

*Original/Research Paper***Work-related musculoskeletal disorders and their association with patient handling practices and repetitive movements among nurses at UNIOSUN Teaching Hospital, Osun State, Nigeria: A cross-sectional study**

Daramola Chinonye Lucky ^{a*}  | Olatunji Iyanuoluwa Precious ^a | Olowu Anointing Tiwalade ^a  | Olalekan Victor Oluwafemi ^a  | Akinbowale Busayo Temilola ^b 

a. Redeemer's University Ede, Osun, Nigeria

b. Osun State University, Osogbo, Nigeria

*Corresponding author(s): Daramola Chinonye Lucky (PhD candidate), Redeemer's University Ede, Osun, Nigeria.

Email: daramolachinonye@gmail.com

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Abstract

Nurses are routinely exposed to physical stressors such as prolonged patient handling and repetitive movements, occupational activities that have been associated with an increased risk of work-related musculoskeletal disorders (WMSDs). The study adopted a cross-sectional study design. The study's target population consisted of all registered Nurses working at UNIOSUN Teaching Hospital in Osun State, Nigeria. The study population of 199 was obtained using convenience sampling. Findings revealed that 30.1% of nurses reported frequently lifting or manually repositioning patients. Risk assessment indicated that 57.3% of respondents were categorized as having a high risk of WMSDs-related symptoms. Regarding workplace factors, 25.1% of nurses reported that adaptive equipment was sometimes unavailable, while 26.1% indicated a lack of mechanical aids for patient handling. 27.6% agreed that patient load per shift was challenging, while 31.2% indicated that shift scheduling is an organizational factor contributing to physical strain. Inferential analysis demonstrated a statistically significant association between years of professional experience and the risk of WMSDs ($\chi^2=14.25$, $df=2$, $P=0.001$). In conclusion, the study demonstrated a high prevalence of prolonged patient handling and repetitive movements among nurses, with a high proportion exhibiting elevated rates of WMSDs. Workplace conditions, including inadequate assistive devices, limited training, and insufficient rest periods, were identified as important occupational challenges. Addressing these factors through ergonomic interventions and supportive workplace policies is essential for promoting nurses' long-term health and occupational well-being.

Keywords: Work-Related Musculoskeletal Disorders, Prolonged Patient Handling, Repetitive Movements, Nurses, Nursing.

1 | Introduction

Work-related musculoskeletal disorders (WMSDs) are an important occupational health problem affecting workers across different sectors, with healthcare professionals, particularly nurses, being at considerable risk. WMSDs are musculoskeletal disorders that can be attributed to the work environment or the performance of occupational activities and may involve the muscles, nerves, tendons, ligaments, joints, cartilage, and spinal discs [1]. Occupational factors such as repetitive movements, forceful exertion, lifting, pushing, pulling, and maintaining

awkward or prolonged postures can contribute to the development or aggravation of these disorders [1].

Nurses are particularly vulnerable because patient care frequently requires lifting, moving, transferring, and repositioning patients, often under physically demanding or constrained working conditions. The National Institute for Occupational Safety and Health identifies patient handling, including lifting, moving, and repositioning patients, as a major occupational risk factor for WMSDs among healthcare workers [2]. Repeated exposure to these activities, particularly when mechanical assistance or adequate coworker support is

unavailable, may increase cumulative biomechanical stress on the musculoskeletal system. The broader burden of musculoskeletal disorders is substantial. According to the World Health Organization, approximately 1.71 billion people worldwide live with musculoskeletal conditions, which are the leading contributor to disability globally and account for approximately 149 million years lived with disability [3]. These conditions are commonly characterized by pain and limitations in mobility and dexterity and may negatively affect individuals' ability to work, perform daily activities, and participate in social life [3]. Importantly, these global estimates refer to musculoskeletal conditions in general and should not be interpreted as the global prevalence of occupationally related WMSDs.

