Work–related Musculoskeletal Disorders Among Healthcare Workers in a General Provincial Hospital in Vietnam

Nong Viet Thuy   *nongvietthuy@gmail.com*
Faculty of Public Health/ Thammasat University
Pathumthani, 12121, Thailand

Soisuda Kesornthong   *k.soisuda@fph.tu.ac.th*
Faculty of Public Health, Thammasat University
Pathumthani, 12121, Thailand

Nontiya Homkham   *nontiya.h@fph.tu.ac.th*
Faculty of Public Health, Thammasat University
Pathumthani, 12121, Thailand

Abstract

Background. Musculoskeletal disorders is the most common disease among healthcare workers. Which affects not only the quality of life but also the income, the health, the economy. In Vietnam, there are some research about the MSDs among healthcare workers and the factors affect this problem, especially, the ergonomic factors. *Objective.* To assess the prevalence of musculoskeletal disorders among healthcare workers in Cao Bang General Provincial Hospital, Vietnam and determine risk factors associated with musculoskeletal disorders. *Material and methods.* A cross-sectional study was conducted among 85 healthcare workers in a general provincial hospital in Vietnam using the Nordic questionnaire and questionnaire. *Results.* High prevalence of musculoskeletal among healthcare workers during the past 12 months (62.4%) and last 7 days (45.9%), with the two most common sites being low back pain (48.2%) and neck (40%). Gender, work experience, total working hours, night shift work, and stress level showed the association with the MSDs in the past 12 months. *Conclusion.* Due to the high prevalence of MSDs among healthcare workers in a general provincial hospital, preventive actions are needed to improve the working conditions and to raise the awareness of healthcare workers about MSDs prevention.

Keywords: Musculoskeletal Disorders, Healthcare Workers, Work Organization.

1. INTRODUCTION

Musculoskeletal disorders are injuries or pain in the human musculoskeletal system, including the joints, ligaments, muscles, nerves, tendons, and structures that support limbs, neck, and back (Adegoke, Akodu, & Oyeyemi, 2008) (CDC, 2017). Musculoskeletal disorders affected the economy, the sickness absence from work, the loss of productivity both either developed countries or developing countries (Adegoke et al., 2008). The survey of The European Labor Force showed that more than half of work-related diseases belonged to musculoskeletal disorders (Engels, van der Gulden, Senden, & van't Hof, 1996). The prospective study among 8952 Danish healthcare workers found that chronic pain in low back pain, neck/shoulder and knees was risk factors for long-term sickness absence (Andersen, Clausen, Mortensen, Burr, & Holtermann, 2012). Those who got MSDs required a median of 12 days to leaves their duty to recover compared with 8 days for other cases (Statistics, 2015). As a consequence of sickness absence from work, presenteeism, loss of productivity and treatment for MSDs, the estimation of the total medical cost for MSDs in The USA was $1219.12 million in 2003 and $1110.19 million in 2007 (Bhattacharya, 2014). MSDs show impacts not only on the economy by their direct cost and indirect cost but also the quality of human life which is the most important part that we should

concern such as pain, reduction of mobility, decline the ability of performance at work as well as return and loss the production. The healthcare profession is known to be at high risk for W-MSDs. It is estimated that up to 90% of Physicians Therapists had W-MSDs during their careers; 50% experiencing W-MSDs within 5 years of practice (Vieira, Schneider, Guidera, Gadotti, & Brunt, 2016). In Turkish, the researchers investigated in 1600 hospital staffs (nurses, physicians, physical therapists, technicians, secretaries, and hospital aides) in 6 hospitals and found that 61.3% of hospital workers reported low back pain within the last 12 months. This fact was similar with dentists, more than half of dentists had experienced symptoms in the shoulders (75%), neck (72%), and lower back (66%) in the year before the survey (Lin et al., 2012). In recent years, many studies have been conducted to provide the basis for the risk assessment of the development of W-MSDs. The studies measured the levels of a variety of factors across a range of occupations at different levels of risk and investigated the associations with the incidence or prevalence of MSDs for the populations concerned. However, the association between current exposure and risk of developing W-MSDs is indeed an issue to be looked into. Most of the previous researches focused on one specific sector of healthcare workers as nurses, physicians or only dentists with their specific tasks for each department. However, the healthcare workers in each department perform different tasks with complicating and high pressure on their work. This research will consider all the risk factors from their work organization, their characteristics.

