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A Review on Use of Rapid Entire Body Assessment (REBA) Tool to Evaluate Musculoskeletal Disorder Among Health Professionals

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Abstract

Musculoskeletal disorders are very common among health professionals. Health issues might range from slight discomfort and interruptions to more serious illnesses that call for treatment or leave from work. Moreover, high prevalence of work-related musculoskeletal disorders has been reported among them. This literature review aims to describe previous studies and its findings of musculoskeletal disorders among health professionals using REBA assessment tool. In this study, the authors explored 11 related articles from different databases including Pub Med, Google Scholar, Scopus, and Research Gate. The selected keywords were classified into two categories as follows: 1. Related to Ergonomics, exercises, Rapid Entire Body Assessment (REBA) 2. Related to MSDs such as Musculoskeletal Disorders, musculoskeletal pain, occupational injuries. 3. Related to Health professionals, Medical Doctors, Nurses, Allied Health Professionals etc. The prevalence of musculoskeletal disorders is very much higher among health professionals even though they are aware about proper ergonomics in working place. Lumbar and cervical region are the main areas which affects the most in all health professionals especially among medical doctors, dentists, nurses. Poor posture, improper use of ergonomic setting, handling patients in risky behaviour etc can be factors for work related musculoskeletal disorders. Early training and education during college days, ergonomically sound workstation, proper patient handling, and correct postural habits helps to reduce the incidence of musculoskeletal problems in medical professionals. To fill the research gap, further studies can conduct on prevalence of symptoms of musculoskeletal disorders among each category among health professionals.

Keywords: Ergonomics, Musculoskeletal Disorder, Health Professionals, Doctors, Dentists, Nurses, Occupational Injuries.

1. Introduction

Ergonomics is the science that focuses on personalizing the workplace for each employee. The ergonomics principle emphasizes that a job should be designed around the human body rather than forcing a person to adapt to an inadequate design or function. Ergonomics plays a variety of important responsibilities in the health sector ^[1]. One of the most common health problems associated with the workplace is musculoskeletal dysfunction (MSD). A musculoskeletal ailment has a substantial impact on person's quality of life and can be quite expensive in terms of lost wages and compensation payments ^[2].

In the healthcare industry, work-related musculoskeletal injuries and diseases (WMSDs) are a serious problem ^[3]. Musculoskeletal injuries and disorders are among the most common occupational diseases in contemporary society and working populations, and occupational medicine is well aware of this association. According to the European Foundation for the improvement of Living and Working conditions, MSDs account for more than 50% of serious work-related diseases and are the most common occupational ailment experienced by European employees ^[4]. WMSDs which are caused by one's job are the major cause of morbidity in the medical community ^[5]. Workplace musculoskeletal disorder adds a heavy strain on society as a whole, businesses and employees. The rationale is that these issues have an impact on those who are employed and help to raise absenteeism, lower productivity and worse worker quality of life ^[6]. Compared to other professional groupings, health

workers experience musculoskeletal injuries are more frequently [7]. They are particularly vulnerable population, with a 4 times greater risk than industrial employees [8,9]. Health issues might range from slight discomfort and interruptions to more serious illnesses that call for treatment or leave from work. In extreme circumstances, they may result in disability and the requirement for early retirement. Most MSDs progress gradually. Early on, there is pain and exhaustion in the affected area while working, but these symptoms go away at night on days off, and during this time, work performance is not harmed. In the intermediate phase, there is work-related pain that continues into the night, and our ability to perform repeated tasks is impaired. In the third or late stage, pain is ongoing and the patient may experience weakness and exhaustion that call for rest. This stage includes an inability to sleep and carry out simple duties occurs in this stage. MSDs typically have multiple causes. Generally speaking, none of the causal elements cause a condition on their own; rather, the occurrence of a disorder requires the combination and interaction of numerous factors. Handling loads, particularly when bending, rotating or twisting, repetitive or sudden movements, awkward and static body positions, vibrations, poor lighting, heat or cold in the environment, a quick pace of work and prolonged sitting or standing in one place are all physical risks and organizational risk factors [10].

At Nottingham Hospital in UK, Sue Hignett and Lynn Mc Atamney created the technique, which was then published in 2000. After identifying and analyzing almost 600 working postures, a team of ergonomists, physiotherapists, and nurses came up with the solution. The upper limb (arm, forearm, wrist) trunk, neck and lower extremities can all be jointly examined with REBA. Additionally, it distinguishes between different between different kinds of grips and muscular activation. From insignificant to extremely high, it categorizes risk into five levels [11].

