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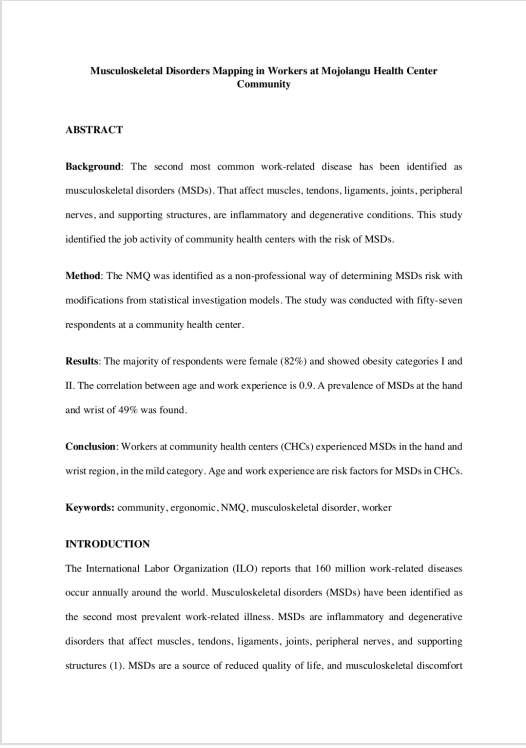

Musculoskeletal Disorders Mapping in Workers at Mojolangu Health Center Community

ABSTRACT

Background: The second most common work-related disease has been identified as musculoskeletal disorders (MSDs). That affect muscles, tendons, ligaments, joints, peripheral nerves, and supporting structures, are inflammatory and degenerative conditions. This study identified the job activity of community health centers with the risk of MSDs.

Method: The NMQ was identified as a non-professional way of determining MSDs risk with modifications from statistical investigation models. The study was conducted with fifty-seven respondents at a community health center.

Results: The majority of respondents were female (82%) and showed obesity categories I and II. The correlation between age and work experience is 0.9. A prevalence of MSDs at the hand and wrist of 49% was found.

Conclusion: Workers at community health centers (CHCs) experienced MSDs in the hand and wrist region, in the mild category. Age and work experience are risk factors for MSDs in CHCs.

Keywords: community, ergonomic, NMQ, musculoskeletal disorder, worker

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has become a public health issue. These previously reported findings point to the necessity for an epidemiological study of MSDs and their consequences on various populations in Indonesia, including Malang City, East Java Province. The high point of MSDs and the current trend toward pathology digitization prompted us to investigate the pattern and extent of muscle activity involved in their utilization of different types of devices. MSDs account for 1.7% and 3.4% of the total disease burden in developing and developed countries, respectively. That disorder accounted for 21.3% of the years spent disabled in the world (YLD) (2,3).

Workstations, positions, and professions are factors in MSDs in healthcare professions that account for more than 75%. Reports of healthcare workstations that have MSDs risk include surgeons, dentists, nurses, osteopaths, and physiotherapists. Previous studies specifically only described MSDs in certain professions (4,5). MSDs were also reported in outdoor and indoor jobs with high physical loads. However, this study mapped MSDs at each workstation in the first-level health service. Each workstation has different procedures following the level, task modification, and professional practice (5).

Health and safety surveys can be used to investigate the relationship between job activities and MSDs. This can stymie the development of workplace prevention methods and early interventions (6,7). There are classified methods for assessing MSDs, that are categorized into three; (1) direct methods is HADA Move-Human, Kinect System (8), (2) indirect methods is Nordic Musculoskeletal Questionnaire (NMQ) (9,10), Quick Exposure Check (QEC) (10), Michigan Questionnare (11–13), Keyserling Questionnare (8), and (3) semi-direct method is Rapid Upper Limb Assessment (RULA), Rapid Entire Body Assessment (REBA) (9,10,14), Ovako Working Posture Analysis System (OWAS) (15), Posture Activity Tools and Handling (PATH), Body Discomfort Map, PLIBEL, Occupational Repetitive Action (OCRA) (9),

NIOSH Lifting Equation, Health and Safety Executive (HSE), Instituto de Biomecanica de Valencia (IBV) (9), Psychophysical Upper Extremity Data, Posture and Repetition Risk Factor Index (PPRFI) (8,16,17).

