

Characteristics of nurses with musculoskeletal disorders from Dr Soedarso Regional Hospital, Pontianak

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Abstract

Musculoskeletal disorders (MSDs) can have a significant negative impact on quality of life, resulting in reduced ability to work, absenteeism, and possibly switching occupations. The purpose of this study was to investigate the relationship between the prevalence and severity of MSDs and the nurse characteristics (NCs) of

nurses working in the Dr Soedarso Regional Hospital (DSRH) inpatient department. An analytical and descriptive cross-sectional methodology was used to examine 134 nurses from Inpatient Wards A and B. Total sampling was used to select the respondents. The level of exposure to the conditions investigated by the quick exposure check (QEC), namely, static and dynamic movements in the back, shoulders/arms, neck, and work-related stress, was significantly correlated with gender and neck (0.050), a history of education-related physical strain, such as back mobility (0.021), years of work-related strain on the neck (0.040), and work-related stress (0.033). There were no significant correlations found between age and static and dynamic movements of the back, shoulders/arms, and neck. Gender, education level, and employment duration all have a strong correlation with MSDs among DSRH inpatient nurses.

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Key words: musculoskeletal disorders, nurse, characteristics.

Conflict of interest: the authors declare no potential conflict of interest, and all authors confirm accuracy.

Ethics approval: the Ethics Committee of INSTITUTION approved this study (No. 45/RSUD/KEPK/V/2022). The study is conformed with the Helsinki Declaration of 1964, as revised in 2013, concerning human and animal rights.

Informed consent: all patients participating in this study signed a written informed consent form for participating in this study.

Patient consent for publication: written informed consent was obtained from a legally authorized representative(s) for anonymized patient information to be published in this article.

Availability of data and materials: all data generated or analyzed during this study are included in this published article.

Acknowledgements: the authors express their gratitude to the Institute of Technology and Health's centre for research and community service for their invaluable help in facilitating the successful execution of this research.

Received: 1 February 2024.

Accepted: 16 March 2024.

Early access: 17 April 2024.

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Healthcare in Low-resource Settings 2024; 12:12343

doi:10.4081/hls.2024.12343

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Introduction

Nurses have highlighted that work-related Musculoskeletal Disorders (MSDs) significantly affect quality of life. Based on a study conducted by the Bureau of Labour Statistics¹ in Xinjiang, the prevalent ailments among nursing professionals included MSDs of the lower back (54%), neck (41%), shoulders (34%), and wrists (26%).

The global incidence of MSDs among nurses ranges from 33.0 to 88.0%. Research on nurses in Estonia and Taiwan reported MSDs in 84.0% and 76.2% of the respondents, respectively. The most common MSD grievance among nurses was chronic pain in the lumbar region, followed by discomfort in the shoulders, neck, hands, and feet. Research on nurses in Brazil and Italy has identified lower back, neck, and knees as the most common MSD. In Turkey, the prevalence of MSD among nurses is 79.5%.²

Asian nurses have a higher prevalence of MSDs, ranging from 40 to 95%, in at least one body region. The lower back, neck, and shoulders are the most commonly affected areas in Western populations, with prevalence rates of 29%–64% for the lower back, 34%–63% for the neck, and 17%–75% for the shoulders. Furthermore, an examination of scholarly articles regarding MSDs in female nurses in the 2021 revealed that the knee, ankle, and foot were the most common MSD regions. MSDs in the knee vary from 7.5 to 77% and from 3.2 to 100% in the ankle.³ Nurses working in inpatient rooms are prone to developing MSDs because of their jobs. The patient care activities performed by nurses and their frequent contact with the environment pose a significant MSD risk.⁴ The work duties that frequently lead to MSDs include maintaining an upright posture (48.8%), bending (42.3%), twisting the body (40.6%), exerting force with the hands or fingers (37.3%), sitting (36.6%), and performing repeated arm motions

(34.3%).⁵ Nurses delivering nursing care in inpatient rooms experience effects like diminished concentration, physical exertion when transferring patients from wheelchairs and beds or vice versa, assisting patients with daily tasks such as bathing, aiding patients with defecation, and challenges due to limited room size, leading to extended working hours.

