately coding each part. The influence and severity of musculoskeletal symptoms on occupational groups have been evaluated using the NMQ. **Aims of study:** To find out the prevalence of work-related Musculoskeletal Disorders and its correlation with Ergonomic risk assessment among Tailors from south Gujarat **Objective of study:** Primary Objective: To find out prevalence of work-related MSDs in tailors. and Secondary Objective: To find out its correlation of work-related MSDs with Ergonomic risk assessment among tailors. **Materials and Method:** In this cross-sectional study total 150 tailors were taken based on inclusion criteria. Convenient sampling method is selected with age group 25 to 50 years. Work related Musculoskeletal disorders assessed by NORDIC whereas Ergonomics risk assessment done by REBA. **Result:** The result shows that there is high prevalence of lower back pain (34%) in acute work-related MSD and neck pain (26%) in chronic work-related MSD. There are significant correlation of acute neck, shoulder and lower back pain with Rapid Entire Body Assessment (REBA) score and significant correlation of chronic neck, shoulder, elbow, wrist and lower back pain with REBA. **Conclusion:** This study concluded that there is high prevalence of low back pain & neck pain in Acute & Chronic MSD respectively then it can be concluded that prolonged sitting, uncomfortable working posture, strenuous movements and repetitive motion are considered important risk factors for Musculoskeletal disorders and its positive correlation with Ergonomic assessment among Tailors.

Keywords: Musculoskeletal Disorders, Ergonomics risk, REBA, NORDIC, Tailors

Introduction

Ergonomics, which derives from the Greek words 'ergon, which means effort, and nomio, which means natural laws, is the study of improving product design to make it more user-friendly.¹ Introduction to Ergonomics The study of the interaction between individuals and their working environment is referred to as ergonomics.² Science's field of study known as ergonomics is focused on how people

behave and react while they are sitting, standing, or moving. Ergonomics is regarded as a philosophical idea and manner of thinking in humans.³ All aspects of business are significantly impacted by ergonomics. Simple adjustments to workplace ergonomics will have a significant impact. The management will benefit from high productivity, lower absenteeism, good employee performance, a decrease in musculoskeletal disorders, and improved work-life balance by applying ergonomic principles inside the company. The science of ergonomics is concerned with how well individuals and their jobs "fit." It puts people first, taking into consideration their strengths and limits, and is concerned with the fit between the user, equipment, and the settings. The goal of ergonomics is to ensure that each worker is comfortable with their duties, tools, knowledge, and surroundings.⁴

The International Ergonomics Association (IEA) defines ergonomics or human factors as the scientific field that emphasizes the understanding of the relationship between humans and other components of a system, as well as the field that applies information, model, principles, and approaches to designing workstations that enhance human well-being and the overall performance of the system.⁵ An evaluation method called the Rapid Entire Body Assessment (REBA) is used to determine a person's ergonomic risk factors. Sue Hignett and Lynn McAtamney created REBA at Nottingham Hospital in the United Kingdom, and it was published in 2007. The creation of REBA had the following objectives: Create a system for postural analysis that is sensitive to musculoskeletal risks in a variety of tasks; segment the body into units that can be individually coded with reference to movement planes; offer a scoring system for muscle activity brought on by static, dynamic, quickly changing, or unstable postures; reflect that coupling is crucial for the handling of loads but may not always occur through the hands; and provide an action level with an indication of urgency.⁶

The REBA technique is a quick and simple observational postural analysis tool for whole-body activities that evaluates the risk factor for ergonomics by directly watching the employee's posture at their desk.⁷ The World Health Organization (WHO) states that Musculoskeletal Disorders (MSD) "range from those that arise suddenly and are short-lived, such as fractures, sprains and strains, to lifelong conditions associated with ongoing pain and disability." The symptoms of MSDs include pain, numbness, tingling, aching, stiffness or burning.⁸ Therefore, work-related MSDs may be distinguished from occupational illnesses because, unlike MSDs, occupational diseases have a clear cause-and-effect link between a single risk factor and a particular disease (for example, asbestos and asbestosis, silica and silicosis).⁹ According to the Canadian Centre for Occupational Health and Safety, MSD are a serious issue. As a result, risk evaluation must be made in order to lower risk because these complaints result in numerous absences, significant financial losses, and decreased productivity.¹⁰

