ORIGINAL ARTICLE

# Prevalence and Risk of Work-Related Musculoskeletal Disorder (WRMD) Among Occupational Therapy Practitioners in Malaysia

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## ABSTRACT

**Introduction:** Occupational therapist practitioners are significantly at risk for Work-Related Musculoskeletal Disorder (WRMD). Past studies proved this profession has a higher risk of musculoskeletal disorders (MSD), however, the risk factor of this rise still needs to be explored, especially in the eastern countries where the prevalence is still not yet proven. Thus, this present study aims to investigate the risks and prevalence of work-related musculoskeletal disorders in Malaysia's occupational therapists. **Materials and Methods:** A Cross-sectional study using purposeful sampling was employed. Fifty-seven Occupational Therapists responded to self-reported questionnaires: Job Requirement and Physical Demand (JRPD) scale and Extended Nordic Musculoskeletal Questionnaire (NMQ-E). **Results:** The study found that the prevalence of task risks is the highest of the upper limb area which is repetitive task/ movement and lifting with one hand, meanwhile for the lower back with repeatedly bend back forward, backward, to the side, or twist and bending or kneeling and constantly move or apply pressure with one or both feet. Prevalence of WRMD at the shoulder with 82.5% (n=47) was the highest among the respondents in lifetime, annual, and point prevalence followed by the low back region with 70.2% of the respondents and 64.9% at the wrist region. **Conclusion:** The present study showed that Malaysian Occupational Therapist has a high prevalence of work-related musculoskeletal disorders.
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**Keywords:** Work-Related Musculoskeletal Disorder, Occupational therapist, Musculoskeletal disorders

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## INTRODUCTION

Occupational therapists are healthcare professionals trained to facilitate individuals' participation in purposeful activities or occupations (1,2). They are helping people of all ages who face physical, cognitive, emotional, or developmental challenges that hinder their ability to participate fully in daily activities (1,3). The shortage of occupational therapists in Malaysia is a very significant issue (4). It was reported that with a population of 34 million people, the number of registered occupational therapists under the Allied Health Professions Act (AHP 774) is only 1,885 and the ratio of occupational therapists in Malaysia is 1 to 17,777 people (5). Despite the importance of occupational therapists within healthcare in Malaysia, limited research is being done to address the issue of musculoskeletal problems among them, especially if it is caused by work nature or job demand itself.

Musculoskeletal disorders (MSD) are one of the leading causes of disability reported in The 2016 Global Burden of Disease (GBD) and are also seen as the second potential cause of disability (6). According to the National Institute for Occupational Safety and Health (NIOSH), there is a significant relationship between physical exertion during work and work-related musculoskeletal disorders (WMSD)(7). In conjunction with that, Occupational Therapy is also one of the health professions having a higher risk of acquiring MSD than other professions (8). In a study of the US population, the prevalence of these work-related diseases among therapists grew from 2% to 10% in 2004, from 5% to 10% in 2005, and then from 5% to 13% in 2006 (9). More specific reported risk factors for MSDs in therapists include the job demands that involve physical capacity, inappropriate postures, and repetitive works (some occurring during handling tasks), especially if the therapist didn't use proper body mechanics when handling the patient and doing an activity (5,9,10).

Recent research on work-related musculoskeletal disorders (WRMD) has concentrated on the job responsibilities of physiotherapists and occupational therapists (OTS) in general (13,14). A study highlighted physical therapists and occupational therapists experience high rates of work-related pain(15). Currently, there is hardly any evidence-based knowledge on work-related musculoskeletal exposures and complaints of occupational therapists in Malaysia. Most of the recent research focuses on occupational therapy work risk and demand among Western countries, but more research needs to be done to point out the differences in South-eastern countries' occupational therapy work risk and demand based on work culture. The work demands of OTs will be investigated as a risk factor for WRMD and will be one of the factors to improve in the future. Work demands, such as work postures and movements, lifting or carrying, patient-related factors, and repetitive tasks, will be explored in detail to focus on the main cause of issues more clearly.

