Prevalence and Factors Associated with Musculoskeletal Disorders among Registered Nurses in Thailand

Withaya Chanchai[1,3]*, Chawalit Prathan[2], Songsit Srisua[3] and Jetsada Kamfoei[3]

[1]Independent Researcher, Bangkok, Thailand

[2]Khon Kaen Hospital, Khon Kaen, Thailand

[3]Innovation Center, Healthmedic Innovation Academy, Bangkok, Thailand

*Corresponding Author: Withaya Chanchai, Innovation Center, Healthmedic Innovation Academy, Bangkok, Thailand.

Abstract

Musculoskeletal problems resulting from manual handling cover many activities, including pulling, lifting, pushing, restraining, holding, throwing, and carrying patients, and are often reported among healthcare workers worldwide. This study aimed to describe the prevalence and factors associated with musculoskeletal disorders in hospital nurses. This cross-sectional research was carried out in Northeastern Thailand at public hospitals. Between April and May 2022, three months of information collection were completed. The self-administered questionnaires assessing their demographic characteristic and musculoskeletal symptoms were distributed to 250 hospital nurses. Finally, 200 hospital nurses who met the criteria were accepted to participate in the research. Musculoskeletal disorders were found in 70.0% of hospital nurses. Musculoskeletal disorders were reported in a variety of body parts, with the lower back (85.7%) being the most commonly reported, followed by the upper back (67.9%) and the hips/thighs (57.1%) and Years of employment (OR 4.128, 95% CI 1.793 - 8.644), prolonged standing (OR 2.007, 95% CI 1.645 - 5.379), heavy load handling (OR 2.6, 95% CI 1.07 - 6.73), repetitive movement (OR 2.986, 95% CI 1.890 - 7.273) and heavy load handling (OR 2.530, 95% CI 1.549 - 5.643) were factors influencing the causality of musculoskeletal disorders. These findings imply that intervention programs based on the participatory ergonomic (PE) approach and coping strategies for musculoskeletal disorders should be recommended for hospital nurses to reduce the rate of occupational hazards.

Keywords: Musculoskeletal Disorders; Risk Factors; Hospital Nurses

Abbreviations

WMSDs: Work-related Musculoskeletal Disorders; PE: Participatory Ergonomic; MSDs: Musculoskeletal Disorders

Introduction

Work-related Musculoskeletal Disorders (WMSDs), such as those caused by lifting and transferring patients, are susceptible to repetitive motion, contact stress, muscular contraction, awkward postures, and persistent position [1-10]. Most studies found that healthcare workers sustain some of the highest overall injury rates in the United States [11]. Hospital nurses in public hospitals have various responsibilities involving frequent manual patient handling [8-10]. These tasks often involve additional manual lifting related to transferring patients, repositioning, and working in extremely awkward positions [1-4,10]. In addition, hospital nurses perform other routine tasks such as lifting, moving, and transporting patients using wheelchairs and stretchers to the outpatient department,

operating room, ward to ward, or other locations within the hospital, consisting of physical and psychosocial ergonomic risk factors in the hospital facility. Most hospital research focuses on patient-related tasks such as lifting and transferring patients by nursing assistants and nurses. Nursing assistants and caregivers are often injured while moving patients and are at greater risk of injury than other healthcare professionals [8-10]. In a sample of China hospital nurses, there was an 84.2% overall 12-month prevalence of MSDs, which were most common in the lower back (73.5%), neck (73.2%) and shoulders (66.2%) [10]. In contrast, it was significantly higher musculoskeletal disorders (MSDs) than Japan, at about 37% [13]. Patient care requires lifting and moving tasks with proven injury hazards to workers. Hospital nurses and healthcare professionals documented the high incidence of back injuries and other musculoskeletal disorders [9,14-16]. In summary, the nurses who performed many works suffer from WMSDs and pain. In Thailand, studies describe factors associated with WMSDs and found in the industry [18], but research on WMSDs in the medical industry and workforce is limited. Registered Nurses in Thailand should thoroughly understand the nature of musculoskeletal disorders, including all types of arthritis and conditions affecting muscles, bones, soft tissues, joints, and the spine. This study aimed to describe the prevalence and factors associated with WMSDs in Registered Nurses in Thailand.