According to Putri *et al.*,⁴ it may be inferred that nurses suffering from MSDs may lose productivity and work efficiency. Musculoskeletal disorders (MSDs) can significantly impair quality of life and lead to work limitations, increased absenteeism, or a desire to switch occupations.² Yan *et al.*¹ identified many characteristics that are considered risk factors for MSDs in the workplace. These variables include age, work status, sex, race, education level, health conditions, shifts, and weekly working hours. Dr. Soedarso Regional Hospital (DSRH), a national referral hospital, has an inpatient facility comprising 11 rooms for inpatient care, ranging from class III to class I. The 2020 Hospital Occupational Safety and Health (k3rs) report of the DSRH revealed that 16 healthcare professionals received outpatient physiotherapy for MSDs or hernia nucleus pulposus (HNP [unpublished data]). HNP is the sixth most prevalent disease affecting healthcare professionals worldwide. However, the prevalence of MSDs among healthcare professionals in hospitals remains unknown. Hence, the present study aimed to assess Nurse Characteristics (NCs) and MSD prevalence among nurses working in the inpatient wards of the DSRH.

Materials and Methods

This study used a quantitative design based on analytical and descriptive statistics, following a cross-sectional approach.

The study population comprised 194 nurses working in Inpatient Wards A and B of the DSRH. This study used total sampling, which included all nurses in the inpatient wards who met the inclusion criteria. The sample included public servant (PNS) and non-public servant (PPT) employees working there for at least one year, not on work leave at the time of the study, and willing to provide informed consent. The sample size was determined based on the Slovin formula as follows:⁶

$$n = \frac{N}{1 + N(d^2)} \cdot 1$$

where N is the population size and e is the margin of error. The calculations indicated a minimum sample size of 131 participants.

Questionnaires were used to collect instrument-based data. Questionnaire A was used to collect data regarding NCs, such as age, gender, education level, and service duration, as well as the quick exposure check (QEC) score checklist.⁷⁻⁹ The QEC checklist was not tested as it uses a standard format. The QEC assessment considers several aspects that represent musculoskeletal risk factors: position in both static and dynamic back movements, shoulders/arms, wrists/hands, neck, work pace, vibrations, and work-related stress.^{10,11} Muscles can function in a static (postural) or dynamic (rhythmic) manner. Static refers to the maintenance of a stance or pose with minimal movement. Dynamic movements consist of repeated motions that actively involve several muscles and joints over their full range of motion.^{10,11} This study was approved by the Review Board and Ethics Committee of the Ministry of Health of DSRH (No. 45/RSUD/KEPK/V/2022). Data analyses were performed using Stata/MP version 17 (StataCorp, USA) and MedCalc statistical software version 15.8 (MedCalc, Ostend, Belgium); $p < 0.05$ was considered statistically significant.

Results

As seen in Table 1, most participants were aged 36 to 45 (53.7%), female (81.3%), employed for equal to or more than five years (89.6%), and possessing an 82.8% nursing diploma. Table 2 shows that most nurses had MSDs in static lower back mobility, with 50.0% falling in the moderate category. Additionally, 97.8% experienced mild MSDs in dynamic back mobility, 40.3% in

Table 1. The nurse characteristics (NCs) of the participants (n=134).

NCs	Frequency	Percentage (%)
Age		
26-35	32	23.9
36-45	72	53.7
More than 45	30	22.4
Gender		
Male	25	18.7
Female	109	81.3
Service duration (years)		
Less than 5	14	10.4
Equal or more than 5	120	89.6
Education level		
Diploma III	111	82.8
Nursing	23	17.2

Table 2. The distribution of musculoskeletal disorder (MSD) severity among the examined nurses (n=134).

Variable	Mild		Moderate		High		Extreme	
	n	%	n	%	n	%	n	%
Back (Static)	61	45.5	67	50.0	6	4.5	0	0
Back (Dynamic)	131	97.8	3	2.2	0	0	0	0
Shoulders/Arms	54	40.3	44	32.8	18	13.4	18	13.4
Wrists/Hands	67	50.0	44	32.8	21	15.7	2	1.5
Neck	63	47.0	30	22.4	28	20.9	13	9.7
Work Pace	13	9.7	116	86.6	5	3.7	0	0
Vibrations	17	12.7	60	44.8	49	36.6	8	6.0
Work-related Stress	17	12.7	60	44.8	49	36.6	8	6.0

shoulders/arms, 50.0% in wrists/hands, 47.0% in the neck, 86.6% at a moderate work pace, and 44.8% in moderate vibrations and work-related stress.

Table 3 shows the NCs that exhibited a significant correlation with the extent of QEC exposure. Spearman's correlation analysis revealed a relationship between NCs and MSDs. There were significant MSD and NC relationships: work pace influenced by education level, work pace, and vibrations influenced by sex, neck condition, and work-related stress influenced by service duration ($p < 0.05$, Table 3). There was no significant correlation between age and any of the QEC components in the static and dynamic movements of the back, shoulders, arms, wrists/hands, neck, vibrations, work pace, or work-related stress ($p > 0.05$).