There were a few studies on the working conditions and risk factors affecting the health of healthcare workers in Vietnam. Moreover, in Vietnam, there are no official records kept for musculoskeletal disorders (MSDs) cases among healthcare workers, even though anecdotal evidence indicates it may be a serious occupational health problem. In 2009, there was research among 400 dentists in Hanoi, 83.6% of respondents reported having experienced one or more musculoskeletal symptoms during the past 12 months (Ma Quang et al., 2009). Although the high prevalence of self-report MSDs was found, the risk factors were not investigated to find in healthcare workers or other occupations. Most of the previous studies on W-MSDs among healthcare workers were limited to specific groups such as nurses, physical therapists or dentists. Due to the high prevalence of MSDs among healthcare workers, the risk factors of MSDs among them should be investigated.

2. METHODOLOGY
The design of this study was a cross-sectional survey using a self-administrated questionnaire to investigate the prevalence of musculoskeletal disorder and to identify the risk factors among 85 healthcare workers (physicians, nurses, technicians, pharmacists, dentists) in a General Provincial Hospital.

The face to face interview by the main researcher was performed for data collection. The questionnaires were administered in person and consisted of 4 parts. Section 1 - general information: gender, age, department, job title, experience, BMI, married status, and lifestyle. Section 2 - work organization: working hours, break time, workload, workplace stress. Section 3 - Standard Nordic Questionnaire: The information about musculoskeletal disorders among healthcare workers by self-report with Standard Nordic Questionnaire.

Data analysis was carried out using the SPSS version 16.00

Descriptive statistics were used to describe frequencies, percentages, means and standard deviations for sociodemographic characteristics, the factor at the workplace, stress factor, work task. Simple binary logistic regression was used to identify the association between independent variables (personal factor, work organization factors) and musculoskeletal disorders (pain at least one part of the body during the past 12 months: pain neck/ shoulders/ elbow, upper back, wrist, hands, lower back, hip/thighs, knees, ankles/foot).

3. RESULTS

3.1 Characteristics of Participant

Among 85 healthcare workers, 76.5% was female, the mean of age was 35.6. The majority had a normal weight (57.6%), but some health workers were overweight and obese (20% and 17.6%, respectively). The healthcare workers had an average of 11 years' experience. In this research, half of the healthcare workers were nurses and a third were physicians. Almost of workers were married (92.9%), no smoking (87.1%) and no extra job (89.4%).

3.2 Pattern of Work Organization

The result showed that around 60% of healthcare workers had a moderate and severe score of stress. The workers worked an average of 63 hours per week and 8.05 hours per shift work. A quarter of workers often work extra time to finish their task in the hospital. The result also indicates that workers had 40 minutes on average for a break during their working hours and they mostly worked at night shift 2 times a week (41.2%) and 1 time a week (35.5%), respectively.

3.3 Prevalence of MSDs among Healthcare Workers

Figure 1 shows the result of the prevalence of musculoskeletal disorders among healthcare workers in 9 body parts. The prevalence of MSDs in the past 12 months in this study was 62.4% and in the last 7 days was 45.9%. Most of the healthcare workers suffered from pain at their lower back (48.2%), neck (40%), left knee (32.9%) and right knee (28.2%). Among healthcare workers who suffered from MSDs, some of them had to go for treatment (18.8%) whereas had disturbed their work (23.5%).

Interestingly, the percentage of healthcare workers who suffered within 7 days was similar to the percentage of within 12 months. the result also showed that healthcare workers felt pain at low back pain (28.5%) and followed by neck (20%).
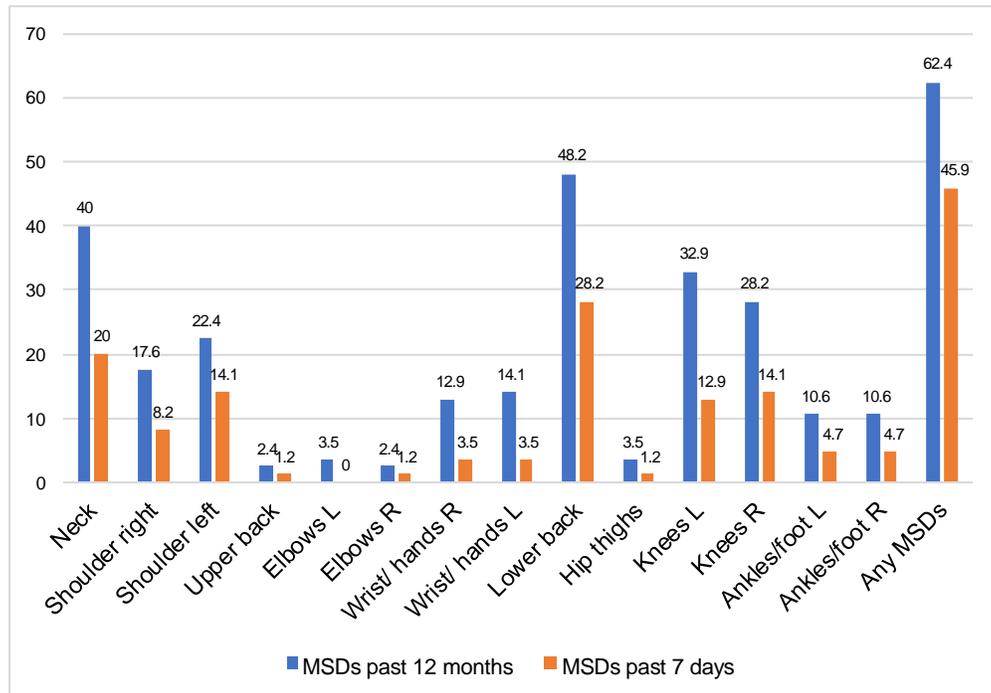
FIGURE 1: The prevalence of musculoskeletal disorders among healthcare workers in 9 body parts.