Materials and Methods

This cross-sectional study was conducted from April to May 2022 at a general hospital (260-bed hospital) in Northeastern Thailand at public hospitals. The sample group consisted of 250 nurses. A self-administered questionnaire was sent to the target hospital. The inclusion criteria for participants were full-time nurses who had worked at this hospital for at least one year. Forty-five subjects who did not meet the eligibility requirements or did not complete the questionnaire were excluded. A self-assessment questionnaire was distributed to the 200 nurses at this hospital. The main duties of these hospital nurses were lifting and transferring patients, moving, and transporting patients using wheelchairs and stretchers to the outpatient department, operating room, ward to ward, or other locations within the hospital. Shift workers were defined as those who intermittently worked in the morning (08.00 a.m. - 04.00 p.m.), afternoon (04.00 p.m. - 12.00 p.m.), and night (12.00 p.m. - 08.00 a.m.). The findings relating to the duties of the hospital nurses under investigation revealed that their work was physically demanding, involving awkward posture, heavy loads, repetitive movement, and local muscle fatigue. In addition, hospital nurses were found to conduct fatigue and pain from WMSDs of many tasks, including performing patient care procedures and moving patients.

Data collection: Data were collected through self-reported questionnaires. Questionnaires gathered participants' demographic, work history, and musculoskeletal symptom data. The Nordic Musculoskeletal Questionnaire (NMQ), validated by Kuorinka., *et al*. was used to measure the prevalence of MSDs [19]. The NMQ was translated into Thai [1,17], and its reliability was acceptable. The questionnaire consisted of questions about demographic factors and musculoskeletal symptoms. Age, education level, income, shift work, and length of employment were all demographic factors. The questionnaire asked participants to fill out a body diagram chart with musculoskeletal disorder symptoms they had experienced in the previous 12 months. Neck, shoulders, upper back, elbows, lower back, wrists/hands, hips/thighs/buttocks, knees, and ankles/feet were all examined. Respondents were asked if they had experienced any musculoskeletal pain (such as aches, pains, discomfort, and numbness) in the previous 12 months that had 'prevented them from carrying out everyday activities (e.g. job, housework, hobbies). The scores were calculated by using the binary score. Employment history and work-related exposure to lifting and transferring patients were also recorded. Respondents were asked to rate how frequently they performed various activities as sometimes,' 'often,' 'always,' or 'never.'' A response of sometimes or 'never' was classified as Rare, while a response of 'often' or 'always' was classified as Frequent. This study received Ethics approval. All participants signed consent forms indicating their willingness to participate in the study before starting the assessment.

Statistical analysis: The study received 200 responses from hospital nurses, with an 80% response rate. SPSS version 16 (Chicago, IL, USA) was used to analyze the data. Descriptive statistics (frequency and percentage) were used to summarize the data. The odds ratio

(OR) of factors associated with the musculoskeletal disorder was estimated using logistic regression. The level of statistical significance was defined at P < 0.05.

Results and Discussion

Descriptive data for sample: Results about the demographic characteristics of the subjects showed that all were male with an average age of 30.15 years (± 5.68). Most of them were females (94.0%). Their average weight was the normal standard value of 20.1 kg/m² (± 3.52). At the time of the study, respondents had worked at the present hospital for an average of 6.8 years (± 9.62 years). All 87.5% had a bachelor's degree, and 85.9% earned more than 20,000 baht per month. Table 1 shows that slightly more than half (44.5%) worked the afternoon shift from 04.00 p.m. to 12.00 p.m. Most nurses report having problems with WMSDs (70.0%).

Characteristic	n (%)
Age (Mean ± SD) years = 30.15 ± 5.68	200 (100)
BMI (mean ± SD) = 20.48 ± 3.52	
Years of working (mean ± SD) = 6.8 ± 9.62	
Sex	
Males	12 (16.0%)
Females	188 (94.0%)
Education level	
Bachelor's degree	175 (87.5%)
≥ Higher than Bachelor's degree	25 (12.5%)
Marital status	
Single	70 (35.0%)
Married	114 (57.0%)
Divorced/Separated	16 (8.0%)
Income (Thai Baht, THB*)	
≤ 20,000	30 (15.0%)
> 20,001	170 (85.0%)
Exercise	
< 3 times/week	162 (81.0%)
≥ 3 times/week	38 (19.0%)
Current alcohol consumption	
No	185 (92.5%)
Yes	15 (7.5%)
Perceived health status	
Good-Very good	187 (93.5%)
Poor-Fair	13 (6.5%)
Performed shift work	
Morning Shift	65 (32.5)
Afternoon	89 (44.5)
Night Shift	46 (23.0)
Musculoskeletal symptom	
Yes	140 (70.0)
No	60 (30.0)

***Table 1:** Hospital nurses' demographic characteristics (n = 200).*

*1 USD approximately 37 THB.