Prevalence studies of work-related musculoskeletal disorders among 17 Iranian Occupational Therapists (OTs) showed that 13 OTs had signs and symptoms of MSD (9). The study shows no association between the prevalence of musculoskeletal disorders with age, height, weight, and gender, including weekly working hours and work experience in the present year (9). For the last 12 months, therapists experienced symptoms of MSD in the areas commonly affected by MSD: wrist and hand, back, knees and neck, and waist and knee area for the last 7 days (9). Similarly, in another study of musculoskeletal complaints among occupational therapists and the general population in Germany, the prevalence of MSD is at the lower back, the neck, and the shoulders for 12 months, especially for OTs at the thumb, wrist, and elbow areas (16).

From a study analysis, they find that the overall work postures and movements, lifting or carrying, patient-related factors, and repetitive tasks are the most frequently perceived risk factors of MSD by health professionals (8,17). This analysis is supported by a survey that showed poor postures at work regularly experienced by therapists with a risk of MSD (8,18). In addition, a systemic review found that patient handling was the most common occupational factor to caused work-related injuries, and fear, anger, isolation, and inability to perform duties, and leisure activities were common psychosocial issues also because of the injuries (18,19). While recent studies have shed light on the alarming prevalence of work-related musculoskeletal disorders (WRMD) among occupational therapists in Western countries, there remains a significant gap in research focusing on the occurrence of WRMD among occupational therapists in Malaysia.

Therefore, this study is highly significant in determining the prevalence and risk of work-related musculoskeletal disorder (WRMD) issues that might occur among Occupational Therapists in Malaysia. There is a need for research that examines the relationship between the prevalence of musculoskeletal disorders and the severity of musculoskeletal disorder symptoms among Occupational therapists to date. Thus, this study aimed to ascertain whether there is an association between the Prevalence of WRMD and the severity of musculoskeletal symptoms among occupational therapists.

## MATERIALS AND METHODS

### Samples

The study design was a cross-sectional study in which to determine the prevalence and the risk of Work-Related Musculoskeletal Disorders among occupational therapists in Malaysia. The participants of the study were Occupational Therapy Practitioners in Malaysia. From January 2023 to April 2023, respondents were collected in this study using convenience sampling. They were included in the study if they possessed the following criteria; (a) aged between 21 and 60 years old; (b) have working experience of at least 1 year, and actively working as Occupational Therapists in Malaysia. They were excluded if they had serious medical conditions (e.g.: Cardiovascular, respiratory, neurological, gastrointestinal, urogenital, or related conditions, pregnancy previous or scheduled surgery, and didn't actively work for the past 1 year. This approval and ethical clearance from the Faculty of Health Sciences of Universiti Teknologi MARA (UiTM) was attained upon commencement of the study [Reference No: FERC/FSK/MR/2022/0270].

An online survey using social networks was used to distribute a set of online questions. It is divided into three sections, the first of which includes sociodemographic information (age, gender, years of working, workplace, current working area, and medical history). The second section is a questionnaire from the Job Requirement and Physical Demand (JRPD) scale that evaluates self-reported biomechanical exposures. The third section is a questionnaire from Extended Nordic Musculoskeletal Questionnaire (NMQ-E) that serves as a screening instrument for musculoskeletal pain.

### Job Requirements and Physical Demands (JRPD) Questionnaire

Job requirements and physical demands (JRPD) questionnaire: The JRPD is a valid measure of back pain-related biomechanical exposures, consisting of 38 items that examine both types of exposure and duration of biomechanical exposures (20). Each item is rated on a 5-point Likert scale: 1 (never), 1 (≤ 5 h/week), 2 (≤ 2 h/day), 3 (2 to 4 h/day), and 4 (≥ 4 h/day) (20). The total score (range: 38–152) is obtained by summing the scores of all 38 items, with higher scores indicating higher levels of biomechanical exposure and a greater likelihood of a subject suffering from LBP within the past

12 months (20).

### Nordic Musculoskeletal Questionnaires

NMQ-E is an extended version of Nordic Musculoskeletal Questionnaires (NMQ). The questionnaire includes 11 questions about 9 body regions, equating to 99 data items generated by the tool. With the exception of age data, all response options are dichotomous (yes/no) (21,22,23). The tool is a screening instrument for musculoskeletal pain (10). NMQ-E inquires about ''trouble,'' defined as ''ache, pain or discomfort'' and 9 body regions (3 each on the upper limbs, spine, and lower limbs) with 11 questions. NMQ-E measures 12 months and lifetime prevalence of musculoskeletal symptoms, and severity of symptoms (impact on work and leisure) (21,22). This questionnaire consists of binary or dichotomous questions where respondents need to choose either a "YES" or "NO" answer.