3.4 Association between Characteristics of Healthcare Workers and MSDs

To find the factor contributing to developing MSDs, the relationship between MSDs and characteristics and work organization was investigated. The study found gender and work experience years statistically significant association with MSDs (Table 1). Females were 3.4 times more likely to suffer from MSDs than males (*p*-value <0.022). The mean age among workers reported MSDs was higher than those without MSDs. But there were no statistically significant differences in age and MSDs *p*-value =0.057. The relationship between working experience and MSDs was demonstrated by using Simple binary logistic regression with *p*-value=0.038. Furthermore, the result indicated that those who had work experience more than 10 years were 2.66 times more likely to experience MSDs than those had work experience less than and equal to 10 years. Even the statistical analysis did not show the statistical significance by using Simple binary logistic regression (*p*-value =0.0911), the prevalence of MSDs among physicians and nurses higher than technicians' and pharmacists. As well as, those had extra job got a higher prevalence of MSDs but it was not a statistically significant difference (*p*-value =0.946). The other factors as BMI, smoking, cooking, sport, and social media were not showed statistically significant differences (data not shown).

Variable (n =85)	MSDs in the past 12 months		OR [e]	p-value [e]
	Yes n (%)	No n (%)		
Gender				0.022*
Male	8 (40%)	12 (60%)	1	
Female	45 (69.2%)	20 (30.8%)	3.4 (1.2 - 9.5)	
Age	36.8 ± 8.1	33.5 ± 6.3	1.1 (0.99 -1.14)	0.057
Work experience years				0.038*
≤10 years	24 (52.2%)	22 (47.8%)	1	
>10 years	29 (74.4%)	10 (25.6%)	2.66 (1.06 - 6.69)	
Job title				0.946
Physician	16 (61.5%)	10 (38.5%)	1	
Nurse	29 (61.7%)	18 (38.3%)	1.0 (0.4-2.7)	
Technician/ Pharmacist	8 (33.3%)	4 (66.7%)	1.3 (0.3-5.3)	
BMI				0.983
Underweight /Normal weight	33 (62.3%)	20 (37.7%)	1	
Overweight/ Obesity	20 (62.5%)	12 (37.5%)	1.0 (0.4-2.5)	
Smoking				0.067
No	49 (66.2%)	25 (33.8%)	1	
Yes/ used to	4 (36.4%)	7 (63.3%)	0.29 (0.08-1.09)	
Exercise				0.113
No	22 (53.7%)	19 (46.3%)	1	
Yes	31 (70.5%)	13 (29.5%)	2.1 (0.8-5.0)	

[e] *Simple binary logistic regression*

TABLE 1: The relationship between characteristics of healthcare workers and MSDs.

3.5 Relationship between Work Organization and MSDs

The correlation between the work organization and MSDs were investigated and presented in table 2. The working hours per week, night shift work and total stress score were statistically significant differences with MSDs by using Simple binary logistic regression. Workers in this hospital have 40 hours per week and at least one-night shift work (16 hours). Based on that reason, the working hours per week was divided into 2 groups less than or equal 56 hours and more than 56 hours. The statistical analysis by Simple binary logistic regression was significantly different from *p*-value =0.038. Similar to working hours per week, by using the Simple binary logistic regression and Chi-square test, the result showed that those had 2 times of night shift

work and more than were 3.6 times higher of getting MSDs with *p*-value =0.008. The extra hours at work and duration times of break were not significantly different (*p*-value >0.05). The workers having moderate and severe the total stress score was at risk of MSDs that those having a good stress score (*p*-value =0.001). The result by Simple binary logistic regression indicated that a high score of stress was 5.3 times higher chance of getting MSDs.

