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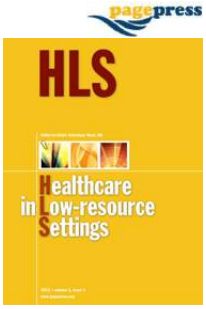

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Characteristics of nurses with musculoskeletal disorders from Dr Soedarso Regional Hospital, Pontianak

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Key words: musculoskeletal disorders, nurse, characteristics.

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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.

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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.

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 Statistics[1] 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 DRSH.

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 DRSH. 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]

$$n = \frac{N}{1+N(d2)} \quad 1$$

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 DRSH (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 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's[12] 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's[13] 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 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's[17] 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 ≥ five years. Habibie[17] found that 52.6% of nurses had served for ≥ five years, supporting the study's conclusions. Rahmawati[11] 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 Situmorang[19] 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 Dewi[18] 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 Martiana[21] 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 Ozer[2] 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 Dewi[20] 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. 38[18] 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 Martiana[21] 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.

References

1. Yan P, Li F, Zhang L, et al. Prevalence of work-related musculoskeletal disorders in the nurses working in hospitals of Xinjiang Uygur Autonomous Region. Pain Res Manag 2017;2017:5757108.
2. Soylar P, Ozer A. Evaluation of the prevalence of musculoskeletal disorders in nurses: a systematic review. Med Sci 2018;7:479–85.
3. Krishnan KS, Raju G, Shawkataly O. Prevalence of work-related musculoskeletal disorders: psychological and physical risk factors. Int J Environ Res Public Health 2021;18:9361.

4. Putri ZM, Murni D, Maisa EA, et al. Dampak gangguan muskoloskeletal akibat pekerjaan pada perawat di RSI Siti Rahmah Padang tahun 2019. Proc. Semin Kesehat Perintis 2019;2:133–7.
5. Ribeiro T, Serranheira F, Loureiro H. Work related musculoskeletal disorders in primary health care nurses. Appl Nurs Res 2017;33:72–7.
6. Adhikari GP. Calculating the sample size in quantitative studies. Scholars' J 2021;4:14–29.
7. Hossain MD, Aftab A, Al Imam MH, et al. Prevalence of work related musculoskeletal disorders (WMSDs) and ergonomic risk assessment among readymade garment workers of Bangladesh: a cross sectional study. PLoS One 2018;13:e0200122.
8. Lavery LA, Higgins KR, Lanctot DR, et al. Preventing diabetic foot ulcer recurrence in high-risk patients: use of temperature monitoring as a self-assessment tool. Diabetes Care 2007;30:14–20.
9. David G, Woods V, Li G, Buckle P. The development of the quick exposure check (QEC) for assessing exposure to risk factors for work-related musculoskeletal disorders. Appl Ergon 2008;39:57–69.
10. Ispășoiu A, Milosan I, Ispasoiu A, Meita C. Study on the application of the bowtie methodology for the assessment of ergonomic risks in the industrial field. Recent J 2021;22:128–36.
11. Tahernejad S, Choobineh A, Razeghi M, et al. Investigation of office workers' sitting behaviors in an ergonomically adjusted workstation. Int J Occup Saf Ergon 2022;28:2346–54.
12. Rahmawati U. Faktor-Faktor yang berhubungan dengan keluhan muskuloskeletal disorders pekerja pengangkut barang di Pasar Panorama Kota Bengkulu. J Kesehat Lingkung 2020;17:49–56.
13. Widodo YW. Hubungan Karakteristik Perawat dan Aktivitas Memindahkan Pasien dari Atas Meja Operasi ke Atas Brankar dengan keluhan musculoskeletal disorders (MSDs) pada Perawat Kamar Operasi RSUPN DR. Cipto Mangunkusumo Jakarta. PhD dissertation, Dept. Perpustakaan. Jakarta, Indonesia: Universidad Muhammadiyah; 2013.
14. Tarwaka. Ergonomi industri dasar-dasar pengetahuan ergonomi dan aplikasi di tempat kerja. Surakarta: Harapan Press; 2015.
15. Grimes P, Legg S. Musculoskeletal disorders (MSD) in school students as a risk factor for adult MSD: a review of the multiple factors affecting posture, comfort and health in classroom environments. J Hum Environ Syst 2004;7:1–9.