By using better procedures, tools, and facilities, musculoskeletal problems can be reduced to a minimum. Musculoskeletal diseases are frequently brought on by rigid posture, forced removal, and other manual tasks performed at high speeds and frequencies.¹¹ The occurrence of musculoskeletal illnesses is significantly influenced by a number of risk factors, including poor ergonomics, manual labour, lifting large things, and repetitive, strenuous occupations.¹² The intensity and significance of musculoskeletal problems in occupational categories have been evaluated using the Nordic Musculoskeletal Questionnaire (NMQ).¹³ The posture that tailors adopt when executing tasks like stitching and clothing repairs varies depending on the job. In this employment, a variety of elements,

including physical, psychological, and mental elements, may have an impact on workers' uncomfortable postures. They therefore run the risk of developing musculoskeletal problems.¹⁴

Tailoring entails boring, extremely repetitive procedures including cutting, assembling, pressing, and finishing that are carried out while sitting at a desk with the head bowed over the sewing machine. Occupational health and safety regulations virtually ever assist the workers in this sector.¹⁵ It is crucial that employees and workstations function well together. The clearance, reach, and comfort of the workers must be taken into account while building these workstations.¹⁶

Objective of the Study: To find out the Prevalence of Musculoskeletal Disorders and its correlation with Ergonomic risk assessment among Tailors from south Gujarat by using REBA and NORDIC scale.

Primary Objective: To find of prevalence of work-related MSDs in tailors.

Secondary Objective: To find out it's correlation of work-related MSDs with Ergonomic risk assessment among tailors.

Material and methods

A cross sectional; observational study was conducted, a total 150 tailors including 55 female and 95 males from different tailors of south Gujarat to participate in study. Convenient sampling technique was used. Ethical clearance was taken from Institutional Ethical Committee. Tailors of age between 25 to 50 years with either side of hand dominancy and at least 6 hours of work on motorized sewing machine. Tailors with Participants with any Traumatic Orthopaedic Condition, any Neurological Condition, with previous known Musculoskeletal Disorders and with BMI > 24 were excluded from the study.

All the volunteers signed written consent and were informed about purpose, nature, possible risks, and benefits of the present study.

Subjects were introduced to the procedure of the study and data were obtained using standard procedure as explained below: The procedure are described in Five discrete steps **FIRST**, each participant was asked to complete musculoskeletal disorder questionnaire by using (SNQ) This questionnaire consist of following section 1) Demographic data 2) Anthropometric variables 3) Working hour data 4) Use of the other device data 5) Rating of pain in different body part. **SECOND**, each participant was then asked to use their machine and do the work while observation was done. **THIRD**, the researcher observes the posture of the worker during work. **FOURTH**, by using the REBA tool to assess this sustained posture is determine a grand score for each side of the body, thus here the REBA assessment is done only for the right side. **FIFTH**, the correlation between musculoskeletal disorders and ergonomic risks among tailors were conducted using statistical analysis. Basic demographic data include age, height, weight, BMI, hand dominance. Habitual characteristic included smoking behaviour, exercise behaviour, underlying disease, musculoskeletal underlying disease any accident history.



The hazard level of working posture is assessed based on the relationship between total score and risk level (Table 1)

Table 1. Rapid entire body assessment (REBA) grand scores, risk levels, and grade standard.

REBA Score	Risk Level	Risk Description
1	1	Negligible risk
2~3	2	Low risk. Change may be needed
4~7	3	Medium risk. Further investigate change soon
8~10	4	High risk. Investigate and implement change
11+	5	Very high risk. Implement change

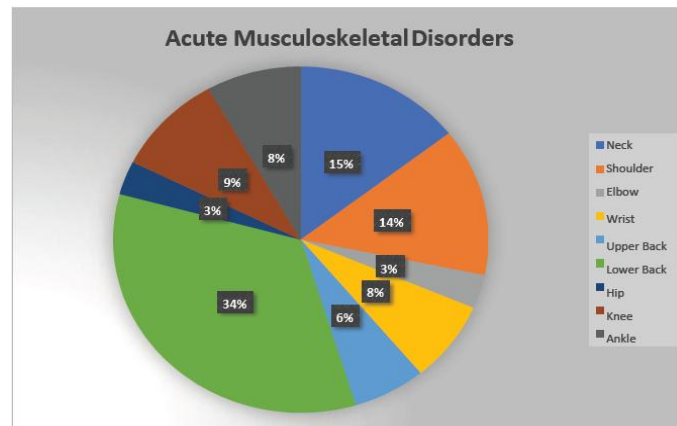
Results:

In the present study, 150 male and female tailors participated. They were on average aged 35.94 years. Table 3 shows the mean and standard deviations of age and BMI. The prevalence of Acute WRMSDs for neck, shoulder, back, elbow/forearm, and hand/wrist is presented in Table 4. The prevalence of Chronic WRMSDs for neck, shoulder, back, elbow/forearm, and hand/wrist is presented in Table 5. Percentage of risk of Rapid Entire Body Assessment (REBA) output is presented in Table 6.

Table 2: Descriptive characteristics of tailors (n=150)

Index	N	Mean±SD	Min	Max
Age (year)	150	35.94±8.45	25	50
BMI (kg/m ²)	150	21.55±1.79	18.4	24.7

Graph 1: Prevalence of Acute Work-Related Musculoskeletal Disorders (WRMSDs) for different region in tailors (n=150)



Graph 2: Prevalence of Chronic Work-Related Musculoskeletal Disorders (WRMSDs) for different region in tailors (n=150)

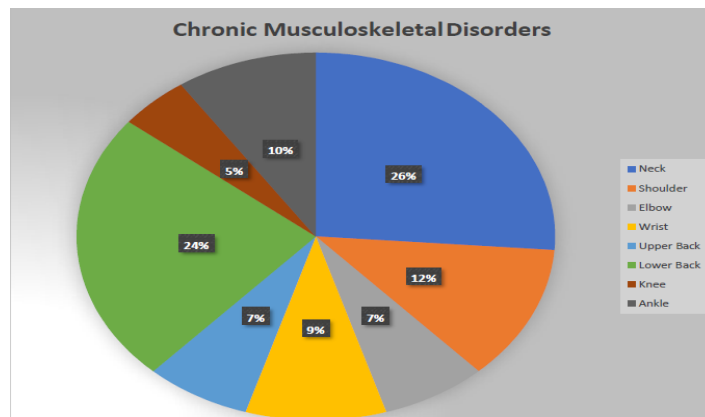


Table 3: Correlation of Acute work-related musculoskeletal disorders in the region of body and rapid entire body assessment (REBA) Score

	Musculoskeletal Disorders	r-Value	p-value
REBA	Neck	0.84**	0.0004
	Shoulder	0.46*	0.03
	Elbow	0.09	0.06
	Wrist	0.19	0.11
	Upper back	0.89	0.68
	Lower back	0.67**	0.0001
	Hip	0.35	0.46
	Knee	0.81	0.56
	Ankle	0.35*	0.02

P<0.05*

P<0.01**

Table 4: Correlation of Acute work-related musculoskeletal disorders in the region of body and rapid entire body assessment (REBA) Score

REBA	Musculoskeletal Disorders	r-Value	p-value
	Neck	0.67**	0.0001
	Shoulder	0.33**	0.002
	Elbow	0.69*	0.04
	Wrist	0.39**	0.01
	Upper back	0.53	0.44
	Lower back	0.68*	0.04
	Hip	0.46	0.35
	Knee	0.99	0.91
	Ankle	0.46*	0.03

P<0.05*

P<0.01**

Discussion:

The current study finding also shows that the majority of the tailors are at higher ergonomics risk during work followed by medium and very higher risk. Correlation of ergonomic risk assessment and acute musculoskeletal disorder are higher in neck and lower back region whereas in chronic musculoskeletal disorder are higher in neck, shoulder and wrist.

As compared to the findings of another study that found moderate for back (static) and back (dynamic), high for shoulder/arm and very high for wrist/hand and neck for sewing workers

In current study, subjects were assessed for WRMSDs in different body regions and it was found that the most common affected area was neck, lower back and shoulder.

This study revealed that ergonomic training is required to reduce MSDs in tailors.

Conclusion:

We have found that the prevalence of acute low back pain and chronic neck pain has been seen in tailors. Majority of the tailors are at higher ergonomic risk during work followed by medium and very higher risk. Correlation of ergonomic risk assessment and acute musculoskeletal disorder are higher in neck and lower back region whereas in chronic musculoskeletal disorder are higher in neck, shoulder and wrist.

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