Taibah University

Journal of Taibah University Medical Sciences

www.sciencedirect.com

Original Article

Work-related musculoskeletal disorders and work ability among hospital nurses

Ashiyat K. Akodu, Ph.D. * and Zainab O. Ashalejo, B.Sc.

Department of Physiotherapy, College of Medicine, University of Lagos, Nigeria

ولاية لاغوس على العمل أي تأثير على انتشار الاضطرابات العضلية الهيكلية ذات الصلة بالعمل.

الكلمات المفتاحية: الممرضين؛ قدرة العمل؛ الاضطرابات العضلية الهيكلية ذات الصلة بالعمل

الملخص

أهداف البحث: بحثت هذه الدراسة الترابط بين القدرة على العمل والاضطرابات العضلية الهيكلية ذات الصلة بالعمل في الممرضين في غرب نيجيريا.

طرق البحث: أجريت دراسة استقصائية مقطعية على ١٣٥ ممرضا (١٢٦ أنثى و٩ ذكور) في مستشفيات تخصصية وثانوية وخاصة في ولاية لاغوس، باستخدام استبانتين معياريتين محققتين ذاتيتي التطبيق. قامت الأجهزة بالتقاط معلومات عن الخصائص الشخصية، والتقرير عن الاضطرابات العضلية الهيكلية ذات الصلة بالعمل وقدرة العمل باستخدام استبانة نوردك العضلي الهيكلي المعياري المعدلة ومؤشر القدرة على العمل.

النتائج: بلغت نقطة ونسبة انتشار الاضطرابات العضلية الهيكلية ذات الصلة بالعمل لمدة ١٢ شهرا ٩٥ (٧٠.٤٪) و ٨١ (٦٠ ٪) بين المستجيبين، على التوالي. كانت آلام أسفل الظهر ٣٥ (٤٣.٢٪) أكثر الاضطرابات المرتبطة بالعمل شيوعا. وقد سجل حوالي نصف المستجيبين (٦٤ أو ٤٧.٤٪) قدرة على العمل جيدة بينما أفاد ١٢٥ (٩٢.٦٪) منهم بأن القدرة على العمل كانت مجهدة جسديا ونفسيا. وأظهرت النتيجة وجود علاقة ذات قيمة بين كل من الجنس ووضعية العمل مع القدرة على العمل. ولم يكن هناك ارتباط ذو دلالة بين امتداد الاضطرابات العضلية الهيكلية ذات الصلة بالعمل مدة ١٢ شهرا والقدرة على العمل لدى الممرضين في ولاية لاغوس.

الاستنتاجات: تظهر هذه الدراسة قدرة جيدة على العمل، ولكن مع ارتفاع في معدل انتشار الاضطرابات العضلية الهيكلية ذات الصلة بالعمل بين الممرضين في ولاية لاغوس. وكان عامل الخطر المتعلق بالعمل الأكثر إبلاغا عنه من قبل الممرضين هو العمل في أوضاع محرجة وضيقة. ولم يكن لقدرة الممرضين في

Abstract

Objectives: This study investigated the association between work-related musculoskeletal disorders (WMSDs) and work ability among nurses in South-west Nigeria.

Methods: A cross-sectional survey was conducted with 135 nurses (126 females and 9 males) in tertiary, secondary, and private hospitals in Lagos state using 2 validated standard self-administered questionnaires. The instruments captured information on personal characteristics, and reported on WMSDs and work ability using the Modified Standard Nordic Musculoskeletal Questionnaire and Work Ability Index (WAI).

Results: The point and 12-month prevalence of WMSDs was 95 (70.4%) and 81 (60%) among respondents, respectively. Lower back pain (35, (43.2%) was the most common work-related musculoskeletal disorder. Approximately half of the respondents (64 (47.4%) reported good work ability, and 125 (92.6%) reported that work ability was physically and psychologically demanding. The results showed a significant association between sex ($p = 0.047$) work status ($p = 0.020$) and work ability. There was no significant association between the 12-month prevalence of WMSDs and work ability of nurses in Lagos state ($p = 0.406$).

Conclusions: This study indicated good work ability, but a high prevalence of WMSDs among nurses in Lagos state. The job risk factors mostly reported by nurses were

* Corresponding address: Department of Physiotherapy, College of Medicine, University of Lagos, PMB 12003, Idiaraba, Lagos, Nigeria.

E-mail: aakodu@unilag.edu.ng (A.K. Akodu)

ELSEVIER | **Production and hosting by Elsevier**

working in awkward and cramped positions. Furthermore, the work ability of nurses in Lagos state had no influence on the prevalence of WMSDs.