### Statistical analysis

The Statistical Package for the Social Science (SPSS) version 28.0 was used to analyze the data collected from the self-report questionnaire by the respondents. Using descriptive analysis, the sociodemographic factor, Job requirements and physical demands (JRPD), and Extended version Nordic Musculoskeletal Questionnaires (NMQ) scores were examined. To describe the prevalence and risk factor of WRMD among Occupational Therapists, usage of frequency, mean, mode, and standard deviation were used.

## RESULTS

### Demographic characteristics of respondents

From a total of 57 respondents, 7 % (n=4) out of the total respondents were male and most of the respondents, 53 % (n= 53), were female. Looking at the respondents' age, overall, 59.6 % (n= 34) of the respondents are in the age range of 20 to 30 years old, followed by 35.1 % (n=20) of them in the range of 31 to 40 years old. The rest of the respondents, 3.5 % (n=2) are in the age group 41-50 and 1.8% (n=1) are in the age group 51-60. Respondents' years of working experience is the most in the range of 1 to 5 years (28, 49.1%), 35.1% (n=20) at the range of 6-10 years, 12.3% (n=7) in the range of 11 to 15 years and 1.8% (n=1) respectively at 16-20 years and above 21 years old.

In regards to sociodemographics, 43.9%(n=25) of the respondents are working in a Rehabilitation centre, in hospital settings is at 38.6% (n=22) and the rest is located at the pediatric center (8.8%, 5), in a General clinic(7.0%,4) and LOCUM (1.8%, 1). More than half the number of these respondents are working in the Pediatric area(59.6%, n=34), and the rest work in areas such as Physical, Orthopedic, and Medical-Neuro. Some of the respondents also work in other various areas (12.3%,7) such as work rehabilitation, Community, Education, and mixed cases. The overall respondents' demographic data were tabulated in Table I.

**Table I: Demographic Data Of Respondents**

| Variable | Category | n (%) |
|---|---|---|
| **GENDER** | Male | 4 (7.0) |
| | Female | 53(93.0) |
| **AGE** | 20-30 years old | 34 (59.60) |
| | 31-40 years old | 20 (35.10) |
| | 41-50 years old | 2 (3.5) |
| | 51-60 years old | 1 (1.80) |
| **YEAR WORKING** | 1-5 years | 28 (49.1) |
| | 6-10 years | 20 (35.1) |
| | 11-15 years | 7 (12.3) |
| | 16-20 years | 1 (1.8) |
| | Above 21 years | 1 (1.8) |
| **WORKPLACE** | Hospital | 22(38.6) |
| | Rehabilitation Centre | 25(43.9) |
| | Pediatric Centre | 5(8.8) |
| | General Clinic | 4(7.0) |
| | LOCUM | 1(1.8) |
| **AREA** | Psychiatric | 1 (1.8) |
| | Physical | 5(8.8) |
| | Pediatric | 34 (59.6) |
| | Orthopedic | 4(7.0) |
| | Neuro-medical | 6(10.5) |

### Work-related risk factors contribute to the prevalence of Work-Related Musculoskeletal Disorders among Occupational Therapists in Malaysia.

The data of biomechanical exposure are presented in Table II. From the results, it can be seen that the mean score of the JRPD scale is 54.63 (SD, 23.75), which is less than average scores. From the mean scores, it can be interpreted that respondent's scores have a lower amount of biomechanical exposure in the workplace and a lower chance of back pain in the prior 12 months. In Figure 1, a bar chart is presented to show the frequency of the total score of respondents in the JRPD scale. From the bar chart, it can be seen that the modes of each area are represented.