1 This investigation uses the semi-direct NMQ as a non-professional way of determining MSDs risk (6,17). NMQ with the Indonesian version has a validity value of 0.8 and reliability above 0.9 based on Cronbach's alpha. The alpha value shows that all question items are consistently perfectly reliable. NMQ is also commonly utilized by researchers since it is simple to use and understand for a variety of people. The NMQ body map is divided into nine anatomical regions. The regions analyzed for the right and left sides together were the neck, back, shoulder, elbow or forearm, hand or wrist, and legs or feet (18,19). Meanwhile, the CHC workers perform repetitive movements in the same pattern every day. This pattern includes all elements in the NMQ assessment (5). So this research aims to map the MSDs complaint region for all CHC workers. In addition to this, this study also aims to identify the dominant regions that experience MSDs.

METHODS

This study aims to map MSDs in workers at all work stations. The mapping is to find out which workstations have the potential for MSDs. This research was conducted in September 2022 and has obtained research permission No. 440/226/35.73.402.014/2022. This study was carried out with after obtaining written informed consent from all participants. The stage of study is adopted and modification from statistical investigation models (9).

Participants

Participation in this study amounted to 57. The study used total sampling on CHC workers in Mojolangu Malang, East Java-Indonesia. The participants worked daily of 8 hours (07:00 AM-14:00 PM). The variables data characteristics were collected is sex, age, body mass index (BMI), job activity and work duration (9,12).

Instrument and analysis data

The participant study included all workforce with various physical demands (repetitive, workspace, and forceful or awkward movement). The NMQ questionnaire was distributed to all participants. To facilitate completion the questionnaire was used in Indonesian language. The original questions consist of 28 items with right and left body maps to the presence of MSDs (4,9).

This questionnaire can find out about the muscle that has problems with a ranging rate from not pain, rather a pain, pain and very painful. The NMQ results can estimate the types and levels of problem, fatigue, and pain in the muscle felt by the worker (19). The assessment process was carried out by respondents to provide a checklist on four-level categories. The participant-checked questionnaires were gathered. Each NMQ acquired has been estimated as a stage in the interpretation process. The scoring is interpreted through the classification of risk levels or the likert scale. The scale in the form of information has not been found with improvement measures with a scale of 1 (28-49), may be needed in the future measures with a scale of 2 (50-70), immediately measures with a scale of 3 (71-90), and a thorough action as soon as possible with a scale of 4 (92-122) (9,10).

The overall data obtained through the interpretation of the questionnaire is presented using tables and diagrams. The presentation uses descriptive studies to analyze the frequency and percentage of respondents' demographic characteristics, MSDs complaints, and the dominance of professional level with MSDs risk.

RESULTS

1 The number of population in the study included 57 respondent with mean age of 36 years. The majority of respondents were female (82%) and a body mass index (BMI) of ≥27 kg/m² showed

1 obesity category grade I and II (Table 1). The correlation age and work experience was positive 0.9 indicating duration is the factor or determinant of the occurrence of MSDs.

The statistics Table 2 shows the deviation of the study results from the mean value of each characteristic. The four characteristics show that the standard deviation (SD) value is less than the mean value. In other words, the point value of each character is not further from the mean value (9). Therefore,Table 2 represents the absence of the average distribution of data deviations.

Figure 2 shows tabulation of the job activity at CHCWs. Midwifery (21%) is the most common job activity, followed by medical records (16%), and nursing (14%) in order. The other percentages are equally divided by dentistry, doctor, public health and environment at 7%, pharmacy, nutrition, accounting, health analysis at 5%, cleaning service at 4%, and ambulance driver, parking officer at 2%.