Among nurses specifically, WMSDs represent a substantial occupational burden. A meta-analysis by Sun *et al.*, (2023), involving 42 studies and 36,934 nurses, estimated the annual prevalence of WMSDs at 77.2%, with the lower back, neck, and shoulders being the most frequently affected anatomical regions [4]. These findings demonstrate the substantial burden of WMSDs within the nursing workforce. Occupational exposures such as repetitive movements, awkward postures, lifting, and patient-handling activities have also been recognized as important contributors to WMSD risk [1, 2]. Evidence from Nigeria similarly indicates that WMSDs are common among nurses. Tinubu *et al.*, (2010), in a study conducted among nurses in Ibadan, South-west Nigeria, reported a lifetime prevalence of 84.4%, a 12-month prevalence of 78.0%, and a point prevalence of 66.1%, with the lower back being the most frequently affected anatomical region [5]. In another study conducted among hospital nurses in Lagos State, Akodu & Ashalejo (2019) [6] reported point and 12-month prevalence rates of 70.4% and 60.0%, respectively. Working in awkward and cramped positions was also identified as one of the most frequently reported occupational risk factors [6]. These findings indicate that WMSDs constitute an important occupational-health concern among nurses in South-west Nigeria.

Despite evidence from other healthcare institutions in South-west Nigeria, occupational conditions may differ substantially between hospitals in staffing, workload, patient dependency, access to assistive devices, and patient-handling practices. Evidence specifically addressing prolonged patient handling and repetitive movements among nurses at UNIOSUN Teaching Hospital, Osun State, therefore remains important. Understanding these occupational exposures may provide locally relevant evidence to develop ergonomic interventions, improve safe patient-handling practices, and strengthen organizational

measures to reduce musculoskeletal risk among nurses. Therefore, this study aimed to determine the prevalence of WMSDs and examine their association with prolonged patient handling and repetitive movements among nurses at UNIOSUN Teaching Hospital, Osun State, Nigeria.

2 | Methods

2.1 | Study design and setting

The research employed a cross-sectional study design to determine the prevalence of prolonged patient-handling practice and repetitive movements in the development of WMSDs; the contribution of the workplace environment to the development of WMSDs among nurses; and the organizational factors influencing prolonged patient-handling practice and repetitive movements in the development of WMSDs among nurses. The study was conducted at UNIOSUN Teaching Hospital, Osogbo, Osun State, a tertiary health institution established in 1997. The hospital has approximately 210 beds and 340 nurses across multiple departments, including accident and emergency, medical/surgical wards, pediatrics, orthopedics, intensive care unit, and renal units.

2.2 | Ethics consideration

Ethical clearance was obtained from the UNIOSUN Teaching Hospital's ethical review committee (UTH/REC/2026/03/1453). This was followed by submission of an introductory letter from Redeemer's University Department of Nursing. Respondents were informed verbally and in writing about the study's purpose, and informed consent was obtained. Privacy and confidentiality were assured, and respondents retained the right to participate or withdraw voluntarily.

2.3 | Sample size

The study population comprised 199 nurses, as determined using Cochran's formula.

2.4 | Participants

Eligible participants included registered nurses with at least 1 year of clinical experience who were directly involved in patient care, such as lifting, repositioning, and transferring. Nurses on administrative duties, those with less than one year of experience, or those with preexisting conditions predisposing them to WMSDs were excluded.