16. Hendi OM, Alturkistani LH, Bajaber AS, et al. Prevalence of musculoskeletal disorder and its relation to stress among medical student at Taif University, Saudi Arabia. Int J Prev Med 2021;12:98.
17. Habibie H, Diani N, Hafifah I. Hubungan umur, jenis kelamin, masa kerja, dan kebiasaan olahraga dengan keluhan musculoskeletas disorders (MSDs) pada perawat. Caring nurs 2019;3:23–30.
18. Keperawatan U-U. Republik Indonesia No. 38 Tahun 2014 tentang Keperawatan. Jakarta; 2014.
19. Yazid B, Situmorang H. Hubungan aktivitas fisik dengan gangguan muskuloskeletal pada perawat di RSU Sundari Medan. J Kel Sehat Sejah 2021;19:38–47.
20. Rudyarti E, Dewi PR. Analisis risiko keluhan muskuloskeletal pada perawat di rumah sakit Sentra Medika Cikarang. J Ilm Kesehat Inst Med DRG Suherman 2019;1:1–9.
21. Nuryaningtyas BM, Martiana T. Analisis tingkat risiko muskuloskeletal disorders (MSDs) dengan the rapid upper limbs assessment (RULA) dan karakteristik individu terhadap keluhan MSDs. Indones J Occup Saf Heal 2014;3:160–9.
22. Gu R. Hubungan faktor individu dan faktor pekerjaan dengan keluhan musculoskeletal disorder (MSDs) pada perawat (Studi observasional pada perawat instalasi Rawat inap RSD Idaman Banjarbaru tahun 2017. PhD dissertation, Perpustakaan. Banjarbaru, South Kalimantan, Indonesia: Universidad Lambung Mangkurat; 2017.
23. Fathonah D, Syahran S, Andriansyah A. Pengaruh peran gender dan stres kerja terhadap kinerja perawat di rumah sakit umum daerah Tarakan provinsi Kalimantan Utara. Coop J Ilm Manaj 2020;11:117–24.
24. Adriansyah M, Mallapiang F, Ibrahim H. Faktor yang berhubungan dengan keluhan MSDs pada penenun Lipa' Sa'be Mandar di Desa Karama Kecamatan Tinambung kabupaten Polewali Mandar. Hig J Kesehat Lingkung 2019;2:79–84.
25. Khasanah FR. Pengaruh latihan stretching fleksi William terhadap tingkat nyeri punggung bawah di wilayah kerja Puskesmas Geger. Thesis. Prodi Keperawatan, stikes Bhakti Husada Mulia Madiun, East Java, Indonesia; 2018.
26. Wuriani W, Rosa EM, Afandi M. Pengaruh perbaikan postur kerja terhadap nyeri muskuloskeletal pada perawat di Klinik Kitamura Pontianak. Mutiara J Kedok Kesehat 2017;17:22–8.

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)		
Lest 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)

	Mild		Moderate		High		Extreme	
Variable	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

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

(* = significant level p- value 0.05)

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Characteristics of Nurses with Musculoskeletal Disorders from Dr Soedarso Regional Hospital, Pontianak

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ABSTRACT

Background: Musculoskeletal disorders (MSDs) can have a significantly negative impact on quality of life and lead to limited ability to work, absenteeism, and, potentially, switching occupations.

Objective: To examine the correlation between the prevalence and severity of MSDs and the nurse characteristics (NCs) of nurses working at the Dr Soedarso Regional Hospital (DSRH) inpatient department.

Method: An analytical and descriptive cross-sectional methodology was used to examine 134 nurses working at Inpatient Wards A and B. Total sampling was used to select the respondents.

Results: The level of exposure to the conditions that the quick exposure check (QEC) examine; namely, static and dynamic movements in the back, shoulders/arms, neck, and work-related stress; significantly correlated with gender and neck (0.050), a history of education-related physical strain; such as back mobility (0.021); as well as years of work-related strain on the neck (0.040), and work-related stress (0.033). However, no significant correlations were observed between age and static and dynamic movements in the back, shoulders/arms, and neck.