Introduction

Musculoskeletal disorders (MSDs) are widely known as the cause of severe long-term pain and physical disability that affect hundreds of millions of people worldwide.[1] Work-related musculoskeletal disorders (WMSDs) are common among health care workers including professional nurses, and can lead to permanent disability, loss of work hours, and the need for long-term medical care.[2]

The nursing population constitutes about 33% of the hospital workforce, and nurses are at a high risk, accounting for 60% of reported occupational injuries.[3] It is estimated that 12% of nurses leave the profession annually, and 52% complain of chronic lower back pain.[2] The combination of high demands and low decision latitude, as well as high efforts and low rewards are prospective risk factors for common mental disorders among nurses. This suggests that the psychosocial work environment is important for mental health.[4] The job requirements of nurses are to maintain patients' hygiene, look after their needs, and provide them with medication. These requirements predispose them to developing MSDs.[5]

Work ability is defined as the worker's capacity to perform a job considering work demands, health, and mental resources.[4] Work ability is the sum of factors enabling employees in a certain situation to manage their work demands successfully.[6] Previous studies addressed the determinants of work ability in occupational populations with predominantly physical work demands such as construction workers,[7] petrochemical industry workers,[8] and hairdressers.[9] Based on these studies, it was deduced that work ability in such occupations is influenced by various factors like health problems, lifestyle, individual characteristics, and work-related risk factors.[7,9]

WMSDs are a significant cause of health problems among the working population.[10] Impaired work ability is believed to be the result of an imbalance between job demands and individual resources. Therefore, work characteristics such as working conditions and job demands are key determinants of work ability.[11]

Studies have been conducted on the WMSDs of nurses in different parts of the world[12,13] and some parts of Nigeria,[3,14,15] as well as on the work ability among nurses in some parts of the world.[16,4] However, there is a paucity of data on the work ability of nurses and association between WMSDs and work ability of nurses in Lagos state, south-west Nigeria.

Thus, there is a need to determine the association between WMSDs and the work ability of nurses in Lagos state, South-west Nigeria.

Materials and Methods

Research design

A cross-sectional survey design was employed.

Subject selection

This study involved 135 practicing nurses, who were recruited consecutively from selected teaching, general, and private hospitals in Lagos state. Nurses with more than one year of post basic practice and those still actively practicing were included in the study. Retired nurses and those who incurred other injuries within the past one year were excluded from the study.

Procedure for data collection

Before this study commenced, Ethical approval (Approval number: ADM/DCST/HREC/APP/2101) was sought and obtained from the Health Research and Ethics Committee of the Lagos University Teaching Hospital (LUTH), Idi-araba, Lagos state and the Health Service Commission.

The aim and objectives of this study were clearly explained to the subjects, who were also assured of the confidentiality of their responses. Written informed consent was obtained from all subjects after explaining the objectives of the study to them. A letter of introduction was also provided to the subjects after informed consent was obtained to briefly explain the questionnaire.

Information on subjects' demographic variables such as age, weight, height, sex, current area of practice, rank/cadre, year of graduation, years of professional experience, specialty area, work status in the last 12 months, work setting, and number of hours per week was collected.

The questionnaire was self-administered, personally distributed to practicing nurses in Lagos state, and collected after each subject had completed it during visits to various nursing departments in teaching, general, and private hospitals in Lagos state.

A closed-ended structured questionnaire, drafted and modified from the short standardised and validated Nordic Musculoskeletal Questionnaire (NMQ)[17] for investigating work-related musculoskeletal symptoms in working populations was employed in this study. A previous study[3] in Nigeria utilised this modified version, and found it suitable for the Nigerian environment and culture.

The questionnaire consists of the following four sections.

Section A: Consists of information on workers' socio-demographic data including age, height, weight, sex, specialty area, work setting, year of experience, and duration of work, as well as information on frequent working patterns.

Section B: Consists of items that describe the point and 12-month prevalence of WMSDs, the onset thereof, most significant WMSDs, and the parts of the body affected. The

symptom survey section of occupational health in the nursing practice domain was modified in the standardised Nordic questionnaire.[17]

Section C: Includes items on perceptions of job risk factors that may contribute to the development of WMSDs.

Section D: Seeks information on the coping mechanisms used to minimise the risk and effects of WMSDs.

The Work Ability Index (WAI) questionnaire consists of seven dimensions, namely: (i) current work ability compared with the lifetime best, (ii) work ability in relation to the demands of the job, (iii) number of current diseases diagnosed by a physician, (iv) estimated work impairment due to disease, (v) sick leave during the past year (12 months), (vi) own prognosis of work ability two years from now, and (vii) mental resources (worker's life in general at work and during leisure time).