The study's goal was to i. Find out and collect all papers, researches, and reports on use of REBA assessment tool to evaluate musculoskeletal disorder among health professional. ii. Emphasis the importance of ergonomics among health professionals to prevent musculoskeletal disorders.

2. Methods

2.1 Search Methods

The present study was conducted to evaluate the musculoskeletal disorders using REBA assessment tool among health professionals in July 2022. In this study, the authors explored more than 50 articles from different databases including PubMed, Google Scholar, Scopus, and Research Gate. The selected keywords were classified into two categories as follows: -1. Related to Ergonomics, exercises, Rapid Entire Body Assessment (REBA) 2. Related to MSDs such as Musculoskeletal Disorders, musculoskeletal pain, occupational injuries. 3. Related to Health professionals, Medical Doctors, Nurses, and Allied Health Professionals etc.

2.2 Criteria for Inclusion and Exclusion

Conference proceedings and letters to the editors were left out. For inclusion, empirical studies, case studies and literature reviews from peer reviewed English publications were evaluated. Participants in the studies must include any

healthcare professionals. There were on limitations on age, gender, race or social class. There were no non-English language articles in the literature review. All research on the topic was taken into consideration because review papers for the evaluation of musculoskeletal problems using the REBA tool literatures are less common.

2.3 Study Selection

All research publications discovered through the search had their titles, keywords, and abstracts, appraised for their applicability to this literature review. The inclusion requirements were searched for and only full text copies found were taken. There were numerous studies on musculoskeletal issues in various professions available. However, the literature on this topic was harder to find during the search.

2.4 Search Results

A total of 50 items were found after a thorough search of the databases. The relevancy of the titles, keywords, and abstracts was checked, and duplicates were eliminated. A total of 11 potentially relevant papers among doctors, nurses, dentists were obtained as a result of this approach. Few publications were removed from the evaluation after further analysis because they did not evaluate the prevalence of MSD using REBA tool among health professionals. Following the exclusions, a final batch of eleven papers was selected for the review.

3. Results

• Medical doctors

Few researchers conducted a study using the REBA evaluation tool in Medical Doctor, a case study was conducted to examine the risk of work-related musculoskeletal disorders caused by inadequate ergonomics. The level of musculoskeletal disorder risk for the occupational task was assessed using Rapid Entire Body Assessment (REBA). So, this design may contribute to the discovery of new information regarding the danger of MSDs and the significance of ergonomics in the practice of medicine, particularly during Covid -19 pandemic. The primary respondent of the study was a physician who sought outpatient physical therapy owing to musculoskeletal pain. After evaluation, it was clear that back pain was the most common problem followed by neck pain. The result of this case study has demonstrated that due to their poor ergonomics, doctors particularly during covid 19 pandemic, are subject to increased risks of musculoskeletal problems risk, investigate and implement change. Therefore, it is crucial to provide appropriate instruction on excellent ergonomics and an ergonomically sound workstation to reduce the incidence of musculoskeletal problems in medical professionals [12].

Another research was done to assess if otolaryngology surgeons experience postural related strain and musculoskeletal discomfort, as well as their level of ergonomics training and access to ergonomic equipments. Intra operative observations and survey research made up the study design and they evaluated the staff during several otolaryngological techniques especially operations using REBA score system to identify ergonomic hazards. Based on these conclusions, a survey evaluating ergonomic practice, environmental infrastructure and prior ergonomic education or training was distributed to otolaryngology

surgeons at a single academic institution in the United States. Result of this study was 69% response rate obtained from 70 surgeons, with the most frequent type of back pain being cervical spine pain which affected 72.9% of those who responded. Interestingly, both subjective survey reports and results from observational risk analysis showed that residents were equally affected when compared to more experienced surgeons. Furthermore, standing was the activity in which 43.8% of surgeons said they suffered the most pain, compared to sitting when only 12.5% did reported. Notably, 10% of respondents said their pain affected their ability to work. Only 24% of surgeons had any prior ergonomic education or training. This study concluded that doctors rarely receive ergonomic training in the context of surgery and indicate that pain and impairment brought on by poor ergonomics are pervasive throughout the otolaryngology community. Furthermore, intraoperative observational results showed that the majority of observed surgeons have poor posture, especially a poor neck angle and use of ergonomics settings, both of which enhance the risk of ergonomic injury [13].