2.5 | Data collection

In this study, data were collected over four weeks—a structured, self-administered questionnaire served as the primary data collection instrument. The questionnaire consisted solely of closed-ended questions, enhancing clarity, ease of analysis and consistency in responses. It was presented in English and organized into four main sections. The socio-demographic data of respondents included age, gender, marital status, education, years of experience, and ward of practice. Prevalence of patient handling practices and repetitive movements included manual lifting, repositioning, repetitive bending, prolonged handling, strain, and fatigue. The workplace environment consisted of availability of assistive devices, training, workload distribution, and rest breaks. Organizational factors influencing prolonged patient handling and repetitive movements include staffing levels, workload intensity, availability of assistance, and shift scheduling. Responses were measured using five-point Likert scales. A pilot study was conducted with 20 nurses (10% of the sample size). Data from these nurses were excluded from the main study. For this study, validity was considered in terms of both internal and external validity. To ensure accuracy, a pilot test was conducted with a small group of nurses. This determined whether the instrument effectively measures the prevalence of prolonged patient handling practices and repetitive movements in the development of WMSDs, the contribution of the workplace environment to the development of WMSDs and organizational factors influencing prolonged patient handling and repetitive movements in the development of WMSDs among nurses. Convenience sampling technique was employed for this study. Nurses who met the inclusion criteria and were available during the data collection period were recruited from the various wards and units of UNIOSUN Teaching Hospital. This approach was adopted due to the nature of the hospital work environment, shift schedules, and the need to minimize disruption to clinical duties. To ensure the reliability of this study, all respondents received the same version of the questionnaire, ensuring uniformity in data collection. The internal consistency of the questionnaire was measured using Cronbach's Alpha. A score of 0.756 or higher was considered an acceptable threshold for reliability. A pilot test was conducted to assess the clarity and consistency of the questionnaire items. The pilot test results informed the necessary modifications, ensuring that the instrument was refined and reliable before the main data collection.

2.6 | Statistical analysis

Data collected were entered, coded and analyzed using the Statistical Package for the Social Sciences (SPSS) version 27.

Before analysis, the dataset was checked for completeness, consistency, and accuracy to minimize errors. Descriptive statistics were used to summarize respondents' socio-demographic characteristics; the prevalence of prolonged patient handling practices and repetitive movements; and the contributions of the workplace environment and Organizational factors to the development of WMSDs. Inferential analysis employed chi-square tests to examine associations between Years of professional experience and risk of WMSDs. Years of professional experience were analyzed as an exposure-related variable. Statistical significance was set at $P < 0.05$.

3 | Results

3.1 | Participants

A total of 199 nurses participated in the study, yielding a response rate of 100%. The majority of respondents were female (95.0%), while only 5.0% were male. Most participants were aged 40–49 years (37.7%), followed by those aged 30–39 years (35.2%). In terms of marital status, 61.8% were married, while 38.2% were single. Regarding educational qualifications, the largest proportion held a diploma (57.8%), followed by bachelor's degrees (39.7%) and master's degrees (2.5%). The majority of nurses had 5–10 years of experience (42.7%), and the most common ward assignment was the surgical ward (35.2%) (Table 1).

3.2 | Prevalence of prolonged patient handling and repetitive movements in the development of WMSDs among nurses

Findings revealed that 30.1% of nurses often manually lifted or repositioned patients, while 27.6% reported often feeling physically strained by patient handling. Similarly, 29.2% indicated frequent repetitive bending or lifting motions, and 28.6% reported often engaging in repetitive hand or leg movements such as writing or operating medical instruments. Extended physical strain was common: 31.2% of respondents often experienced it, and 29.7% reported frequent muscle fatigue from repetitive motions (Table 2).

3.3 | Risk classification of WMSDs

Risk assessment showed that 57.3% of nurses were categorized as high risk for WMSDs-related symptoms, while 42.7% were classified as low risk (Table 3).

3.4 | Contribution of workplace environment to the development of WMSDs among nurses

About 25.1% of nurses reported that adaptive equipment was sometimes unavailable, and 26.1% indicated that mechanical aids were sometimes lacking. Training programs to minimize strain were reported as only occasionally available (24.1%). Similarly, workload distribution was occasionally not enforced (25.1%), and 23.6% of respondents reported sometimes lacking adequate breaks during shifts (Table 4).

3.5 | Organizational factors influencing prolonged patient handling and repetitive movements in the development of WMSDs

The majority of nurses (30.2%) reported often performing physically demanding tasks, such as lifting, repositioning,

bending, or pushing patients. 27.6% agreed that patient load per shift was challenging, while 31.2% indicated that shift scheduling is an organizational factor contributing to physical strain. Low staffing levels were also reported as a factor, with 27.6% agreeing that it increased time spent on patient handling and repetitive movements (Table 5).