Conclusion: Gender, education level, and employment duration strongly correlate with MSDs among the nurses at the inpatient department of the DSRH.

Keywords: Musculoskeletal Disorders Nurse Characteristics

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1. INTRODUCTION

Nurses have highlighted that work-related musculoskeletal disorders (MSDs) significantly impact their quality of life. Based on a study conducted by the Bureau of Labour Statistics [1] in Xinjiang, the prevalent ailments among nursing professionals include MSDs of the lower back (54%), neck (41%), shoulders (34%), and wrists (26%).

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

Asian nurses have a higher MSD prevalence, ranging from 40 to 95% in at least one body region. The lower back, neck, and shoulders are the most commonly afflicted areas of the body in Western populations, with a prevalence of 29 to 64% for the lower back, 34 to 63% for the neck, and 17 to 75% for the shoulders. Further, an examination of the scholarly articles regarding MSDs in female nurses in the last year revealed that the knee, ankle, and foot are the most common MSD regions. MSDs in the knee vary from 7.5 to 77% and 3.2 to 100% for the ankle [3]. Nurses working in inpatient rooms are prone to and develop MSDs due to 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, gender, race, education level, health conditions, shifts, and weekly working hours. The Dr Soedarso Regional Hospital (DSRH), being a national referral hospital, features an inpatient facility that includes 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 of their healthcare professionals received outpatient physiotherapy due to MSDs or hernia nucleus pulposus (HNP) [unpublished data]. HNP is sixth among the ten most prevalent diseases affecting their healthcare professionals. Regrettably, MSD prevalence among health professionals in hospitals remains unknown. Hence, the present study aims to assess nurse characteristics (NCs) and MSD prevalence among nurses working in the inpatient wards of the DRSH.

2. METHOD

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

The population of this study comprised the 194 nurses working in Inpatient Wards A and B of the DRSH. This study used total sampling, which includes all nurses in inpatient wards who met the inclusion criteria. The sample includes 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 is determined based on the Slovin formula as follows: $n=\frac{N}{1+N(d2)}$ [6] where, N is the population size and e is the margin of error.

The calculations indicate a minimum sample size of 131 respondents. Instrument-based data collection was conducted using a questionnaire. 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], [2]. The QEC checklist was not tested as it uses a standard format. The Ministry of Health the Review Board and Ethics Committee of the DRSH approved this study (No. 45/RSUD/KEPK/V/2022). The data analyses were conducted using Stata/MP version 17 (StataCorp, USA) and MedCalc statistical software version 15.8 (MedCalc, Ostend, Belgium). $P < 0.05$ was considered statistically significant.

3. RESULTS AND DISCUSSION

3.1. Results

As seen in Table 1, most participants were aged 36 to 45 (53.7%), female (81.3%), employed for ≥ five years (89.6%), and had a diploma in nursing with an 82.8% grade. Table 2 reveals that most nurses suffered from MSDs in the static lower back mobility, with 50.0% falling into the moderate category. Additionally, 97.8% experienced mild MSDs in dynamic back mobility, 40.3% in the shoulders/arms, 50.0% in the wrists/hands, 47.0% in the neck, 86.6% at moderate work pace, and 44.8% during moderate vibrations and work-related stress.

Table 3 demonstrates the NCs that exhibit a noteworthy correlation with the extent of exposure to QEC. Spearman correlation revealed the relationship between NCs and MSDs. There were significant MSD and NC relationships: work pace influenced by education-level, work pace and vibrations influenced by gender, neck and work-related stress influenced by service duration ($p < 0.05$, Table 3). There was no significant correlation between age and all the components of the QEC in the static and dynamic movements of the back, shoulders/arms, wrists/hands, neck, vibrations, works pace, and work-related stress ($p > 0.05$).