**Table II: Mean of JRPD Total Scores (n=57)**

| | JRPD Scale (N=57) |
|---|---|
| Mean | 54.63 |
| SD | 23.75 |

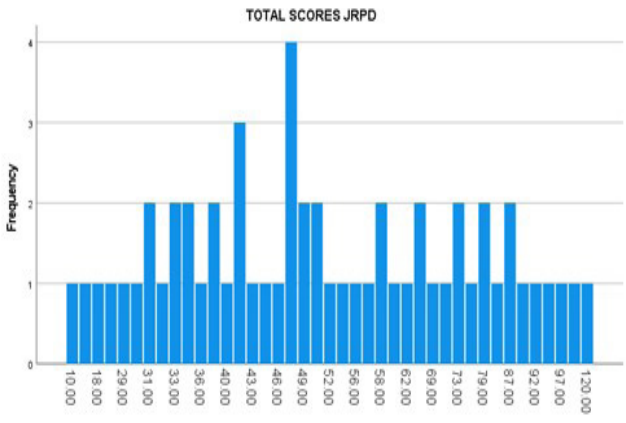


**Fig. 1: Bar Chart of JRPD frequency of respondents' total scores**

Based on the frequency of exposure, in the upper limb area, question 4 (I perform a series of repetitive tasks/ movements during the normal course of my work) and question 15(I lift and/or carry items with one hand) have the highest mode which on 2-4 hours per day (3) and more than 4 hours per day (4). For the low back area, there is no significant difference in mode among the items listed. In the low back area, question 4 (Repeatedly bend back forward, backward, to the side, or twist), 7 (kneel or squat) & 8 (constantly move or apply pressure with one or both feet using foot pedals, driving) has the highest time spent.

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From the findings of the assessments in Table III, shoulder body region has the highest prevalence in a lifetime (82.5%, 47), annually (73.7%,42) in the last 12 months, month prevalence (66.7%,38), and point prevalence (38.6%,22). This prevalence is followed by the lower back region and at the lowest prevalence wrist region. Even though the wrist region shows less prevalence, this area is more prone to musculoskeletal injury, especially for occupational therapists who specialize in splinting areas, for which they are required to use the scissors repetitively (24). More research needs to be done to explore this finding.

**Table III: Prevalence of Musculoskeletal Symptoms among Occupational Therapists**

| Body Region | Shoulder | | Wrist | | Low Back | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| NMQE Prevalence of Musculoskeletal Symptoms | | | | | | |
| Lifetime Prevalence | 47 | 82.5 | 37 | 64.9 | 40 | 70.2 |
| Annual Prevalence (last 12 months) | 42 | 73.7 | 35 | 61.4 | 36 | 63.2 |
| Month Prevalence (last month) | 38 | 66.7 | 28 | 49.1 | 33 | 57.9 |
| Point Prevalence (today) | 22 | 38.6 | 17 | 29.8 | 18 | 31.6 |

Based on Table IV, some of the respondents show signs of severity in these body regions symptoms: prevention of normal work, visits to the health professional, taking medication, and needing sick leave. The severity of low back symptoms prevents 31.6% of respondents from normal work, 19.3% visit a health professional, 10 of them need to take medicine and 8 respondents need to take sick leave due to the symptoms.

**Table IV: Severity of Musculoskeletal Symptoms among Occupational Therapists**

| Body Region | Shoulder | | Wrist | | Low Back | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| NMQE Severity of Symptoms | | | | | | |
| Prevention of normal work | 14 | 24.6 | 11 | 19.3 | 18 | 31.6 |
| Visit a health professional | 13 | 22.8 | 4 | 7.0 | 11 | 19.3 |
| Taken Medication | 13 | 22.8 | 6 | 10.5 | 10 | 17.5 |
| Sick Leave | 6 | 10.5 | 2 | 3.5 | 8 | 14.0 |