3.6 | Inferential analysis

The chi-square test indicated a significant association between years of professional experience and the risk of WMSDs ($\chi^2=14.25$, $df=2$, $P=0.001$). Nurses with less than 5 years of experience had the highest proportion in the high-risk category (69.7%), compared with 55.7% among those with 5–10 years of experience and 42.0% among those with more than 10 years of experience.

Table 1. Socio-demographic characteristics of the participants (N=199).

Variables	n (%)
Age (years)	
20 to 29	50 (25.1)
30 to 39	70 (35.2)
40 to 49	75 (37.7)
50 to 59	4 (2.0)
Sex	
Male	10 (5.0)
Female	189 (95.0)
Marital status	
Single	76 (38.2)
Married	123 (61.8)
Educational qualification	
Diploma	115 (57.8)
Bachelor's degree	79 (39.7)
Master's degree	5 (2.5)
Years of professional experience	
<5	60 (30.2)
5 to 10	85 (42.7)
>10	54 (27.1)
Current ward	
Medical	65 (32.7)
Surgical	70 (35.2)
Emergency	8 (4.0)
Other wards	56 (28.1)

Data are presented as frequency (percentage).

Table 2. Frequency of patient-handling activities and repetitive movements among nurses (N=199).

Variables	n (%)
Manual lifting or repositioning of patients during shifts	
Rarely	20 (10.1)
Occasionally	30 (15.1)
Sometimes	50 (25.1)
Often	60 (30.1)
Always	39 (19.6)
Physical strain from handling patients	
Rarely	25 (12.6)
Occasionally	35 (17.6)
Sometimes	45 (22.6)
Often	55 (27.6)
Always	39 (19.6)
Repetitive bending or lifting during shifts	
Rarely	18 (9.0)
Occasionally	28 (14.1)
Sometimes	52 (26.1)
Often	58 (29.2)
Always	43 (21.6)
Repetitive hand or leg movements	
Rarely	22 (11.1)
Occasionally	34 (17.1)
Sometimes	48 (24.1)
Often	57 (28.6)
Always	38 (19.1)
Physical strain from handling patients for extended periods	
Rarely	16 (8.0)
Occasionally	30 (15.1)
Sometimes	54 (27.1)
Often	62 (31.2)
Always	37 (18.6)
Muscle fatigue due to repetitive movements	
Rarely	19 (9.5)
Occasionally	32 (16.1)
Sometimes	50 (25.1)
Often	59 (29.7)
Always	39 (19.6)

Data are presented as frequency (percentage).

Table 3. Risk level for WMSDs associated with prolonged patient handling and repetitive movements (N=199).

WMSD risk level	n (%)
Low risk	85 (42.7)
High risk	114 (57.3)

Data are presented as frequency (percentage).

Note: Low risk: score <24.5; High risk: score ≥24.5. Possible scores range from 6 to 30.

Table 4. Workplace environmental factors associated with WMSDs among nurses (N=199).

Variables	n (%) or mean
Lack of suitable adaptive equipment for patient handling	3.12
Rarely	30 (15.1)
Occasionally	45 (22.6)
Sometimes	50 (25.1)
Often	40 (20.1)
Always	34 (17.1)
Unavailability of mechanical aids or assistive devices in the workplace	3.18
Rarely	28 (14.1)
Occasionally	40 (20.1)
Sometimes	52 (26.1)
Often	45 (22.6)
Always	34 (17.1)
Lack of training programs on techniques to minimize strain during repetitive movements or patient handling	3.05
Rarely	35 (17.6)
Occasionally	48 (24.1)
Sometimes	46 (23.1)
Often	40 (20.1)
Always	30 (15.1)
Lack of appropriate workload distribution	3.03
Rarely	32 (16.1)
Occasionally	50 (25.1)
Sometimes	48 (24.1)
Often	38 (19.1)
Always	31 (15.6)
Inadequate or infrequent breaks during shifts	2.86
Rarely	40 (20.1)
Occasionally	45 (22.6)
Sometimes	47 (23.6)
Often	38 (19.1)
Always	29 (14.6)

Data are presented as frequencies (percentages) or means.