Discussion

Rahmawati's¹² study indicated that musculoskeletal disorders (MSDs) often manifest at 35 years of age. This shows that individuals in their productive age comprise the majority of NCs, which raises the risk of MSD. Widodo's¹³ study indicated that most people suffering from MSDs were ≥ 30 years old. Our study indicated a higher proportion of individuals aged 36-45 years; however, the

Table 3. Musculoskeletal disorders (MSDs) and nurse characteristics (NCs) affect QEC scores for static and dynamic back movements, shoulders/arms, wrists/hands, neck, vibrations, work pace, and work-related stress (n=134).

NC	MSD	p	Correlation coefficient
Age	Back (Static)	0.969	0.003
	Back (Dynamic)	0.346	-0.088
	Shoulders/Arms	0.627	0.042
	Wrists/Hands	0.592	0.047
	Neck	0.728	-0.030
	Work Pace	0.682	-0.036
	Vibrations	0.703	-0.033
	Work-related Stress	0.781	0.024
Education	Back (Static)	0.570	0.050
	Back (Dynamic)	0.188	0.115
	Shoulders/Arms	0.329	0.085
	Wrists/Hands	0.456	0.065
	Neck	0.251	0.110
	Work Pace	0.877	-0.013
	Vibrations	0.016*	0.207
	Work-related Stress	0.109	-0.138
Gender	Back (Static)	0.778	0.025
	Back (Dynamic)	0.396	0.074
	Shoulders/Arms	0.406	0.072
	Wrists/Hands	0.068	0.159
	Neck	0.316	0.087
	Work Pace	0.004*	0.247
	Vibrations	0.036*	0.181
	Work-related Stress	0.571	0.049
Service Duration	Back (Static) movement	0.181	-0.116
	Back (Dynamic) movement	0.418	-0.071
	Shoulders/Arms	0.857	0.016
	Wrists/Hands	0.111	-0.139
	Neck	0.048*	0.171
	Work Pace	0.589	0.047
	Vibrations	0.385	0.075
	Work-related Stress	0.033*	0.183

* p 0.05).

statistical analysis did not reveal any significant findings. Workers aged 35 years often experience musculoskeletal issues that tend to increase with age. Muscular complaints arise due to a decline in muscular strength and endurance, leading to an increased likelihood of experiencing muscle issues.¹⁴ School-aged children frequently experience musculoskeletal diseases due to factors such as improper sitting posture while studying, carrying school bags over 10% of body weight, and lack of daily muscular stretching or warm-up before activities.¹⁵ MSDs are not influenced by age but rather by factors such as physical load, BMI, sitting posture, and daily activities. Regardless of age, individuals are at risk of developing MSDs if they do not maintain spinal balance as well as muscle and bone flexibility.¹⁶

The findings of this study were consistent with Habibie's¹⁷ findings that the majority of nurses are women, as nursing tends to value maternal instincts over other vocations. According to Soylar and Ozer,² nurses' age and sex affect the prevalence of MSDs, with age increasing the likelihood of MSD symptoms. Beginning at approximately 40 years of age, muscle mass, capacity, and intervertebral disk potency decrease, reducing strength and mobility. Additionally, the majority of respondents had served for \geq five years. Habibie¹⁷ found that 52.6% of nurses had served for \geq five years, supporting the study's conclusions. Rahmawati¹¹ found that those who had served for $>$ five years were more likely to develop MSDs. The disc space narrows permanently and degenerates because of the long-term spinal strain.

Most respondents in this study had a nursing diploma. Diploma III nursing education is vocational and most hospital workers are graduates, in line with Indonesian Nursing Law No. 38.¹⁸ Yazid and Situmorang¹⁹ stated that more formal education makes it simpler to absorb knowledge, particularly health information, and increases awareness of healthy living behaviors. Human behavior is heavily influenced by cognitive knowledge.

