

Assessment of Work-Related Musculoskeletal Pain and Work Posture Using REBA in Watchmakers

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ABSTRACT

Background: A watchmaker uses his skills in repairing a watch. They identify the problem correctly and rectify it using appropriate tools. A large number of watchmakers work in sitting positions for long periods of time. Due to this, several musculoskeletal problems like pain, awkward postures develop.

Objective: To assess work related musculoskeletal pain using Nordic Pain Questionnaire. To assess work related posture using REBA.

Method: n = 50 subjects were included in the study. The REBA scale was used to assess the work posture and the Nordic pain questionnaire was used to find the involvement of musculoskeletal system.

Results: From the study it was revealed that shoulders (29%) and neck (27%) were the most commonly involved structures and 80% population was under medium risk of having musculoskeletal disorders.

Conclusion: From the study it can be concluded that, majority of the watchmakers fall under medium risk category in REBA (80%). Abnormal work posture has a negative effect on the body with shoulder (29%) and neck (27%) being the most commonly affected parts.

Keywords: Watchmakers, Work Posture, Musculoskeletal disorders

INTRODUCTION

The watchmaker has the abilities to repair a watch according to the preferred specifications. They are capable to adjust, repair and/or replace various parts of a

watch. They are aware of the functional defects and have the skills in selecting the appropriate tools to correct the problem.^[1]

Watchmakers have to work in sitting positions for lengthy periods of time. Due to this, many occupational issues occur which include pain, discomfort, awkward working postures, eye-strains and visual fatigue.^[2]

Other occupations similar to Watchmakers are Goldsmiths, electronic manufacturers, microbiologists etc.^[3] Goldsmith's work in situations require an excessive degree of ability in gold curing, wire making, assembling various parts, engraving details and polishing of gold. Jewellers have an expertise in precision, skills and attention to detail, just like those who work in electronics production and in watch repairing.^[3] Laboratory employees such as microbiologists are exposed to many ergonomic hazards due to the nature of their work. Their work requires constant static postures, excessive repetition of movements, reaching for objects, using various grips while working and repetitive motions. This may be a factor in development of different kinds of musculoskeletal disorders among them.^[4]

Persisting with a static posture, such as sitting, stresses the musculoskeletal structures and increases the demand on the muscles, ligaments, and other soft tissues. Pain and discomfort in the back, neck, and shoulders are common in people who work in sitting for most periods of their time.^[5]

Workers who are engaged in highly repetitive jobs involving continuous hand exertion, vibration and localized mechanical pressure are vulnerable to various soft tissue injuries known as cumulative trauma disorder (CTD).^[6] It is also been observed that poorly designed workstation leads to unnecessary physical efforts, which in turn affects the efficiency and productivity of the job.^[7]

Rapid Entire Body Assessment (REBA) was developed by Hignett and McAtamney as a way to evaluate entire body posture for risk of work associated musculoskeletal problems. REBA is developed to help a practitioner and is used as a tool specifically designed to be sensitive to the type of unpredictable working postures found in health care and other service industries. REBA allows one to investigate the postures of the upper limbs (arm, forearm, wrist), trunk, neck as well as the lower extremities. Also, it differentiates the type of grip and muscle activity performed. It identifies five levels of risk, from negligible to very high.^[9]