Table 5. Factors associated with prolonged patient handling and repetitive movements among nurses (N=199).

Variables	n (%) or mean
Frequent lifting, repositioning, bending, or pushing of patients	3.47
Strongly disagree	15 (7.5)
Disagree	35 (17.6)
Neutral	40 (20.1)
Agree	60 (30.2)
Strongly agree	49 (24.6)
Challenging number of patients assigned per shift	3.57
Strongly disagree	10 (5.0)
Disagree	30 (15.1)
Neutral	50 (25.1)
Agree	55 (27.6)
Strongly agree	54 (27.2)
Frequent assistance from colleagues or mechanical devices during patient handling	3.29
Strongly disagree	20 (10.1)
Disagree	40 (20.1)
Neutral	45 (22.6)
Agree	50 (25.1)
Strongly agree	44 (22.1)
Shift scheduling contributing to physical strain	3.54
Strongly disagree	12 (6.0)
Disagree	28 (14.1)
Neutral	48 (24.1)
Agree	62 (31.2)
Strongly agree	49 (24.6)
Low staffing levels increasing time spent on patient handling and repetitive movements	3.46
Strongly disagree	18 (9.0)
Disagree	32 (16.1)
Neutral	42 (21.1)
Agree	55 (27.6)
Strongly agree	52 (26.2)

Data are presented as frequencies (percentages) or means.

4 | Discussion

The demographic findings of the present study showed that most respondents were aged 40–49 years, were female and married, and held a diploma qualification. The largest proportion had 5–10 years of professional experience, while the surgical ward represented the most frequently reported work unit. These characteristics primarily describe the study population and should not independently be interpreted as determinants of WMSDs. Nevertheless, age, duration of employment, and accumulated occupational exposure may influence musculoskeletal risk.

Wang et al., (2024) identified age, longer service duration, heavy workload, prolonged working hours, frequent night shifts, and work-related fatigue as factors associated with WMSDs among nurses [7]. Moreover, perioperative and surgical nursing environments are characterized by considerable physical demands. Clari et al., (2021) reported that among perioperative nurses, the most frequently affected anatomical regions were the lower back, knees, shoulders, waist, and neck, with pooled prevalence estimates of 62%, 47%, 44%, 42%, and 39%, respectively [8].

A major finding of the present study was the high level of reported exposure to prolonged patient handling and repetitive movements. Many respondents indicated that lifting, repositioning, bending, pushing, pulling, and transferring patients were common components of their routine work. This finding is consistent with the broader evidence showing that nursing personnel are regularly exposed to substantial biomechanical demands. In a meta-analysis involving 42 studies and 36,934 nurses, Sun *et al.*, (2023) estimated the annual prevalence of WMSDs at 77.2%, with the lower back, neck, and shoulders being the most frequently affected anatomical regions [4]. Although this prevalence estimate cannot be directly compared with the perceived occupational exposures assessed in the present study, it demonstrates the considerable burden of musculoskeletal problems among nurses. It supports the relevance of the physical risk factors reported by participants.

The present findings are also consistent with studies examining specific ergonomic exposures during nursing activities. Kim & Jeong (2024) identified standing, repetitive movements, awkward postures, patient lifting or carrying, and heavy-object handling among important occupational exposures experienced by hospital nurses [9]. Similarly, Abedini *et al.*, (2015), in a study involving 400 nurses from 75 hospital wards, evaluated the risks associated with manual patient handling and demonstrated that patient-transfer activities constituted an important source of musculoskeletal workload [10]. These findings support the present study's observation that repeated patient handling and repositioning may expose nurses to substantial biomechanical stress.

Awkward and prolonged body postures may further intensify the effects of repetitive patient-handling tasks. Nourollahi *et al.*, (2018) [11] reported a 72% prevalence of low back pain among hospital nurses. They found a significant relationship between the duration of exposure to awkward trunk postures and low back pain [11]. Activities such as transferring or repositioning dependent patients often require trunk flexion, lateral bending, reaching, pushing, or pulling. When these postures are repeatedly maintained throughout a working shift, cumulative biomechanical loading may occur. Therefore, the perception among nurses in the present study that prolonged handling and repetitive movements contribute to WMSDs is consistent with ergonomic evidence linking prolonged exposure to awkward postures with musculoskeletal symptoms.