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
45	30	22,4
Gender		
Male	25	18,7
Female	109	81,3
Service Duration (Years)		
< 5	14	10,4
≥ 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)

	Mild		Moderate		High		Extreme	
Variable	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

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)	0.181	-0.116
	Back (Dynamic)	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

(* = significant level p- value 0.05)

3.2. Discussion

This study confirms Rahmawati's [10] findings that MSDs first appear at age 35. It reveals that productive age dominates NCs, increasing MSD risk. Widodo's [11] study indicated that most were ≥ 30 years old. This study's findings were consistent with Habibie's [12] findings that the majority of nurses are women, as nursing tends to value maternal instinct above other vocations. According to Soylar and Ozer [2], the nurse's age and gender affect MSD prevalence, with age raising the likelihood of MSD symptoms. Beginning around 40 years old, muscle mass, capacity, and intervertebral disc potency decrease, reducing strength and mobility. Additionally, the majority of respondents had served for ≥ five years. Habibie [12] found that 52.6% of nurses had served for ≥ five years, supporting the study's conclusions. Rahmawati [10] found that those who have served for > five years are more likely to get MSDs. The disc space narrows permanently and degenerates due to long-term spine strain.

Most of the 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 [13]. Yazid and Situmorang [14] state that more formal education makes it simpler to absorb knowledge, particularly health information, and increases awareness of healthy living behaviours. Human behaviour is heavily influenced by cognitive knowledge.

The study showed that most nurses have MSDs in the static and dynamic back, shoulders/arms, wrists/hands, and neck. Work-related stress and work pace were medium. The complaints were mostly mild to moderate for every component in the QEC. Rudyarti and Dewi [15] found that 60% reported at least two complaints, and 36% reported three in the past six months. Lower back symptoms were the most frequent MSDs among nurses (69.6%). Neck problems outnumbered shoulder complaints (45.7% vs. 54.3%). Shoulder issues were less prevalent than neck complaints (45.7% vs. 54.3%). 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 [15]. Nurnaningtyas and Martiana [16] also reported that many inpatient nurses' work requires uncommon postures; such as bending, standing, and sitting. Nurses have complained of back, waist, calf, and foot pain due to abnormal working posture. Soylar and Ozer [2] also believe that pulling

and pushing beds, lifting patients, repeated motions, excessive flexion, bending, twisting, and rapid movements impact nurses' health in hospitals. Rudyarti and Dewi [15] also link work-related physical demands to neck, shoulder, and back MSD symptoms.

This study's results indicate that gender is associated with MSD symptoms, specifically neck issues, among nurses at the inpatient wards of the DSRH. Another study found a correlation between gender MSD prevalence ($p < 0.05$) [17]. This condition reveals women's natural tendency to care for patients and the dual duty of a female nurse as a housewife, child rearing, and family supporter. According to Fathonah et al. [18], married female nurses may experience harmful work-family conflicts. Besides fulfilling their duties and responsibilities as nurses, to perform well according to organisational standards, they must also care for and foster their families, which can cause musculoskeletal complaints.

Indonesian Nursing Law No. 38 [13] states that nurses at home and abroad, graduating with 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 indicate 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 duty, evaluations, diagnoses, nursing, and assessing, which require sitting, standing, bending, and walking. The distance from supporting examination areas, including laboratory, radiology, and surgery rooms, exacerbates MSDs in nurses. Nuryaningtyas and Martiana [16] recommend 10 minutes for each patient for bending exercises like lifting. Actions like this are done daily without stretching or resting.

Working time increases the risk of MSDs, especially in physically demanding jobs [14]. This study found a link between service duration and neck and work-related stress-based musculoskeletal symptoms. Nuryaningtyas and Martiana [16] found a link between service duration and MSDs. According to Soylar and Ozer [2], nurses' work hours impact MSD complaints. Adriansyah et al. [19] found a link between service duration and MSDs ($p = 0.002$). Muscle diseases, especially neck disorders, can manifest due to unsuitable working circumstances and postures; such as placing an intravenous (IV) drip while bending inappropriately, which nurses repeatedly do during long work hours. Proper work posture requires a 20° to 60° bend. Musculoskeletal disorders (MSDs) more likely arise due to these circumstances [16]. Nurses may avoid MSDs by learning to lift weights, have proper posture, and staying healthy. Fitness may be improved by stretching before or after work. William's flexion stretching exercises reduce lower back discomfort [20]. Wuriani et al. [21] found that static stretching and appropriate work posture reduce musculoskeletal discomfort. In all QEC aspects, age does not affect the prevalence of MSD among nurses working in the inpatient wards of the DSRH.