These dimensions were derived as the sum of ten items. Possible scores range from 7−49. Subjects with a WAI score of 36 or lower are classified as having low work ability, and those with a WAI score of 37 and higher as having satisfactory work ability.[18]

More recently, the validity and reliability of WAI has been studied and confirmed as adequate.[19]

Data analysis

The data obtained from this study were analysed using the Statistical Package for Social Sciences (SPSS) windows version 22 and summarised using descriptive statistics of the mean, standard deviation, bar chart, pie chart, frequency, and percentages. Inferential statistics of the chi-square test were used to determine the association between variables at an alpha level of $p \leq 0.05$.

Results

In total, 143 copies of the questionnaire were distributed, of which 135 were returned, with a response rate of 94.41%. Therefore, 135 questionnaires were considered valid for analyses.

The majority of the respondents (46, 34.10%) were in the 31−40 year range, followed by those in the 21−30 year range (31, 23%). Only 28 respondents (20.70%) were older than 50 years. The mean age of respondents is 40.23 ± 10.538 years. Furthermore, 126 (93.30%) respondents are female, and only 9 (6.70%) male. In addition, 48 (35.60%) are obese with a Body Mass Index (BMI) greater than 30, while 6 (4.405%) are underweight.

The point prevalence rate of WMSDs was 95 (70.40%) for all respondents. Of the 135 respondents, 81 (60.00%) complained of musculoskeletal pain in the last 12 months. The 12-month prevalence rate of WMSDs was highest for the lower back 35 (43.20%), followed by that for the knees, shoulders, and upper back, with the same prevalence of 8 (9.90%). It was lowest for the fingers and thumbs 1 (1.20%) (Table 1).

It was observed that respondents aged between 31 and 40 years reported the highest 35 (76.10%) 12-month prevalence of WMSDs. Most respondents 132 (97.80%) worked full time, 130 (96.30%) work 40 hours or more per day. In total, 71 (52.60%) respondents had more than ten years of experience.

There was no significant association between respondents' age ($p = 0.447$), sex ($p = 0.801$), years of experience ($p = 0.873$), working hours ($p = 0.605$), work status ($p = 0.887$), and a 12-month prevalence of WMSDs (Table 2).

The current area of practice for most respondents 110, (81.50%) is the clinic, while only 4 (3.00%) reported their current area of practice as academic. Of the respondents, 39 (28.90%) have the highest rank of nursing officer I, 1 (0.70%) was at the lowest rank of assistant director, and 1 (0.70%) was a principal nursing officer. The mean year of graduation is 15.72 ± 10.379 years.

Furthermore, 115 respondents (85.20%) had post basic nursing qualifications, and 86 (63.7%) work in tertiary hospitals. The specialty areas of respondents varied from midwifery (76, 56.30%) to ear, nose, and throat (1, 0.70%), respectively (Table 3).

No significant association was evident between respondents' specialty area ($p = 0.787$), work setting ($p = 0.542$), and 12-month prevalence of WMSDs.

The results indicate that the highest percentage of respondents 31 (38.30%) experienced their first episode of a WMSD in the first five years of clinical practice. Two (2.50%) had their first episode of a WMSD before training as a nurse. Most respondents 67 (82.70%) reported the gradual onset of WMSDs, while 10 (12.30%) reported the sudden onset thereof. Of all respondents who indicated having WMSDs, only 59 (72.80%) sought treatment from other health practitioners for the conditions, and 16 (18.50%) changed their area of specialty.

Information on preventing occupational hazards

This study revealed that 56 (69.10%) respondents received training on preventing occupational hazards. Only 13

Table 1: Point prevalence, 12-month prevalence, and parts of the body affected by work-related musculoskeletal disorders (WMSDs).

Variables	Frequency (n)	Percentage (%)
Point prevalence		
Yes	95	70.40
No	40	29.60
Total	**135**	**100.00**
12-month prevalence		
Yes	81	60.00
No	54	40.00
Total	**135**	**100.00**
Parts of the body affected		
Ankles	3	3.70
Elbows	5	6.10
Fingers	1	1.20
Hips/thighs	4	4.90
Knees	8	9.90
Lower back	35	43.20
Neck	7	8.60
Shoulder	8	9.90
Thumb	1	1.20
Upper back	8	9.90
Wrist	2	2.50

Table 2: Association between age, sex, years of experience, working hours, and work status with the 12-month prevalence of WMSDs.