Prevalence of musculoskeletal symptoms in various body regions: Following the NMQ results, the frequency of musculoskeletal problems in various body regions among hospital nurses over the past 12 months has been 70.0%, as shown in table 2. Lower back pain was reported by most hospital nurses (n = 140; 85.7%), followed by upper back pain (n = 140; 67.9%), hips/thighs pain (n = 140; 57.1%), knee pain (n = 140; 52.9%), shoulders (n = 140; 52.9%), and finally neck pain (n = 140; 42.9%). Ankles/feet (n = 140; 50.0%), arms (n = 140; 42.9%), and wrists/hands (n = 140; 42.9%) were also identified.

		Number	Percentage
Pain	Reported pain	140	70.0
Pain site	Neck	60	42.9
	Shoulders	71	50.7
	Arm	60	42.9
	Upper back	95	67.9
	Wrists/hands	60	42.9
	Lower back	120	85.7
	Hips/thighs/buttocks	80	57.1
	Knees	74	52.9
	Ankles/feet	70	50.0

Table 2: The number of musculoskeletal symptoms in various body regions observed by 200 hospital nurses in the last 12 months.

The table 3 shows the outcomes of the multiple logistic regressions. Hospital nurses with more than 6.8 years of experience were more likely to have significant musculoskeletal disorder problems (P < 0.05). Nurses whose jobs required prolonged standing, heavy load handling, and repetitive movement were significant (P < 0.05). Heavy load handling (P < 0.05) and performing patient handling and patient care tasks were also significant (P < 0.05).

12- month prevalence of MSDs n (%) OR		Multivariate		
		95% CI	p-value	
Age (yr)				
Less than 30	45 (32.5%)	Reference		
30 or more	135 (67.5%)	1.684	1.125-9.751	0.040
Marital Status				
Single or divorce	174 (87.0%)	Reference		
Married	26 (13.0%)	0.587	0.421-3.721	0.367
Monthly income (THB*)				
≤ 20,000	30 (15.0%)	Reference		
> 20,001	170 (85.0%)	0.413	0.520-2.135	0.490
Education level				
Bachelor degree	175 (87.5%)	Reference		
Higher Bachelor degree	25 (12.5%)	0.581	0.190-3.278	0.511
Nutritional status				

Healthy Weight (BMI ≤ 24.9)	186 (93.0%)	Reference		
Overweight (BMI > 24.9)	14 (17.0%)	1.97	0.694-6.90	0.253
Current alcohol consumption				
Yes	15 (7.5%)	Reference		
No	185 (92.5%)	0.219	1.894-6.116	0.589
Sport				
Yes	162 (81.0%)	Reference		
No	38 (19.0%)	1.086	1.456-3.890	0.598
Years of employed (yr)				
6.8 or less	79 (39.5%)	Reference		
More than 6.8	121 (60.5%)	4.128	1.793-8.644	0.002*
Work schedule				
Day work	65 (32.5)	Reference		
Afternoon shift work	135 (67.5%)	2.965	1.490-7.860	0.093
Prolonged standing				
Rare	40 (28.57%)	Reference		
Frequent	125 (89.28%)	2.007	1.645-5.379	0.008*
Repetitive movement				
Rare	37 (26.4%)	Reference		
Frequent	89 (63.6%)	2.986	1.890-7.273	0.041*
Uncomfortable postures				
Rare	60 (42.9%)	Reference		
Frequent	55 (39.3%)	1.245	0.268-3.296	0.161
Heavy load handling				
Rare	60 (42.9%)	Reference		
Frequent	97 (69.3%)	2.530	1.549-5.643	0.034*
Physical and mental stress				
Yes	68 (48.6%)	Reference		
No	39 (27.9%)	0.5790	0.932-2.853	0.845

Table 3: Multivariate logistic regression analysis of risk factors of self-reported 12-month prevalence of MSDs among hospital nurses (n = 200).

*p-value < 0.05.