Figure 3 illustrates that there are three major issues among all respondents to the NMQ. Issues in the hand and wrist region had a mild category of 49%, and in the neck region they had a moderate category of 37%. While interference in the back area of 14% is considered severe.

Respondents over the age of 41 with long years of service account is the highest severity category. However, this study concentrates on the most common problems in the NMQ in general, specifically in the hand and wrist region. Respondents in this region complained about the average when they were ≤30 years old and had worked for ≤5 years (Table 1).

DISCUSSION

Early detection is important to determine MSDs. The high NMQ grading points show that it is important to properly solve MSDs (20) for CHC in the city of Malang, East Java, Indonesia. Problems in the hand and wrist region had the highest prevalence of the nine regions that were mapped (Figure 3). This prevalence also occurs in Europe (17). The hand and wrist function is to work properly in all directions without any limitation. Normal hand and wrist function is a major part of daily life. The hand and wrist are fascinating biological motor systems that perform gross and fine motor activities (6,21).

The prevalence Figure 3 is dominated by respondents in the age range of 21-30 years with <5 years of work experience. The respondents averaged midwife, nurses, and medical records with a BMI category of 27 kg/m² (Figure 2). The NMQ remains reliable and valid to identify the MSDs with normal or obese BMI category. A pilot study on BMI ≥ 30 kg/m² conducted by Alberto Rassi Hospital (HGG), Goiânia, Brazil, showed sensitivity and specificity in all NMQ regions reaching 85% (18).

Ergonomic behavior patterns in the usage of gadgets (22), workstations, and mouse or keyboards are triggers for the disease in this study (23,24). The hand and wrist are the most common regions for MSDs problems. Tingling, numbness, and discomfort over the nerve distribution area are all common symptoms of muscle dysfunction (24). The discussion of this

study focuses on the ergonomics of input devices with corrected functional and ergonomic characteristics. Ergonomics, education, exercise, physiotherapy, and occupational health are some of the strategies for preventing MSDs. When particular intervention categories were examined, it was discovered that ergonomic interventions involving keyboard, mouse, and wrist rest adjustments did not have the desired effect on the tested conditions. Input devices are the most applicable interfaces for data entry and navigation. Intensive use of input devices with repetitive motion as well as wrist deviation causes MSDs. The recommended use of input devices is less than 20 hours per week, and more than that can result in carpal tunnel syndrome (CTS) (3). The design of input devices must be standard and ergonomic. Requirements for input devices involving the hand and wrist are suggested accordingly: neutral anatomical posture, improved movement of the hand and wrist or devices, minimizing pronation, and fitting and proper use of the user's hand (25).

When ergonomic interventions were combined with or compared with education, positive results were obtained. Ergonomic hand and wrist positions in neutral positions with modifying accessory settings (keyboard, mouse, wrist rest, and workstation) can reduce exposure. While education can be interpreted as a medium for studying to change workplace habits. Primary prevention device to intervene in workplace cultural aspects. Optimal results are shown when combined with physical exercise for 60-75 minutes. According to Nguyen, interventions that can prevent MSDs include education, assistive devices, regular control, and multi-interventions (26).

The limitation of this study is that it does not ensure the anthropometric fit and proper operation of the input devices on CHC (24). However, there is an interesting phenomenon the average level of complaints occurs in the young age group with a working period of ≤5 years. Whereas

in previous studies, MSDs were influenced by the age factor (27). The assumption is that this is influenced by productivity factors or senior-centricity in the service process. This assumption is reinforced by the relevance of job title and superior clinical care as risk factors for MSDs in the hospital environment (28). Work culture factors in work activities are interesting themes to be discussed in future research.

CONCLUSION

CHCs workers in Mojolangu generally suffer from MSDs with mild severity in the hand and wrist regions. While the work station or obstetric job activity has the highest potential for MSDs compared to others.

CONFLICT OF INTEREST

The author declares there is no conflict of interest regarding the publication of this study.

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The study doesn’t recived any grant form public or private founding source.