• Nurses

Few researchers conducted an Ergonomic study of nursing tasks in surgical hospital services and the biomechanical strain brought on by patient handling, among other responsibilities, exposes nurses to risk factors for work-related musculoskeletal disorders. REBA and Nordic Musculoskeletal Questionnaire were used in the surgical internment services of a central hospital in Northern Portugal to specifically assess the nurses' patient handling risks and also to evaluate the frequency of their musculoskeletal symptoms. Data was collected initially, and after seeing the various postures taken, an objective risk evaluation was made. The majority of nurses reported having musculoskeletal pain in various parts of body with lumbar and cervical regions being the worst impacted, according to the results. The REBA assessment revealed that the task of handling patients carries risk of WMSD [14]. Another study conducted on nurses to assess musculoskeletal risk at work. Nursing profession has higher than average risk of developing musculoskeletal diseases at work. Numerous researches on nurses have shown that they had high prevalence rates of back injuries as well as other symptoms linked to WMSDs, particularly in back. The activities that lead to back pain most frequently include patient handling. The main objectives of the study was to identify the major risk factors of WMSDs for home care nurses and to carry out an impartial assessment of the risk for these specialist. REBA and Manual Handling Assessment Charts (MAC) were both used to measure the risks of MSDs related to nursing duties. For tasks involving manual material handling and patient management, respectively, REBA and MAC techniques were used. The findings show that a variety of risk factors are present and they have a significant impact on the risk level discovered-generally moderate but seen as high for particular activities. They concluded that the practice of home care has unique traits that unmistakably affect the nurse's adoptions of risky behaviors [15].

The purpose of another study conducted on nurses was to assess the link between the working posture of operating room nurses and their demographic and professional characteristics. REBA checklist and a questionnaire were

used in this cross-sectional study of 147 operating room nurses in Tabriz, Iran. The data were examined using SPSS and the t test, Pearson correlation analysis of variance and linear regression tests for univariate and multivariate analyses respectively. The mean REBA score for the examined nurses was 7.7 which indicates a high-risk level and emphasizes the urgent need to alter working postures. In univariate analyses, there was a statistically significant correlation between working posture and age, gender, regular daily exercise, work experience, number of shifts per month and type of operation rooms. In a multivariate study, the operating room type and gender of the nurses were the predictors of their working positions. In univariate analyses, there was a statistically significant correlation between working posture and age. The findings showed that this study population needs ergonomic interventions and educational programmes to improve working posture, which can afterwards help to promote their health and wellbeing [16].

• Dentists

Another study done after the assessment and adjustment of work postures through ergonomic interventions are necessary for the prevention of musculoskeletal disorders, which make up a significant portion of occupational diseases in dental practitioners. The purpose of this study was to evaluate the ergonomics of the dental profession and to examine the connection between MSDs and working circumstances. 65 dentists participated in this cross-sectional study, in which Rapid Entire Body Assessment (REBA) approach was used. Through the use of the Nordic Musculoskeletal Questionnaire, the prevalence of MSDs was determined. The results showed that the prevalence of MSDs for various body parts in this injury was 75.9% for the neck, 58.6% for the shoulders, 56.9% for the upper back, 48.3% for the lower back and 44.8% for the wrist. Using REBA for job analysis, it was found that both groups had score more than 4. The risk levels determined using REBA approach exhibit a significant link only with neck and lower back discomfort. It was concluded that dentists need to adopt better work positions. In addition to education, considerations should be given to the design of the workstation, breaks during the work day, and frequent physical activity [17].

Another study conducted on dental hygienists for assessing the MSDs. In addition to examining working postures frequently employed during periodontal treatment, this study sought to give fundamental information that can be used in the prevention and treatment of musculoskeletal diseases. Three dental hygienists with more than ten years of experiences working in dental clinics served as the subjects. They mimicked dental hygienists work postures during scaling and oral radiography imaging jobs for the examination of work postures. To carefully watch the individuals as they worked, video of the subjects was taken. The Rapid Entire Body Assessment, Rapid Upper Limb Assessment and Strain Index ergonomic assessment techniques were used to evaluate and analyze the captured working postures. In results, there were no variations between the manual and ultrasonic scaling intensities. The shoulder and waist were frequently overworked body parts. Working postures for manual scaling and ultrasonic scaling were shown to be the most hazardous according to the strain index. Researchers concluded that dental hygienists work postures when scaling are ones that are quite likely to

result in work related musculoskeletal diseases. Therefore, it is believed that the creation of therapeutic exercise programmes that can be conveniently carried out at the workplace and throughout daily life is essential to preventing work related musculoskeletal illness^[18].