Variable (n =85)	MSDs in the past 12 months		OR [e]	p-value [e]
	Yes n (%)	No n (%)		
Work hours per week				0.038
≤56 hours	24 (52.2%)	22 (47.8%)	1	
>56 hours	29 (74.4%)	10 (25.6%)	2.7 (1.06-6.7)	
Duration time to break	40.1 ± 16.9	42.2 ± 18.6	0.99 (0.97-- 1.01)	0.593
Night shift work				0.008
0-1 times/week	22 (48.9%)	23 (51.1%)	1	
≥2 times/week	31 (77.5%)	9 (22.5%)	3.6 (1.4-9.2)	
Stress score				0.001
Low	14 (40%)	21 (60%)	1	
Moderate and severe	39 (78%)	11 (22%)	5.3 (2.05 - 13.77)	

[e] *Simple binary logistic regression*

TABLE 2: Relationship between work organization with MSDs.

4. DISCUSSION

Healthcare workers were reported at high risk with MSDs due to the risk factors at the workplace. Several studies were declared the high prevalence of MSDs among health care workers and demonstrated the relationship with risk factors at the workplace.

Our research was conducted in a General Provincial Hospital in Vietnam and found a high prevalence of MSDs (62.4%). The result was higher than the result of healthcare workers in India, only 50.7% (Yasobant & Rajkumar, 2014). It can be explained that because of this hospital lack of healthcare workers, so the healthcare workers had to work more hours and faced numerous patients in a day. Another research conducted among nurses in Vietnam during the same period with this research showed a higher prevalence of MSDs in the past 12 months with 74.7% (Duc Luan et al., 2018). Because the subject for study was nurse, who was known as the highest risk of MSDs in the hospital. The other research among nurses in Japan also had a higher prevalence of pain at least one body part with 85.5%. The result showed a

The research, also, indicated that low back pain was the most common part (48.2%), followed by neck pain (40%), ranked third was knee left and right pain with 32.9% and 28.2%, respectively (Figure 1). This order was similarly with the research among nurses in Japan, the low back pain was the highest report by the nurses (44.1 %), followed by neck and knees pain with 28.0% and 22.4%, respectively (Tinubu et al., 2010) or several studies as in Japan (Ando et al., 2000), China (Smith, Wei, Zhao, & Wang, 2004), Nigeria (Adegoke et al., 2008).

An effort to find the predictive factors for MSDs among healthcare workers in the hospital. In this study, the characteristics and work organization were investigated to find the relationship between factor and MSDs in the past 12 months. In terms of characteristics of healthcare workers, the result showed that gender and work experience years related to the MSDs in the past 12 months. As various studies indicated that female was predominance in the prevalence among the general population (Wijnhoven, De Vet, & Picavet, 2006), among physiotherapist (Chung et al., 2013), among healthcare workers (Yasobant & Rajkumar, 2014) and nurses (Karahan, Kav, Abbasoglu, & Dogan, 2009). The result in this study, as well, indicated that female was 3.4 times more likely to suffer from MSDs in the past 12 months with (*p*-value<0.05). It was also found that healthcare workers working more than 10 years had a 2.66-time higher chance of developing MSDs. The mean age among those suffering from MSDs in the past 12-month was

36.8, it was higher than those without MSDs 3.3 years. However, the result did not show a statistically significant difference. This study was similar to other research among healthcare workers as in Nigeria (Adegoke et al., 2008), or among healthcare workers in India (Yasobant & Rajkumar, 2014) or nurse in Vietnam (Duc Luan et al., 2018). A lot of studies showed that overweight and obesity had more chances of developing MSDs (Attarchi, Raeisi, Namvar, & Golabadi, 2014; Trinkoff, Lipscomb, Geiger-Brown, Storr, & Brady, 2003), however, in this study, the prevalence of MSDs was nearly equal in both groups (obesity and overweight; normal and underweight).