3.2.1. The implications for healthcare systems

Recognising 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 nurses' daily lives.

3.3. Limitations of the Study

The sole instrument utilised in this study is the QEC, which is one of the many techniques with which to identify musculoskeletal grievances. Furthermore, not every employee has the ability to diagnose MSDs simultaneously.

4. CONCLUSION

Musculoskeletal disorders (MSDs) among the inpatient nurses at the DSRH were primarily moderate for the static back, mild for back dynamic, shoulders/arms, neck, vibrations, work pace, and work-related stress. Nurses' gender, education, and service duration at the DSRH's inpatient wards affect MSD prevalence. Among the nurses working at the DSRH's inpatient wards, age does not affect back mobility-related MSDs.

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<td>Suriadi Jais is a associate professor of Clinical Nurse Specialist, Post Graduate of Nursing, The Institute of Technology and Health Muhammadiyah Pontianak, Indonesia. His research interests are mainly focused on the wound, enterostomal, continence, chronic diseases and complementary therapy. He is a President of Indonesian Wound Enterosmtomal Continence Nurses Association (InWECNA). Committee member of Indonesian National Nurses Association (INNA). He can be contacted at email: suriadif@yahoo.com.au.</td>
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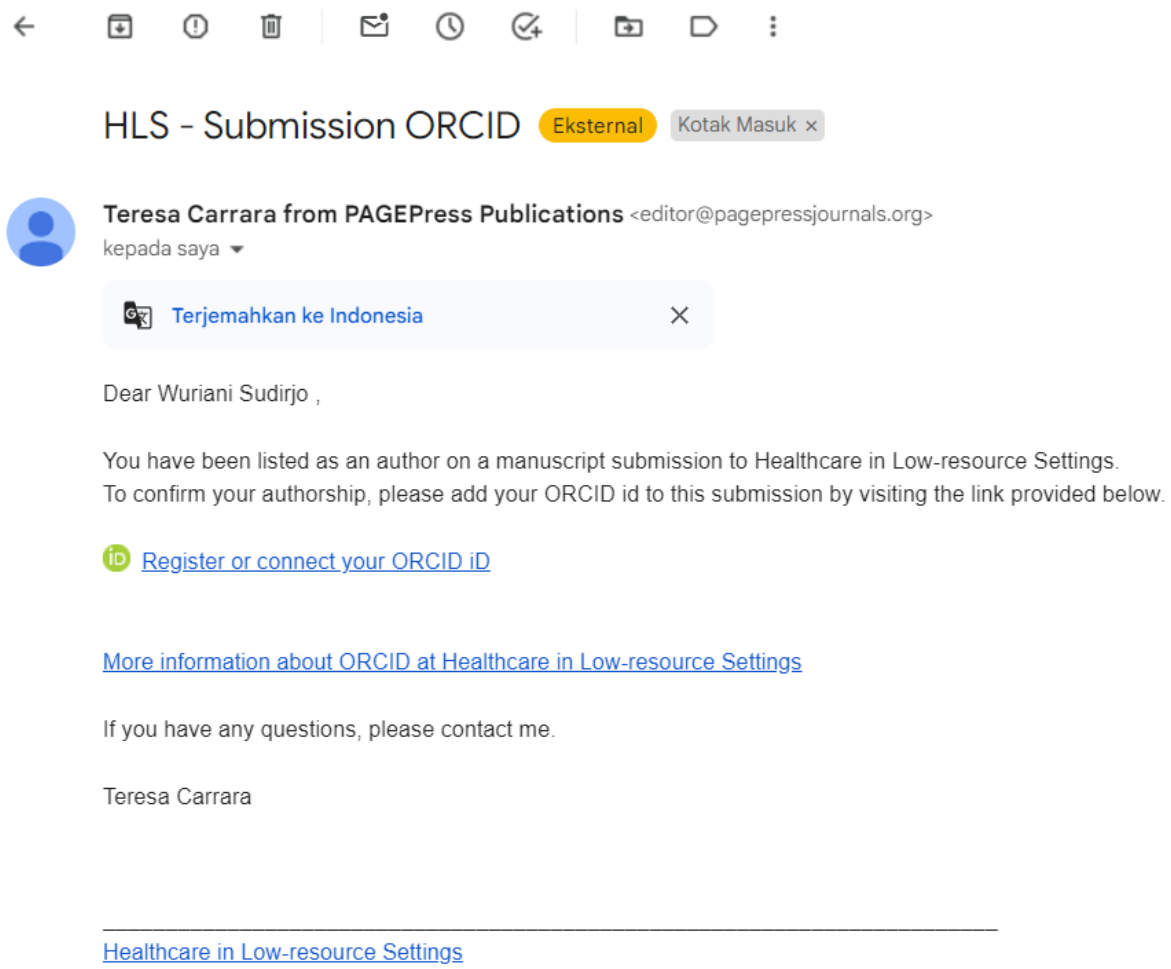