**Relationship Between Prevalence of WRMD and Severity of Musculoskeletal Symptoms**

The relationship between the Prevalence of WRMD and musculoskeletal symptoms' Severity was conducted using a Pearson's Chi-Square test. The Chi-square tests showed that the prevalence of WRMD at the shoulder region differed significantly between the severity of the musculoskeletal symptoms, $X^2$ (4= 57) = 13.97; p= 0.007. Therefore, we concluded that there is a relationship between the prevalence of WRMD at the shoulder and the severity of musculoskeletal symptoms. Other than that, the Chi-square tests showed that the prevalence of WRMD at the wrist region also differed significantly between the severity of the musculoskeletal symptoms, $X^2$ (3= 57) = 12.79; p= 0.005. Therefore, we concluded that there is a relationship between the prevalence of WRMD at the wrist and the severity of musculoskeletal symptoms. Next, for low back region the Chi-square tests showed that the prevalence of WRMD at the low back region also differed significantly between the severity of the musculoskeletal symptoms, $X^2$ (4= 57) = 19.40; p= 0.001. Therefore, we concluded that there is a relationship between the prevalence of WRMD at the low back and the severity of musculoskeletal symptoms.

## DISCUSSION

In this study, it is found that most of the participants have higher scores in the JRPD upper limb compared to the lower limb. This is supported by a study that found that occupational therapists were subjected to high exertion of the hand at work, which became one of the major causes of MSD complaints in the hand and wrist area (14). Forceful, repetitive work requiring non-neutral postures is associated with an increased risk of hand/wrist tendon-related disorders, epicondylitis, and CTS, as evidenced by epidemiological studies (25). Understanding the relationship between exposure levels of workplace risk factors and musculoskeletal symptoms at the hand can improve injury prevention and rehabilitation (26).

Biomechanical Exposure on upper limbs based on responses shows the highest frequency of question number 15 with exposure of more than 4 hours per day and second highest on question number 4 with exposure of 2-4 hours per day. Question number 15 is about lifting and carrying items with one hand and question number 4 is about performing a series of repetitive tasks/ movements during the normal course of my work (e.g., using a keyboard, tightening fasteners, cutting meat).

Biomechanical exposure on the lower limbs based on responses shows exposure of less than 2 hours per week on questions 4 (Repeatedly bend back forward, backward, to the side, or twist), 7(Work required to kneel or squat) and 8 (constantly move or apply pressure with one or both feet). A systemic review found that patient handling was the most common occupational factor to

cause work-related injuries, and fear, anger, isolation, and inability to perform duties, and leisure activities were common psychosocial issues also because of the injuries (18).

After the study, data was collected on the prevalence of shoulder, with 82.5% being the highest among the respondents in terms of lifetime, annual, and point prevalence. This result is supported by evidence from a study found that occupational therapists in Korea experienced pain in common areas such as the shoulders with 81.1% of the respondents and hands, wrists, or fingers with 73.7% of the respondents (27). The second highest of lifetime prevalence is a low back region with 70.2% of the respondents and followed by the wrist region.

A study on LBP prevalence for occupational therapists revealed that lifetime prevalence was 79.4%, one year at 71.1%, and point prevalence at 28.6%37 (28). This study also found that 63.2% of the respondents reported having experienced low back pain in the last 12 months (28). Previous data from the study LBP prevalence for occupational therapists shows that they had generally higher lifetime and annual prevalence of LBP among occupational therapists but lower for point prevalence. Thus, this supports this study data on LBP which has a high prevalence of LBP for both annual and lifetime and a lower point prevalence.

Despite that, one study revealed that most of the respondents with LBP had a higher frequency of these signs compared with shoulder and wrist body regions. Data on the severity of low back symptoms, 31.6% of the respondents answered Yes on having difficulty in doing normal work, 19.3% need to visit a health professional due to the problems, 17.5 % need to take medication to relieve the pain, and 14 % need to take sick leave in the past 12 months. On the other hand, another study reported that 70% of occupational therapist have severe lower back pain, and disengagement and exhaustion were found related to musculoskeletal issues and this also affects their work (29). In another study done in 12-month working period, 23 % of occupational therapy experienced musculoskeletal injuries. Muscle strain (52 %) and lower back (32 %) were the most injured body parts (30).