Evidence from Nigerian nurses further demonstrates the occupational importance of WMSDs. Tinubu *et al.*, (2010) [5] reported a lifetime prevalence of 84.4%, a 12-month prevalence of 78.0%, and a point prevalence of 66.1% for WMSDs among

nurses in Ibadan, Nigeria. The lower back was the most frequently affected body region, followed by the neck and knees [5]. These findings indicate that musculoskeletal disorders represent a substantial occupational-health problem among nurses. However, the prevalence estimates reported in previous studies should not be directly compared with the present study's findings, as the current investigation primarily assessed nurses' perceptions and exposure to occupational risk factors rather than establishing the clinical prevalence of WMSDs.

Another important finding of the present study was that more than half of the respondents perceived the workplace environment as contributing to the development of WMSDs. This observation is supported by previous studies showing that both biomechanical exposures and characteristics of the working environment influence musculoskeletal problems among nurses. Aarsland *et al.*, (2014) [12], in a study of 520 nursing personnel, reported that 88% had experienced a musculoskeletal disorder in at least one body region during the preceding 12 months. The study also identified unfavorable working conditions, including inadequate patient-transfer devices, overexertion, inflexible work schedules, and adverse physical and psychosocial conditions [12]. These findings suggest that the physical environment in which nursing care is delivered may significantly influence the level of musculoskeletal strain experienced by nurses.

The availability of assistance and patient-handling equipment also appears to be particularly important. Banga *et al.*, (2024) [13], in a study of 391 nurses working in public hospitals, reported a one-year prevalence of low back pain of 61.9%. Lack of assistance from coworkers and failure to use assistive devices were independently associated with increased odds of low back pain [13]. This supports participants' perception in the present study that workplace conditions may contribute to WMSDs. In circumstances where adequate mechanical aids or coworker assistance are unavailable, nurses may be required to lift, transfer, and reposition patients manually, thereby increasing exposure to potentially harmful biomechanical loads.

Evidence concerning technical patient-handling aids also suggests that ergonomic interventions may reduce occupational musculoskeletal injuries. Hegewald *et al.*, (2018), in a systematic review of controlled intervention studies, reported a pooled risk ratio of 0.78 for musculoskeletal injury claims following the introduction of technical patient-handling aids [14]. Nevertheless, the authors rated the certainty of the available evidence as low to very low because of methodological limitations. Therefore, assistive devices should be regarded as an important component of musculoskeletal-risk reduction, while recognizing that their effectiveness depends on appropriate

implementation, staff training, accessibility, and broader organizational support.

The majority of nurses in the present study also perceived organizational factors as influencing prolonged patient handling and repetitive movements. This finding is particularly relevant because occupational musculoskeletal risk is not solely determined by individual behavior. Heavy workload, extended shifts, insufficient opportunities for rest, frequent night work, and work-related fatigue may increase the risk of repetitive or strenuous physical activity. A systematic review and meta-analysis by Wang et al., (2024) identified heavy workload, working more than 40 hours per week, working more than eight hours per day, frequent night shifts, and occupational fatigue as factors associated with WMSDs among nurses [7]. Similarly, Yang et al., (2019) reported a high burden of WMSDs among intensive care unit nurses and identified several occupational and work-related factors associated with musculoskeletal risk [15]. These findings support a systems-based interpretation in which organizational conditions may influence the frequency, duration, and intensity of biomechanical exposure.

Staffing limitations may further increase musculoskeletal demands by reducing opportunities for nurses to obtain assistance during patient transfers or repositioning. When workload is high, patient handling may also need to be performed more rapidly and under greater time pressure, potentially resulting in less favorable working postures and greater cumulative physical strain. Therefore, interventions focusing exclusively on individual posture or lifting technique may be insufficient. Effective prevention should also address staffing, workload distribution, shift organization, teamwork, and accessibility of appropriate patient-handling equipment.