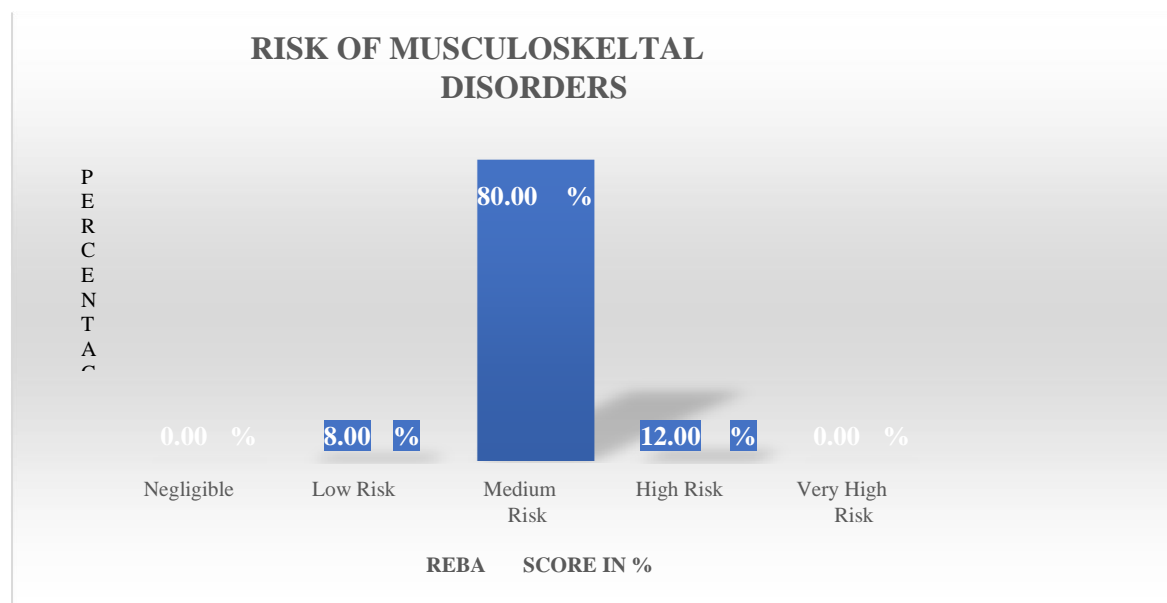
MATERIALS & METHODS

An observational study was performed on 50 watchmakers aged between 35-45 years

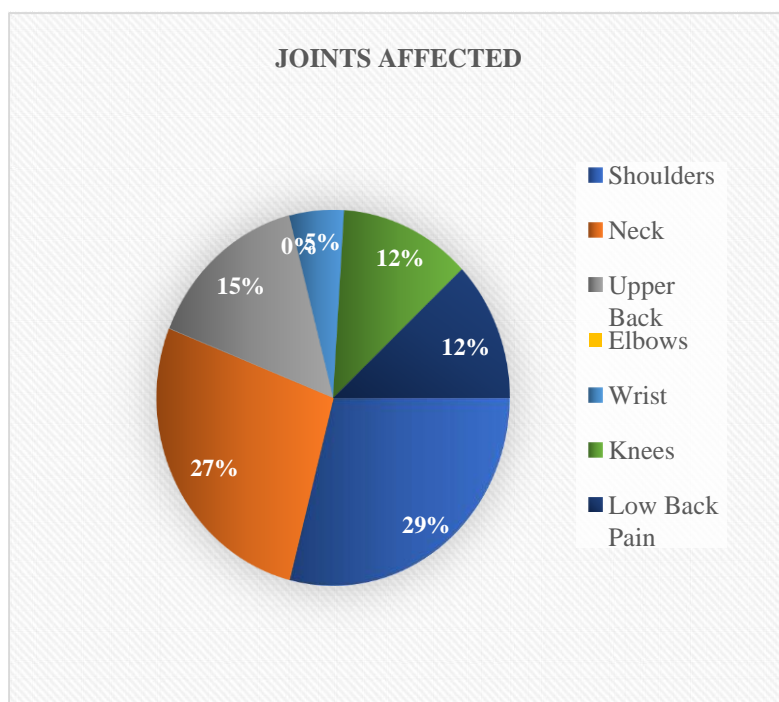
with a work experience of minimum 2 years. The work posture was analyzed using Rapid Entire Body Assessment while the Nordic Pain Questionnaire was used to assess painful sites. The work posture of the subjects was observed and scored under REBA. Score A was noted by finding the trunk, neck and leg score from table A and adding the load/force. Score B was noted by finding the upper arm, lower arm and wrist score from table B and adding the couple. Score A and B were added to find the score C. Activity score was to the score C to get the final REBA score. The Nordic Pain Questionnaire was provided to each subject. The significance of the Questionnaire was explained. The subject was asked to fill the questionnaire.

RESULT

The study was conducted on 50 watchmakers aged between 35-45 years. The work posture was analyzed using Rapid Entire Body Assessment (REBA) scale. The Nordic pain questionnaire was used to identify the musculoskeletal pain in specific joints. Figures were plotted using Microsoft Excel.



Inference: The bar diagram shows most of the watchmakers fell under medium risk of musculoskeletal disorders.