Variables	12-month prevalence				
Age range	Yes n (%)	No n (%)	Total n (%)	X^2	p-value
21−30	21 (67.70)	10 (32.30)	31 (100.00)		
31−40	35 (76.10)	11 (23.90)	46 (100.00)		
41−50	18 (60.00)	12 (40.00)	30 (100.00)	**2.659**	**0.447**
51−60	21 (75.00)	7 (25.00)	28 (100.00)		
Total	**95 (70.40)**	**40 (29.60)**	**135 (100.00)**		
Sex					
Male	6 (66.70)	3 (33.30)	9 (100.00)		
Female	89 (70.60)	37 (29.40)	126 (100.00)	**0.063**	**0.801**
Total	**95 (70.40)**	**40 (29.60)**	**135 (100.00)**		
Years of experience					
1−5	24 (70.60)	10 (29.40)	34 (100.00)		
6−10	20 (66.70)	10 (33.30)	30 (100.00)	**0.271**	**0.873**
>10	51 (71.80)	20 (28.20)	71 (100.00)		
Total	**95 (70.40)**	**40 (29.60)**	**135 (100.00)**		
Working hours					
˂40 hrs	3 (60.00)	2 (40.00)	5 (100.00)		
≥40 hrs	92 (70.80)	38 (29.20)	130 (100.00)	**0.268**	**0.605**
Total	**95(70.40)**	**40(29.60)**	**135(100.00)**		
Work status					
Full time	93 (70.50)	39 (29.50)	132 (100.00)		
Part time	2 (66.70)	1 (33.30)	3 (100.00)	**0.020**	**0.887**
Total	**95 (70.40)**	**40 (29.60)**	**135 (100.00)**		

Significant at p ≤ 0.05.
X^2: Chi-square.
n: Frequency.
%: Percentage.

Table 3: Association between work setting and specialty area with the 12-month prevalence of WMSDs.

Variables	12-month prevalence				
Work setting	Yes n (%)	No n (%)	Total n (%)	X^2	p-value
Tertiary	62 (72.10)	24 (27.90)	86 (100.00)		
Secondary	24 (63.20)	14 (36.80)	38 (100.00)		
Primary	7 (77.80)	2 (22.20)	9 (100.00)	**2.149**	**0.542**
Others	2 (100.00)	0 (0.00)	2 (100.00)		
Total	**95 (70.40)**	**40 (29.60)**	**135 (100.00)**		
Specialty area					
A&E	4 (100.00)	0 (0.00)	4 (100.00)		
Dental nursing	1 (33.30)	2 (66.70)	3 (100.00)		
Ear, nose, and throat	1 (100.00)	0 (0.00)	1 (100.00)		
General nursing	13 (72.20)	5 (27.80)	18 (100.00)		
Intensive care unit	3 (100.00)	0 (0.00)	3 (100.00)		
Midwifery	54 (71.00)	22 (28.90)	76 (100.00)		
O&G	6 (60.00)	4 (40.00)	10 (100.00)	**7.152**	**0.787**
Occupational health	1 (50.00)	1 (50.00)	2 (100.00)		
Orthopaedics	4 (57.10)	3 (42.90)	7 (100.00)		
Paediatrics	4 (80.00)	1 (20.00)	5 (100.00)		
Peri-operative	2 (66.70)	1 (33.30)	3 (100.00)		
Public health	2 (66.70)	1 (33.30)	3 (100.00)		
Total	**95 (70.40)**	**40 (29.60)**	**135 (100.00)**		

Significant at p ≤ 0.05.
X^2: Chi-square.
Key:
A&E: Accident and Emergency.
O&G: Obstetrics and gynaecology.
N: Frequency.
%: Percentage.

Table 4: Work demand and points rating of respondents' work ability.

Variable	Frequency (n)	Percentage (%)
Work demand		
Physically demanding	10	7.40
Physically and psychologically demanding	125	92.60
Total	135	100.00
Points		
0−2	2	1.40
3−4	2	1.50
5−6	29	21.50
7−8	69	51.10
9−10	33	24.50
Total	**135**	**100.00**
Grades		
7−27	8	5.90
28−36	31	23.30
37−43	64	47.40
44−49	32	23.70
Total	**135**	**100.00**

Key:
Point grade 0−2 = Very poor.
3−4 = Rather poor.
5−6 = Moderate.
7−8 = Rather good.
9−10 = Very good.
Grades:
7−26: Poor.
28−36: Moderate/Fair.
37−43: Good.
44−49: Excellent.

Table 5: Association between age, sex, years of experience, work status, and work ability.