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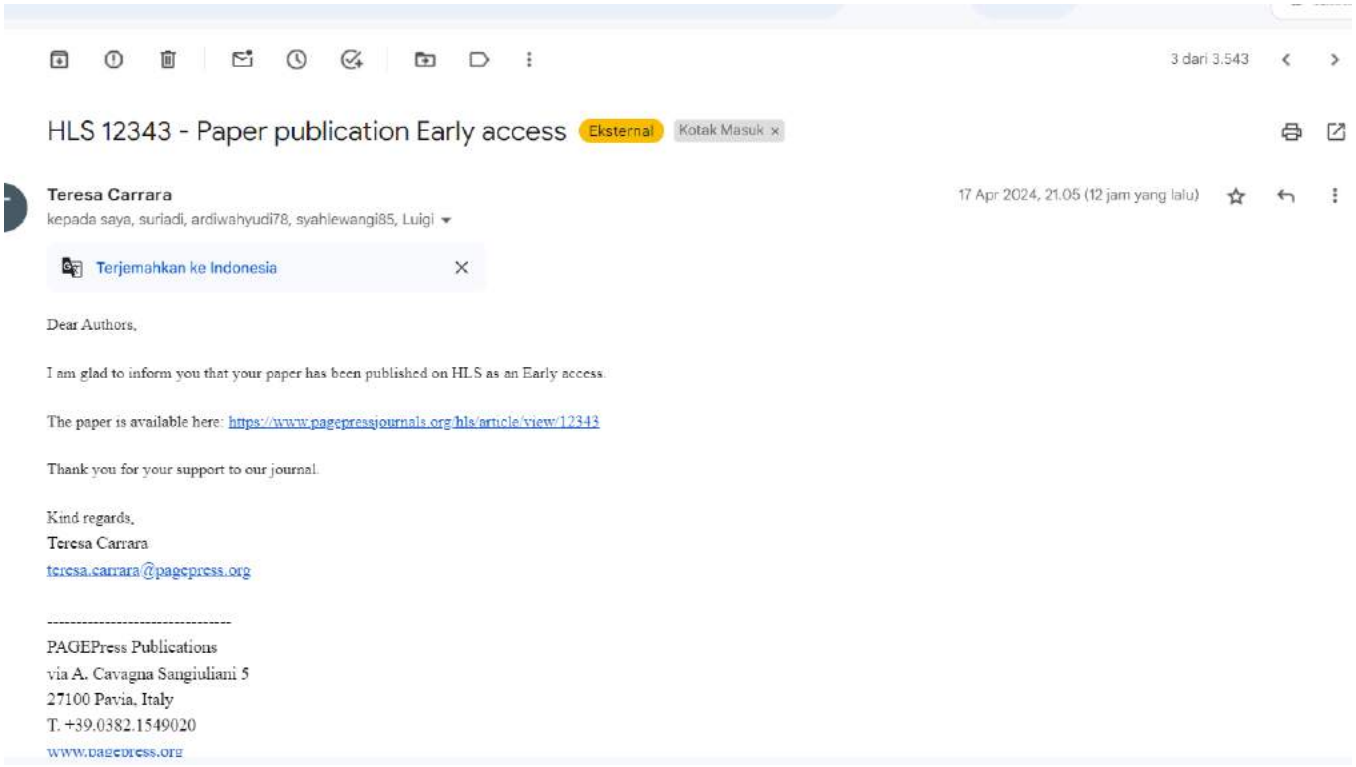

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