Discussion

The prevalence of musculoskeletal disorders was 70.00% among participants. Musculoskeletal disorders were most common in the lower back (n = 120; 85.71%), then in the upper back (n = 95; 67.90%), and subsequently in the hips/thighs (n = 80; 52.85%). Nurses are at a higher risk of MSDs due to the nature of their work, which includes patient care, lifting, transferring patients, constant repetition, constant stress, forceful contraction, awkward postures, and sustained positions. The findings strongly suggest that MSDs are a significant issue for hospital nurses in Thailand's general hospitals, particularly patient escort nurses. Over 12 months, the prevalence of MSDs

among the study's sample group was 70.0%, a much higher percentage than that reported for other healthcare professionals such as cytotechnologists 58% [20], physiotherapists 58% [23], and dentists 53% [21]. This disparity may be caused by the fact that, while the work of hospital nurses and healthcare professionals involves patient care, lifting, and transferring patients, the specific tasks performed by each group differ. Discrepancies in the findings could be attributed to differences in research methods, procedures, and sampling techniques used in the current study instead of those used in other studies. Lower back pain was the most common among questionnaire respondents, with 85.71% reporting discomfort. This is consistent with Chanchai., *et al*. and Ains., *et al*. who found that the prevalence of MSDs, specifically lower back pain, was 74.5% among hospital-setting healthcare professionals [1-4,16]. According to other studies, the prevalence of MSDs ranges from 43% to 76% [24-27]. According to the current study, hospital nurses with more than 6.8 years of experience are more likely to have musculoskeletal disorders. This could be due to their wide responsibilities, including patient care, lifting and transferring tasks, and assisting patients all day. This finding was consistent with a previous study of Registered Nurses in Thailand, which found that nurses with more than 20 years of experience were more likely to suffer from poor mental health and musculoskeletal symptoms [28]. Work activities such as awkward or tiring positions [29,30], awkward grip and hand movements [30,31], repetitive movement [29,33], prolonged standing, duration of work, uncomfortable postures, physical and mental stress [1] were all associated with MSDs, as in previous studies. While all nurses are exposed to these conditions during some of their careers, our analysis of the area of pain and the type of work revealed that 200 of 250 (80.0%) nurses who reported lower back pain were involved in patient care and heavy load handling. Their constant standing could cause this pain, and the posture they implemented while patient care, lifting and transferring patients [33,35]. This is consistent with previous findings that body flexion, rotation and weight lifting are major causes of lower back pain [1-4,21,34,35]. Regarding risk factors for MSDs, the current study found that patient care, years of employment, prolonged standing, heavy load handling, repetitive movement, and heavy load handling had a statistically significant impact. Uncomfortable emotions and muscle fatigue are caused by repetitive movements, such as arm or wrist twisting, overexertion, and awkward posture. As an outcome, it is not surprising that the patient escort nurses who participated in this study had MSDs, as prolonged standing, heavy load handling, repetitive movement, and heavy load handling tasks inevitably require frequent effects of WMSDs. This finding supports the results of Anis., *et al*. who encountered a connection between frequent repetitive movement and MSDs [1]. Another risk factor for MSDs among healthcare workers and nurses was heavy load handling, such as transferring overweight or obese patients and patient care daily. These movements overload the spine vertebrate area of the lower back, which results in awkward posture and movement [36]. This finding agrees with Holtermann's, who associated MSDs with the heavily loaded handling required during patient transfer [37]. An analysis of the workstations indicated that the patient escort nurses that performed lifting and transferring patients between different workstations had a statistically significant chance of suffering from MSDs. This finding is consistent with the literature. Nurses who did patient Heavy load handling were at a statistically significant risk of suffering from MSDs [37,38]. Despite these findings, statistical analysis of the present data revealed no significant association between the occurrence of MSDs and work duration, uncomfortable postures, physical and mental stress, and work shift. This study had some limitations due to recovery factors such as medical treatment, spontaneous recovery, and psychotherapy activities, which could also reduce MSDs for hospital nurses. The respondents were chosen from a single hospital in a specific location. Furthermore, no measurement scale was available to assess the intensity of pain/discomfort observed by study participants.

Conclusion

WMSDs are prevalent among Registered Nurses in Thailand, with low back pain being the most commonly injured. To reduce MSDs among hospital nurses and improve work efficiency, we recommend creating educational programs to raise awareness of these risk factors. Furthermore, we recommend that MSD effective and participatory intervention programs be made mandatory to reduce the rate of occupational exposure among hospital nurses.

Limitations of the Study

This study had some limitations due to recovery factors that may lead to a reduction in MSDs for hospital nurses, such as medical treatment, spontaneous recovery, and rehabilitation activities. The respondents were recruited from 1 hospital in a selected locale. In addition, there was no measurement scale for measuring the intensity of pain/discomfort reported by respondents.

Acknowledgments

Conflict of Interest

There is no conflict of interest, according to the authors.

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