Variables	Work ability					X^2	p-value
Age range (years)	7−27 n (%)	28−36 n (%)	37−43 n (%)	44−49 n (%)	Total n (%)		
21−30	2 (6.50)	7 (22.60)	12 (38.70)	10 (32.30)	31 (100.00)		
31−40	3 (6.50)	10 (21.70)	23 (50.00)	10 (21.70)	46 (100.00)		
41−50	3 (10.00)	7 (23.30)	15 (50.00)	5 (16.70)	30 (100.00)	**4.947**	**0.839**
51−60	0 (0.00)	7 (25.00)	14 (50.00)	7 (25.00)	28 (100.00)		
Total	**8(5.90)**	**31(23.00)**	**64(47.40)**	**32(23.70)**	**135(100.00)**		
Sex							
Male	2 (22.20)	0 (0.00)	6 (66.70)	1 (11.10)	9 (100.00)	**7.935**	**0.047***
Female	6 (4.80)	31 (24.60)	58 (46.00)	31 (24.60)	126 (100.00)		
Total	**8(5.90)**	**31(23.00)**	**64(47.40)**	**32(23.70)**	**135(100.00)**		
Years of experience							
1−5	1 (2.90)	9 (26.50)	15 (44.10)	9 (26.50)	34 (100.00)	**4.154**	**0.656**
6−10	3 (10.00)	4 (13.30)	14 (46.70)	9 (30.00)	30 (100.00)		
>10	4 (5.60)	18 (25.40)	35 (49.30)	14 (19.70)	71 (100.00)		
Total	**8(5.90)**	**31(23.00)**	**64(47.40)**	**32(23.70)**	**135(100.00)**		
Work status							
Full time	8 (6.10)	31 (23.50)	64 (48.50)	29 (22.20)	132 (100.00)	**9.876**	**0.020***
Part time	0 (0.00)	0 (0.00)	0 (0.00)	3 (100.00)	3 (100.00)		
Total	**8(5.90)**	**31(23.00)**	**64(47.40)**	**32(23.70)**	**135(100.00)**		
Working hours							
‘40 hrs	0 (0.00)	3 (60.00)	1 (20.00)	1 (20.00)	5 (100.00)	**4.262**	**0.235**
≥40 hrs	8 (6.20)	28 (21.50)	63 (48.50)	31 (23.80)	130 (100.00)		
Total	**8(5.90)**	**31(23.00)**	**64(47.40)**	**32(23.70)**	**135(100.00)**		

*Significant at p ≤ 0.05.
X^2: Chi-square.
Key:
n: Frequency.
%: Percentage.
Grades: 7−27 = Poor.
28−26 = Moderate, 37−43 = Good, 44−49 = Excellent.

Table 6: Association between work setting and specialty area with work ability.

Variables	Work ability						
Work setting	7−27 n (%)	28−36 n (%)	37−43 n (%)	44−47 n (%)	Total n (%)	X^2	p-value
Tertiary	7 (8.10)	17 (19.80)	42 (48.80)	20 (23.30)	86 (100.00)		
Secondary	1 (2.60)	11 (28.90)	15 (39.50)	11 (28.90)	38 (100.00)		
Primary	0 (0.00)	2 (22.20)	6 (66.70)	1 (11.10)	9 (100.00)	6.446	0.695
Others	0 (0.00)	1 (50.00)	1 (50.00)	0 (0.00)	2 (100.00)		
Total	8 (5.90)	31 (23.00)	64 (47.40)	32 (23.70)	135 (100.00)		
Specialty							
Accident and Emergency	0 (0.00)	1 (25.00)	1 (25.00)	2 (50.00)	4 (100.00)		
Dental nursing	0 (0.00)	0 (0.00)	2 (66.70)	1 (33.30)	3 (100.00)		
Ear, nose, and throat	0 (0.00)	0 (0.00)	0 (0.00)	1 (100.00)	1 (100.00)		
General nursing	1 (5.60)	1 (5.60)	11 (61.10)	5 (27.80)	18 (100.00)		
Intensive care nursing	0 (0.00)	1 (33.30)	1 (33.30)	1 (33.30)	3 (100.00)		
Midwifery	5 (6.60)	17 (22.40)	35 (46.10)	19 (25.00)	76 (100.00)		
Obstetrics and gynaecology	1 (10.00)	6 (60.00)	1 (10.00)	2 (20.00)	10 (100.00)	31.631	0.535
Occupational health	0 (0.00)	1 (50.00)	1 (50.00)	0 (0.00)	2 (100.00)		
Orthopaedics	1 (14.30)	1 (14.30)	5 (71.40)	0 (0.00)	7 (100.00)		
Paediatrics	0 (0.00)	0 (0.00)	4 (80.00)	1 (20.00)	5 (100.00)		
Peri-operative	0 (0.00)	2 (66.70)	1 (33.30)	0 (0.00)	3 (100.00)		
Public health	0 (0.00)	1 (33.30)	2 (66.70)	0 (0.00)	3 (100.00)		
Total	**8(5.90)**	**31(23.00)**	**64(47.4)**	**32(23.70)**	**135(100.00)**		

*Significant at p ≤ 0.05.
X^2: Chi-square.
Key:
N: Frequency, %: Percentage.
Grades: 7−27 = Poor.
28−26 = Moderate.
37−43 = Good.
44−49 = Excellent.