Another study aimed to analyze the impacts of physical balance, work accumulation, and working posture on shifts in plantar pressure in dental hygienists by measuring plantar pressure, which evaluates physical balance, and REBA which evaluates working posture. This study involved 24 dental hygienists who are currently employed by dental offices. Dental hygienists working posture was assessed ergonomically using the Rapid Entire Body Assessment and plantar pressure was measured using a gait analyzer. The result was the mean REBA score for the subjects was 4.96 and 87.5% of the subjects had poor working posture. Seven of eight components of the foot's sole displayed noticeably different plantar pressure between the right and left feet in patients with a REBA score of four points. Specifically for patients with a REBA score of four points or more, pressure increased in the left foot and the anterior right foot when we looked at changes in plantar pressure over the courses of a week. Study concluded that the majority of the dental hygienists had hunched over posture while working. Differences in plantar pressure between the right and left foot were seen in subjects with bad posture that required correction. Musculoskeletal diseases can be brought on by improper posture. Therefore, it will be required to plan internal and external measures, such as education, exercise, improving the working environment and improving ergonomic equipment and devices, to maintain optimal working posture in dental hygienists^[19].

The occupational health services sector has significant issues due to work related musculoskeletal disorders. Another study done on dental professionals as they are one of the high-risk health professionals. They frequently encounter ergonomic dangers that can result in musculoskeletal disorders in different parts of body. The purpose of this cross-sectional study was to examine MSDs and determine the best ergonomic risk assessment technique for dentistry offices. In Shahroud, Iran, this study involved 70 dentists and 70 members of the administrative staff of dental businesses. Two observational ergonomic risk assessment techniques, Quick Exposure Check (QEC) and Rapid Entire Body Assessment (REBA) as well as the Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) were used. Results shown that dentist had significantly higher mean scores for musculoskeletal discomforts than the other administrative staff. Additionally, the outcomes of the multiple regression analysis method suggested that age, working hours and job duration all had a substantial impact on the overall number of MSDs. It has been discovered that regular exercise greatly lowers complaints of neck pain. Also it was discovered that QEC was superior to REBA in terms of anticipating musculoskeletal discomforts. Given the high prevalence of WMSDs in dentists, a variety of interventions including improved physical working conditions, ergonomic training programmes and redesigned workstations, are recommended^[20].

Another study in dentistry stated that poor working posture is the primary factor contributing musculoskeletal problems. REBA was used in this study to analyze the

work postures of general dentists and specialists. In this cross-sectional study, 90 dentists had their work postures evaluated using the REBA tool. The stratified sampling was adopted. In SPSS 19, the analysis of variance (ANOVA), independent t-test and Pearson's correlation test were used to examine data. According to the findings, 90% of dentists work postures posed a moderate to high risk. The poorest body postures were displayed by oral and maxillofacial surgeons, pedodontists, and periodontists among the specialist. The study concluded that since dentists working postures generally need to be improved and universities dentistry curricula must include more extensive ergonomic training and promotion^[21].

Few researchers done another study on dentists have been reported to have a high prevalence of musculoskeletal diseases due to lengthy difficult and awkward operations requiring non- neutral vertebral postures and dangerous joint articulations. The study's objective was to investigate the feasibility and reliability of the application of REBA among dental students using three digital photos of the operator, could be applied successfully and consistently among dental students. In a clinical session, third year dental students (n=28) took profile, back and frontal digital photos of student operators. Student groups and an independent physiotherapist assigned REBA scores for each student using the images. For both scores, statistical comparisons were made. Results showed that between the scores obtained from students and staff, there was a significant inter-rater reliability was observed and reasonable concordance level. According to students and staff assessments of the REBA scores, the proportion of medium and high-risk students in the class was 64% and 75% respectively. The incidence of MSDs reported by dentistry students in the literature correlated well with the high percentage of medium to high-risk REBA levels. Students with intermediate reliability were better able to produce REBA results than staff. The study concluded that for clinical dental students, REBA using digital photos may be a simple to use and reasonably reliable approach for alerting static ergonomic danger. Early training at risk behavior can be changed to reduce the development of negative posture habits and help prevent MSDs throughout clinical years and beyond graduation^[22].

4. Conclusion

The prevalence of musculoskeletal disorders is very much higher among health professionals even though they are aware about proper ergonomics in working place. Lumbar and cervical region are the main areas which affects the most in all health professionals especially among medical doctors, dentists, nurses. Poor posture, improper use of ergonomic setting, handling patients in risky behavior etc can be factors for work related musculoskeletal disorders. Early training and education during college days, ergonomically sound workstation, proper patient handling, and correct postural habits helps to reduce the incidence of musculoskeletal problems in medical professionals. To fill the research gap, further studies can conduct on prevalence of symptoms of musculoskeletal disorders among each category among health professionals.

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