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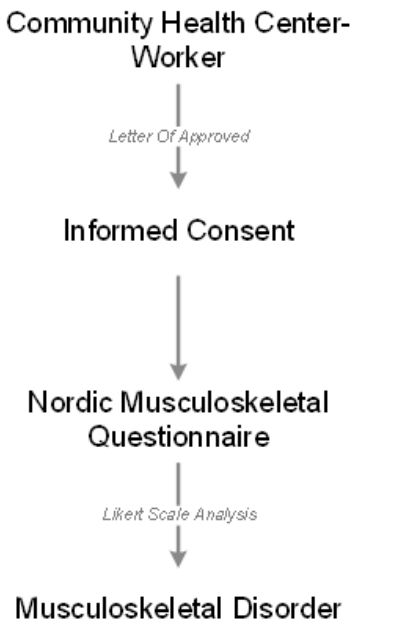


Figure 1. Stage of study MSDs

Table 1. Demographic characteristics of respondent

Characteristics	Number of Respondents (n)	Presentation (%)
Respondent	57	100
Age		
21-30 years	25	44
31-40 years	16	28
41-50 years	10	18
≥51 years	6	11
Gender		
Male	10	18
Female	47	82
Body Mass Index (BMI)		
25-29.9	6	11
≥30	51	89
Work Experience		
≤5 years	24	42
6-10 years	3	5
11-15 years	14	25
16-20 years	8	14
≥21 years	8	14

Table 2. Statistic characteristics of respondent

Characteristics	Statistics		
	Range	Mean	Standard Deviation
Age (years)	20-59	35.8	10.4
Work experience (years)	01-21	11.3	10.8
Body Mass Index (Kg/m²)	27-53	37.7	6.14

Likert Scale of NMQ	28-98	51.0	20.0

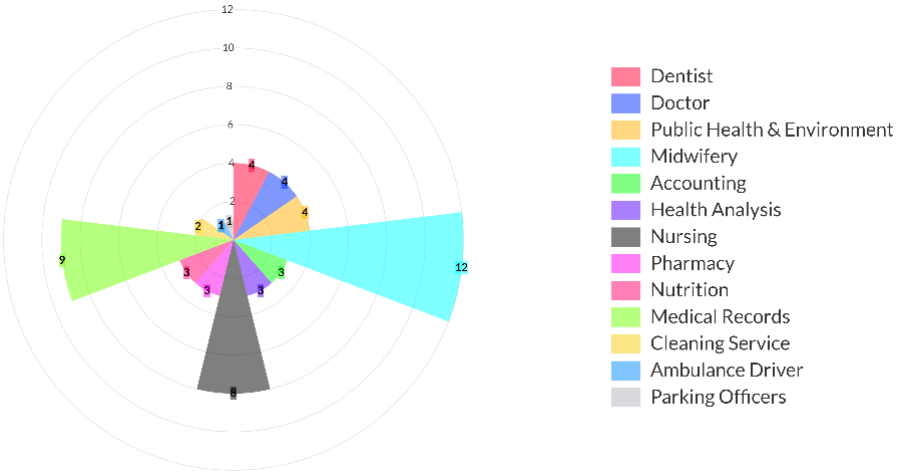
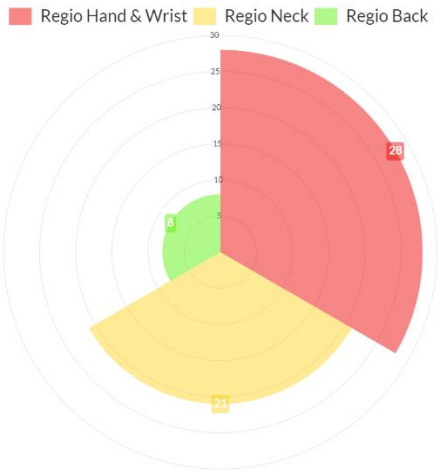


Figure 2. Polar graph of job activity at community health centers



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