(16.00%) reported having considered leaving the nursing profession to pursue another career as a result of WMSDs.

Respondents who experienced WMSDs perceived working in awkward and cramped positions 71 (52.60%); carrying, lifting, or moving heavy materials 68 (50.40%); continuing to work while injured or hurt 63 (46.70%); working in the same position for long periods 61 (45.20%); lifting or transferring dependent patients 60 (44.5%); and treating an excessive number of patients in one day -59 (43.70%) as job risk factors precipitating WMSDs during their clinical practice.

This study revealed that getting help in handling heavy patients (65, 48.10%), modifying nursing procedures 59 (43.70%) to avoid stressing an injury, and modifying the position of the nurse 57 (42.20%) as respondents' top three coping strategies to ameliorate the risk of WMSDs.

Respondents' work ability

In total, 125 (92.60%) respondents reported that their work was physically and psychologically demanding, and 10 (7.40%) respondents reported that their work was physically demanding. Most, 69 (54.10%) of the respondent reported that their work ability was rather good (Table 4).

A significant association was evident between sex (p = 0.047), work status (p = 0.020), and respondents' work ability (Table 5).

Table 6 shows no significant association between work setting (p = 0.695), specialty area (p = 0.535), and respondents' work ability.

Table 7 indicates no significant association between the 12-month prevalence of WMSDs of respondents and work ability (p = 0.406).

Table 7: Association between work ability and a 12-month prevalence of WMSDs.

Variables	12-month prevalence				
Work ability (Grades)	Yes n (%)	No n (%)	Total n (%)	X^2	p-value
7−27 (Poor)	6 (4.40)	2 (1.50)	8 (5.90)		
28−36 (Moderate)	25 (18.50)	6 (4.40)	31 (23.00)		
37−43 (Good)	41 (30.40)	23 (17.00)	64 (47.40)	2.908	0.406
44−49 (Excellent)	23 (17.00)	9 (6.70)	32 (23.70)		
Total	**95(70.40)**	**40(29.60)**	**135(100.00)**		

Significant at p ≤ 0.05.
X^2: Chi-square.

Current diseases varied from those accidently caused by other diseases. The highest rate of respondents' self-diagnosis of current diseases was 36 (26.70%) from MSDs, while the highest diagnoses made by a physician was injury due to an accident 20 (14.80%). Furthermore, 10 (7.40%) respondents reported a diagnosis of both cardiovascular and respiratory diseases.

Discussion

Previous studies showed that musculoskeletal problems are particularly common in health care workers in direct contact with patients.[20,3] This study was conducted to evaluate the prevalence of WMSDs and work ability of nurses in Lagos state, Nigeria. The response rate for this study was 94.41%, consistent with a similar study in Thailand by Jin et al.[21] with a response rate of 97.20% and higher than the 78.00% reported by Fabunmi et al.[14] in Oyo state, Nigeria.

This study revealed that the 12-month prevalence of WMSDs among nurses was 60.00% across different parts of the body (lower back, knee, shoulder, neck, wrist/hand, ankle/feet, fingers, hip/thigh, upper back, and elbow). The prevalence reported in this study was less than that in previous studies on nurses by Raithatha et al.[5] in India (89.20%) and 80.00% in Uganda by Munabi et al.[22] This might be because Lagos state is a metropolitan state, and the nurses are well informed about their condition in the course of their profession. This study revealed that there were more female than male nurses, which concurs with previous studies,[3] but differs from research by Ajibade,[15] which included more males than females.

A high percentage of the nurses in this study experienced their first episode of symptoms of WMSDs in the first five years of clinical practice, which is in line with a report by Tinubu et al.,[3] who studied nurses in Ibadan, south-western Nigeria. This could be attributed to the vigorous working style and role in the early years of practice compared to later years of practice.