The study showed that most nurses had MSDs in the static and dynamic back, shoulders/arms, wrists/hands, and neck. Work-related stress and pace were moderate. The complaints were mostly mild-to-moderate for every component of the QEC. Rudyarti and Dewi¹⁸ found that 60% reported at least two complaints and 36% reported three complaints in the past six months. Lower back symptoms were the most frequent MSDs among the nurses (69.6%). Neck problems outnumbered shoulder complaints (45.7% and 54.3%, respectively). Shoulder issues were less prevalent than neck complaints (45.7% vs 54.3%, respectively). 28.3% of nurses reported experiencing both lower back and neck issues, whereas 34.8% reported lower back and shoulder complaints, and 23.9% reported neck and shoulder complaints.²⁰ Nurnaningtyas and Martiana²¹ also reported that many inpatient nurses' work requires uncommon postures such as bending, standing, and sitting. Nurses complained of back, waist, calf, and foot pain due to an abnormal working posture. Soylar and Ozer² also believe that pulling and pushing beds, lifting patients, repeated motions, excessive flexion, bending, twisting, and rapid movements affect nurses' health in hospitals. Rudyarti and Dewi²⁰ also linked work-related physical demands to neck, shoulder, and back MSD symptoms.

The results of this study indicated that sex is associated with MSD symptoms, specifically neck issues, among nurses in the inpatient wards of DSRH. Another study found a correlation between gender MSD prevalence ($p < 0.05$).²² This condition reveals women's natural tendency to care for patients and the dual duty of a female nurse as a housewife, mother, and family supporter. According to Fathonah *et al.*,²³ married female nurses may experience harmful work-family conflicts. Besides fulfilling their duties and responsibilities as nurses, to perform well according to

organizational standards, they must also care for and foster their families, which can cause musculoskeletal issues.

Indonesian Nursing Law No. 38¹⁸ states that nurses at home and abroad graduating with a higher education in nursing, specifically those with a diploma, the most basic higher education level, provide care to sick or healthy individuals, families, groups, or communities. Studies have indicated that nursing education is linked to MSDs, particularly back pain.

Most nurses hold a Diploma III in nursing, with a focus on physical nursing. During the 8.5-hour morning shift, nurses perform guard duties, evaluations, diagnoses, nursing, and assessments, which require sitting, standing, bending, and walking. Distance from the supporting examination areas, including the laboratory, radiology, and surgery rooms, exacerbates MSDs in nurses. Nuryaningtyas and Martiana recommended 10 min for each patient for bending exercises such as lifting.²¹ Actions like this are performed daily without stretching or resting.

Working time increases the risk of MSDs, especially in physically demanding jobs.¹⁸ This study found a link between service duration and neck and work-related stress-based musculoskeletal symptoms. Nuryaningtyas and Martiana²¹ found a link between service duration and MSDs. According to Soylar and Ozer,² nurses' work hours affect MSD complaints. Adriansyah *et al.*²⁴ found a link between service duration and MSDs ($p = 0.002$). Muscle diseases, especially neck disorders, can manifest because of unsuitable working circumstances and postures such as placing an intravenous (IV) drip while bending inappropriately, which nurses repeatedly perform during long work hours. Proper work posture requires a 20-60° bend. MSDs are more likely to arise because of these circumstances.¹⁹ Nurses may avoid MSDs by learning to lift weights, maintain proper posture, and stay healthy. Fitness may be improved by stretching before or after work. William's flexion stretching exercises reduce lower back discomfort.²⁵ Wuriani *et al.*²⁶ found that static stretching and appropriate work posture reduce musculoskeletal discomfort. Among all QEC aspects presented in our study, age does not affect the prevalence of MSD among nurses working in the inpatient wards of the DSRH.

The implications for healthcare systems

Recognizing musculoskeletal grievances is fundamental to ensuring comfort in the workplace. Nurses with MSD knowledge can contribute to the early prevention of occupational disorders, such as HNP, which can disrupt their daily lives. The findings of this study may offer perspectives and emphasize the need for training healthcare professionals, particularly in the field of ergonomics. It is crucial for hospitals to prioritize and support nurses, particularly concerning safety, protection, and comfort for both nurses and other hospital staff. This attempts to enhance spinal stability and function in workers with lower back pain and stabilize the pelvic muscles.

Limitations of the study

The sole instrument utilized in this study was the QEC, which is one of the many techniques used to identify musculoskeletal grievances. Furthermore, not every employee can be simultaneously diagnosed with MSDs.

Conclusions

Musculoskeletal disorders (MSDs) among inpatient nurses at the DSRH were primarily moderate for static back and mild for back dynamics, shoulders/arms, neck, vibrations, work pace, and

work-related stress. Nurses' sex, education, and service duration in DSRH inpatient wards affect the prevalence of MSDs. Among the nurses working in DSRH inpatient wards, age did not affect back mobility-related MSDs.

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