Inference: The pie chart shows the percentage of joints affected where Shoulders and neck are the most commonly affected joints followed by upper and lower back

DISCUSSION

The purpose of this study was to assess the work posture and work-related musculoskeletal pain in watchmakers. For this, 50 watchmakers aged between 35- 45 years were selected as per the inclusion and exclusion criteria. The work posture was assessed using Rapid Entire Body Assessment (REBA) scale while Nordic Pain Questionnaire was used to identify the painful body regions.

From analysis of the work posture, it was observed that 80% of population was distributed under Medium-Risk category (REBA Score 4- 7) which indicates further investigation and soon changes in static working postures of watchmakers. 12% of the population fell under High-Risk category (REBA Score 8- 10) indicating an immediate investigation and changes in the static posture. Maximum number of the watchmakers do not have a proper workstation which leads to them not sitting in a suitable posture while working. Working in awkward postures and long duration repetitious movements can increase the force and degree of exertion and can

lead to stress on the joints as well as reduction in the blood inflow. Furthermore, watchmaking needs repeated hand, thumb, finger and forearm movements, wrist twisting, neck bending, sitting for a longer duration of time. Also, watchmakers have to repeat the wrist and hand movements while they work on the workstation that generally requires prolonged flexion of back and neck, raised shoulders, awkward wrist and hand positions which leads to attainment of an abnormal work posture. These factors lead to stressing of the lumbar spine and the entire body. Repetitive motion injuries develop over time and happen when joints are stressed, tendons are irritated, muscles and nerves are strained and blood inflow is limited.^[10]

In a study conducted to assess the ocular stress profile in watchmakers, it was observed that the physical and physiological parameters related to eye strain such as NPC, IOP were significantly affected. Most of the workstations do not have satisfactory lighting at their workplace. This causes the watchmaker to sit in an abnormal posture to compensate for the affected vision.^[2] All

these factors lead to the watchmaker sitting in an incorrect posture leading to occurrence of multiple Work- Related Musculoskeletal Disorders.

In a study conducted on technologists, it was observed that they frequently worked in awkward positions and with awkward posture due to the length of the microscopes and the height of the main workstation. A technologist's head and arms were usually placed in a forward and in an unsupported position with their shoulders rounded. The abnormal posture of the watchmakers in this study can be explained by the above study of not having acceptable knowledge about ergonomic principles and their applications, lack of regular work-site evaluations, lack of corrective and precautionary actions, and use of equipment that wasn't designed with ergonomic principles in mind.^[11]

Secondly, the Nordic Pain Questionnaire was used to identify the painful body regions. In this study, the shoulder complaint was found to be 29% while the neck complaint was found to be 27%. The main reason for these symptoms could be the static posture adopted by neck during repair work, which in a study stated that high degrees of static contraction, prolonged static loads, and awkward postures involving the neck and shoulder muscles were associated with an increased threat for Musculoskeletal disorders (MSDs).^[4] As the work surface is too low, the watchmaker leans forward, lowers and changes the position of the shoulders and places them forward causing fatigue and pain in the scapular muscles. From the observation and analysis of the work posture of the watchmakers, it was found that they keep their neck and back inclined forward from the correct sitting posture due to their poor workstation design for prolonged periods of time. Adopting postures involving fairly extended head or neck for prolonged periods are likely to lead to musculoskeletal discomfort.

The presence of Upper back complaint was found to be 15% while Lower back complaint was present in 12% of the total

population. The neck and back muscles are involved while sitting down in a static posture to identify and view the parts of the watch using a magnifying glass. This could be the reason for observing high percentage of symptoms in neck and lower back in the present study.

Knee complaint was present in 12% while wrist complaint was found in 5% of the total population. Majority of the workstations don't have an acceptable arm and foot rest which leads to an abnormal upper and lower extremity posture attained by the watchmakers during their working hours. Unsupported forearm and wrist positions may sooner or later lead to Cumulative Trauma Disorders (CTD). As there is a lack of foot support, maximum number of watchmakers resort to a cross legged posture which puts an excessive stress on the knees leading to discomfort.

CONCLUSION

The study primarily focused on watchmakers having a workstation. The age group was kept narrow to avoid the risk of any bias. From this study it was concluded that, majority of the watchmakers fall under medium risk category in REBA (80%). Abnormal work posture has a negative effect on the body with shoulder (29%) and neck (27%) being the most commonly affected parts.

SUGGESTIONS

Workstation analysis and subsequent modifications can be done to prevent the risk of work-related musculoskeletal disorders.

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