It was observed in this study that the lower back (43.20%) was the most affected part of the body. The prevalence of lower back pain found in this study was within the ranges reported in Nigeria (44.10%)[3] and India (48.20%).[13] The high prevalence of lower back pain reported in this study supports the findings of Choobineh et al.,[23] but contradicts Jin et al.,[21] which reported the shoulder as the most common location of MSDs among nurses in Thailand. Among nursing professionals, lower back pain was the most common WMSD with an annual prevalence of 40–50%.[24] Lifting patients in bed, transferring them out of bed, and lifting them from the floor were job activities nurses most commonly reported as sources of back pain[25].

This study revealed that almost half the respondents are obese, which may be attributed to the nature of their occupation. Obesity is assumed to cause pain by increasing the mechanical stress on weight-bearing joints.[26]

In this study, 59% of nurses sought treatment for their WMSDs, higher than the 30.30% reported by Tinubu et al.[3] From this study, getting assistance or support staff to handle heavy patients, modifying nursing procedures to avoid re-injury, and modifying the patient/nurse's position were the top three coping strategies used to ameliorate the risk of WMSDs. Furthermore, in this study, the nurses working full time had more WMSDs than those working part time.

Working in awkward and cramped positions (71, 52.60%) was the most perceived job risk factor of WMSDs among the nurses in this study. This contradicts Tinubu et al.,[3] who reported working in the same position for a long time as the most perceived job risk factor.

The results of this study indicate no significant association between respondents' age and a 12-month prevalence of WMSDs among nurses. The highest prevalence was among subjects aged 31–40 years, supporting the findings of Anap et al.[13] and Tinubu et al.,[3] and contradicting the results of Ajibade et al.,[15] who reported that nurses aged from 26 to 31 years had the highest prevalence of WMSD in Osun state.

The results of this study indicate that the relatively higher risk of WMSDs among nurses with more than ten years of clinical experience and lower risk among nurses with six to ten years of experience, respectively. However, this result might be attributed to chance, rather than a true effect, as the Chi square test of association did not reveal a significant association between rate of WMSDs and number of years of clinical experience.

In this study, there was no significant association between sex, working hours, years of experience, and 12-month prevalence of WMSDs among nurses. This is similar to the findings of Munabi et al.[28] for nurses in Uganda. This simply means that sex, working hours, and years of experience do not determine the 12-month prevalence of WMSDs. There was also no significant association between specialty area, work status, work setting, and a 12-month prevalence of WMSDs among nurses in this study.

The work environment, work organisation, and workload are variables that influence the WAI.[27] In this study, there was a substantial prevalence (47.40%) of the increased work ability (scores > 37 points) of nurses. The overall WAI score obtained in this study was similar to those in previous studies on fire-fighters in Belgium[18] and construction workers in the Netherlands.[7]

The results of this study indicated that 7.40% of respondents perceived their work demands as physically demanding, while 92.60% perceived their work to be both physically and psychologically demanding. A previous study by Pacheco[9] on hairdressers in Rio de Janeiro reported that 29.25% of the participants perceived their work ability to be physically demanding, while 59.43% considered it both physically and psychologically demanding.

In this study, the prevalence of respondents' self-diagnosis of current diseases due to MSDs, accidents, skin disease, and neurological or sensory disease was 26.70%, 21.50%, 17.00%, and 8.90%, respectively. This renders MSDs the most frequently self-diagnosed disorder among nurses in Lagos state. The results showed that even nurses self-diagnose and probably self-medicate.

Furthermore, the results of this study showed that 47.40% of the respondents had good work ability. This result corroborates a study by Godinho et al.[28] on technical administrative workers.

There was no significant association between age, working hours, years of experience, specialty area, work setting, and work ability. Previous research on physically demanding jobs demonstrated that work ability is negatively influenced by older age.[29,7] In this study, a significant association between respondents' sex, work status, and work ability was evident, which may be attributed to the fact that the number of female nurses outweighed that of males. In addition, nurses working full time tend to experience higher mental psychological demand because of their work than those working part time.

Limitations of the study

The limitations of this study included the inadequate responses of nurses and unwillingness to fully answer the questions in the questionnaire, because of the number of items and their busy schedules. It was also assumed that the responses given by the nurses were true.

Conclusion

Based on the results of this study, the following conclusions were reached.

There is a high prevalence of the symptoms of WMSDs among nurses in Lagos state. The lower back is the most commonly affected part of the body. The most commonly used coping strategy to ameliorate the risk of the symptoms of WMSDs is getting help in handling heavy patients. The job risk factors mostly reported by nurses is working in awkward and cramped positions. There was good work ability among nurses in Lagos state, which was not influenced by the prevalence of the symptoms of WMSDs. However, sex and work status significantly influenced the work ability of the respondents in Lagos.