Previous intervention research further supports the need for a multidimensional approach. Richardson et al., (2018), in a systematic review of interventions designed to prevent and reduce musculoskeletal injuries among registered nurses, identified patient-lift systems, patient-handling training, and multicomponent interventions among the principal strategies evaluated [16]. However, the authors emphasized that the methodological quality of the available evidence on interventions remained limited. More recent ergonomic approaches have also demonstrated potential benefits. Zakerian et al., (2021) reported that using an ergonomic belt during patient handling reduced perceived physical exertion and was associated with fewer musculoskeletal complaints among nurses [17]. These findings suggest that assistive technologies can help reduce physical workload but are more appropriately implemented as part of

comprehensive safe-patient-handling programs rather than as isolated interventions.

Overall, the findings of the present study are consistent with a substantial body of evidence indicating that prolonged patient handling, repetitive movements, awkward postures, inadequate patient-handling equipment, limited coworker assistance, high workload, and unfavorable organizational conditions may contribute to musculoskeletal risk among nurses. Importantly, the present findings should be interpreted as reflecting nurses' reported exposure to and perceptions of occupational risk factors rather than establishing the clinical prevalence or causal determinants of WMSDs. Nevertheless, the consistency between participants' perceptions and previous epidemiological and ergonomic evidence emphasizes the importance of comprehensive preventive strategies. Healthcare institutions should prioritize ergonomic assessment, adequate staffing, availability and accessibility of appropriate patient-transfer equipment, teamwork during physically demanding transfers, appropriate work-rest arrangements, and regular training in safe patient-handling practices. Addressing both biomechanical and organizational determinants may provide a more effective approach to reducing the burden of work-related musculoskeletal problems among nurses.

4.1 | Limitations

Findings of this study were limited by a single-site design, self-reporting bias, and a symptom-based self-report approach rather than clinical diagnosis or radiological confirmation.

4.2 | Implications for clinical practice in nursing

The high prevalence of prolonged patient handling and repetitive movements among nurses highlights the need for improved ergonomic practices in clinical settings. Nurses should adopt safe patient-handling techniques and make use of assistive devices where available. Furthermore, interventions such as task rotation, adequate rest breaks, and workload distribution should be prioritized to reduce the risk of musculoskeletal disorders.

5 | Conclusions

The findings of this study indicated a significant prevalence of prolonged patient handling and repetitive movements among nurses. Workplace environmental factors, including inadequate assistive devices, lack of training, and insufficient breaks, contribute to these challenges. In addition, organizational factors such as workload and staffing levels, availability of assistance during patient handling, shift scheduling, and the frequency of physically demanding tasks also influence the challenges nurses

face. The study also revealed that years of experience are significantly associated with the risk of developing WMSDs. This shows that early-career nurses may benefit from enhanced training and workload adjustments to reduce the risk of WMSDs. Hence, addressing these factors is crucial to promoting nurses' long-term health and occupational well-being.

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Authors' contributions

Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work: DCL, OIP, OAT, OVO, ABT; Drafting the work or revising it critically for important intellectual content: DCL, OIP, OAT, OVO, ABT; Final approval of the version to be published: DCL, OIP, OAT, OVO, ABT; Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved: DCL, OIP, OAT, OVO, ABT.

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Ethics approval and consent to participate

Ethical clearance was obtained from the UNIOSUN Teaching Hospital's ethical review committee (UTH/REC/2026/03/1453). This was followed by submission of an introductory letter from Redeemer's University Department of Nursing. Respondents were informed verbally and in writing about the study's purpose, and informed consent was obtained. Privacy and confidentiality were assured, and respondents retained the right to participate or withdraw voluntarily.

Competing interests

We do not have potential conflicts of interest with respect to the research, authorship, and publication of this article.

Availability of data and materials

The datasets used during the current study are available from the corresponding author on request.

Using artificial intelligent chatbots

ChatGPT version 5.6 was used to improve the readability and language of the manuscript.

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