The risk factors in terms of work organization, the work hours per week, night shift work and stress at the workplace were found in the relationship with the MSDs. The mean of workhours among this population was around 63 hours per week. Normally, a worker has at least one-night shift work per week (except woman staff had children under 2 years old), so normal working hours of workers in this population was 56 hours. The variable total working hours per week was divided into two groups less than and equal to 56 hours and other groups working more than 56 hours per week. The result showed that the prevalence of MSDs among those working more than 56 hours was 74.4%, which was higher than workers worked less than and equal to 56 hours (52.2%) and indicated that staffs worked more than 56 hours per week was 2.7 times higher of suffering from MSDs than the rest. That finding indicated that the work hours in this hospital need to improvement to reduce the MSDs among their workers. This result is inconsistent with the findings of a previous study conducted among 1163 nurses in the united states (Lipscomb, Trinkoff, Geiger-Brown, & Brady, 2002), or a 24 year follow up study among 484 workers from different jobs in Sweden concluded that long working hour lead to the neck pain among female workers (Fredriksson et al., 1999), it also agreed by the research in the Netherlands prove that the working hours affected on the pain of back and leg (Engels et al., 1996) and the relationship of working hours with pain their thumb was illustrated by the linear (Cromie, Robertson, & Best, 2000).

The healthcare workers reported the mean of break times was around 40 minutes in shift work. The mean of break times among those got MSDs was higher than among those without MSDs. However, the difference was not significantly different. The result was similar to the research among nurses in China. By contrast with the research among 260 workers in Sweden, it indicated that lack of rest break opportunity had 2.7 times higher of their neck/shoulder/ arm pain and 7.4 times higher of development tension neck syndrome than those has enough break times (Bergqvist, Wolgast, Nilsson, & Voss, 1995). The reason for this may be that healthcare works with risky posture had more time for breaks than the other workers.

The result indicated that those who had more one time on night-shift work per week had 3.6 times of pain the musculoskeletal disorders. It is in agreement with the research among nurses in Norwegian, the research, also, declared that the nurses had "very often night shift work" was 1.64 times higher of suffering from low back pain compared to those never at night shift work (Eriksen, Bruusgaard, & Knardahl, 2004).In this research, the result indicated more clearly than others research about the times at night-shift could affect to the MSDs.

The workplace stress score indicated that more half of workers were moderate stress, and only 3.5% of them got severe stress. The result showed that those who got a moderate score and severe were 5.3 times higher more likely to suffer from MSDs than among those who got well score (p-value<0.05). This result agreed with the conclusion from previous research that working in high-stress pressure had more change of pain their MSDs (Siegrist et al., 2004), (Smith et al., 2004). The stress level in this research was evaluated by the stress questionnaire at workplace, so the result indicated exactly what kind of stress that the healthcare workers faced with.

5. CONCLUSION AND RECOMMENDATION
5.1 Conclusion
The high prevalence of MSDs was reported in this study. Nearly two-thirds of workers in this study reported that they suffered from musculoskeletal problems during the 12 months previously.

Among nine body parts, low back pain was mostly reported as them symptom, followed by neck pain and knee pain. During the last 12 months, some of them (23.5%) were affected by the symptoms of MSDs and approximately 20% need to visit doctors for treatment. The result also found that approximately 45% of healthcare workers complained about the MSDs symptom within 7 days and the most common part of the body affected them was low back.

The study found that females and who worked more than 10 year-experience had more risk of suffering from MSDs than males and those less than 10 years' experience. The general factors including age, married status, job title, BMI, smoking, exercise, did not relate to the musculoskeletal disorders in this study.

Factors on the organization were showed significantly with the musculoskeletal problem in this hospital. The result indicated that work experience more than 56 hours per week, work more than 1-night shift work per week, and a high score on stress related to MSDs in the past 12 months.

5.2 Recommendation
The work organization in terms of the night-shift work should be improved by changing the worker to a different department. The workplace should organize the team building, entertainment activities to reduce the stress at work for the healthcare workers. The surveillance system and intervention should be applied for this hospital such as health education on common postural change or exercise or improve the equipment to support the healthcare workers.

For future researchs, the video display terminal should be applied for recording and estimating the posture and duration at work of healthcare workers such as awkward posture, manual handling or repetition tasks. That will be support to find the postures affect to the MSDs among them. base on this result the hospital can improve the equipment and traning the knowledge for their healthcare workers to reduce the affect of bad postures on their musculskeletal system.

6. LIMITATION OF THE STUDY
The limitation of our study was that the cross-sectional analysis could not be used to determine causality between the general factors, work organization or the nature of work with the MSDs.

The time for interview and observation healthcare workers in the working time was short of time and it may affect by the subjective estimates to recall information for answering the questionnaire about the posture and the duration times of each posture.

The sample size was small that affect the conditions of some statistical analysis tests.

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