Some of the respondents did respond on shoulder and wrist symptoms with these symptoms but with lower frequency compared to those who responded on the lower back. However, there is not much difference in the numbers of severity on the shoulder and lower back. From the past 12 months, 24.6% of the respondents answered Yes on having difficulty in doing normal work, 22.8% need to visit a health professional due to the problems, and need to take medication to relieve the pain, respectively and the rest 10.5% need to take sick leave due to that issues. Wrist data of severity consist of 19.3% on prevention of normal work, 7% had visited a health professional, 10.5% had taken medication, and lastly, 3.5 % had sick leave. Even though the wrist region shows less prevalence, the wrist is also prone to musculoskeletal injury due to the frequency of use of the scissor during splinting fabrication to the patient. (24). Because of this, this body region should be focused on as pain in this area will also affect the therapist's hand function, thus giving a negative impact on the therapist's work performance, for example, taking longer time to fabricate a splint because of the uncomfortable and pain at wrist area when handling the scissor (24). This will result in less productivity of the therapist.

The findings of the relationship between the prevalence of WRMD among OTs in Malaysia and the severity of musculoskeletal disorder symptoms show a statistically significant relationship. As we can see from the data tabulation, these cross-data of the prevalence of WRMD among OTs in Malaysia annually and several symptoms that represent the severity of musculoskeletal symptoms show significant values. This is supported by a study that revealed five regions of the body: shoulders, elbows, wrists/hands, hips/thighs, and ankles/feet are prone to WRMDs, and these regions negatively influence absenteeism and presenteeism of the workers (31). As we all know, the number of the occupational therapists in Malaysia is not enough to serve the population. Thus, the occurrence of WRMD should be prevented as it may cause severe symptoms to the therapist, such as prevention of normal work, the need to visit a health professional, taking sick leave, and also taking medication.

As in every other research, there will be limitations that is the same goes for this study. This study has limitations compared to the previously done studies. First of all in which relating to the number of respondents and the sample size. Within the period of data collection, only a total of 57 respondents were collected among a sample size of 273 for this study. The first limitations may be due to the method and procedure of data collection which is restricted by only contacting each possible participant online one by one. It is suggested that this data collection method should be widened and more spread out to reach the sample size needed. As such having both an online approach and an offline approach, with a much more efficient way to collect data instead of having to reach out to each participant, the strategy using posters and others such as fliers may attract more respondents. Other than that, the volume of patients for each hospital and centre should also be considered to see the relationship with the occurrence of WRMD among occupational therapists.

For further studies, there are several recommendations for conducting the topic of the Prevalence of Work-Related Musculoskeletal Disorder (WRMD) among Occupational Therapists in Malaysia and the risk factors

that contribute to it. This study is may or not helpful for the health care services to improve the quality of work and work-life balance of this profession which can be further intervened with proper and effective approaches. Having both prevalences on which body part affect the population and the risk factors will further expand the possible intervention and modalities effective to the issues. The interventions suggested may consist of proper work positioning or a more ergonomic way of working, providing limitation of work tasks for each individual to prevent the incidences of WRMD, and education or awareness for the professions on the risk of WRMD. Other than that, it is hoped that having this study will be in charge of the stepping platform for further research on this topic. As such other branches of the topic such as which intervention will efficiently help counter this matter, levels of severity of WRMD among this profession, and work positioning may affect this occurrence of WRMD among Occupational therapists.

## CONCLUSION

To conclude all of the findings from this study, it can be stated that Malaysian Occupational Therapist has a high prevalence of work-related musculoskeletal disorders from the data and results presented. Risk factors of MSD among occupational therapists are summarized into upper limb which are repetitive task or movement and carrying items using one hand and lower limb which are repeatedly bend back forward, backward, to the side, or twist, work required to kneel or squat and constantly move or apply pressure with one or both feet.

The findings of this study show the relationship between the annual prevalence of WRMD among OTs in Malaysia and the severity of symptoms of musculoskeletal disorders. Based on the information obtained from this study, it was evident that the severity of low back symptoms prevents 31.6% of respondents from normal work, 19.3% visit a health professional, 10 of them need to take medicine and 8 respondents need to take sick leave due to the symptoms. The results proved that WRMDs significantly contribute to the severity of symptoms of musculoskeletal disorders. Other than that, it confirmed that different body parts would be affected when performing different occupational therapy tasks. These different regions of WRMDs will negatively impact normal work, visit health professional status, medication, and frequency of sick leave. Future studies should include a program to reduce WRMD among occupational therapists in Malaysia, where there is a shortage of such professionals to serve the population.

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