Recommendations

Therefore, it is recommended that nurses be enlightened on the high prevalence of the symptoms of WMSDs and possible predisposing factors. They should undergo ergonomic training and be educated on lifestyle health promotion programs like exercise, lifestyle modification, diet, physical activity, and weight management to prevent the symptoms of WMSDs and improve their work ability.

Source of funding

Conflict of interest

The authors have no conflict of interest to declare.

Ethical approval

Informed written consent was obtained from the subjects after fulfilling the inclusion criteria, while ethical approval was obtained from the Health Research and Ethics Committee of Lagos University Teaching Hospital (LUTH) Idiaraba with approval number: ADM/DCST/HREC/APP/2101.

Consent

Not applicable.

Authors' contributions

Authors testify that all persons designated as authors qualify for authorship. AK was involved with study concept and design, interpretation of data, wrote the initial and final draft of the article. ZO was involved in data acquisition, analysis of data. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

Acknowledgment

Availability of data and material

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Appendix 1

Work Ability Index Questionnaire

1. Is your work? ☐ Psychologically demanding? ☐ Physically demanding? ☐ Physically and psychologically demanding?
2. Current work ability compared to highest work ability ever: Assume that your work ability at its best has a value of 10 points. How many points would you give your current work ability? (0 means that you currently cannot work at all.)

0	1	2	3	4	5	6	7	8	9	10
completely unable to work									work ability at its best	

3. Work ability in relation to demands. How do you rate your current work ability with respect to the physical demands of your work? ☐ Very good ☐ Rather good ☐ Moderate ☐ Rather poor ☐ Very poor

4. How do you rate your current work ability with respect to the mental demands of your work? ☐ Very good ☐ Rather good ☐ Moderate ☐ Rather poor ☐ Very poor

5. Current diseases: In the following list, mark your current diseases or injuries. Also indicate whether a physician has diagnosed or treated these diseases.

	Yes, own opinion	Yes, physician's diagnosis	No
Injury due to an accident (e.g. to the back or limbs, or burns)			
Musculoskeletal disease in back, limbs, or other part of the body (e.g. repeated pain in the joint or muscle, sciatica, rheumatism, arthritis)			
Cardiovascular disease (e.g. hypertension, coronary heart disease)			
Cardiovascular disease (e.g. hypertension, coronary heart disease)			
Respiratory disease (e.g. repeated infections of the respiratory tract, bronchial asthma, emphysema)			
Mental disorder (e.g. depression, 'burn-out', anxiety, or insomnia)			
Neurological or sensory disease (e.g. hearing or visual disease, migraine, epilepsy)			
Digestive disease/condition (e.g. gastritis, gall stones, liver or pancreatic disease, repeated constipation)			
Genitourinary disease (e.g. infection in urinary tract, gynaecological disease, or prostate)			
Skin disease (e.g. allergic or other rash, varicose veins)			
Tumour or cancer			
Endocrine or metabolic disease (e.g. diabetes, severe obesity, or gout)			
Blood diseases (e.g. anaemia, other blood disorder or defect)			
Birth defects			
Other disorder or disease			

6. Estimated work impairment because of disease: Does your illness or injury hinder your current job? Circle more than one alternative if needed.
    ☐ There is no hindrance./I have no diseases.
    ☐ I am able to do my job, but some symptoms are evident.

☐ I must sometimes slow down my work pace or change my work methods.
☐ I must often slow down my work pace or change my work methods.
☐ Because of my condition, I feel I am able to do only part-time work.
☐ In my opinion, I am entirely unable to work.

7. Illness within last year (12 months): During the last 12 months, how many whole days have you been off work because of:
    ☐ None ☐ Max 9 days ☐ 10−24 days ☐ 25−99 days ☐ 100−354 days

8. Estimation of own work ability in two years. Do you believe, according to your present state of health, that you will be able to do your current job two years from now? ☐ Unlikely ☐ Not certain ☐ Relatively certain

9. Mental capacities. Considering the last three months, have you been able to enjoy your regular daily activities? ☐ Often ☐ Rather often ☐ Sometimes ☐ Rather seldom ☐ Never

10. Considering the last three months, have you been active and alert? ☐ Always ☐ Rather often ☐ Sometimes ☐ Rather seldom ☐ Never

11. Considering the last three months, have you felt yourself to be full of hope about the future? ☐ Continuously ☐ Rather often ☐ Sometimes ☐ Rather seldom ☐ Never

References

1. Adegoke BOA, Akodu AK, Oyeyemi AL. Work-related musculoskeletal disorders among Nigerian Physiotherapists. **BMC Muscoskelet Disord 2008**; 9: 112.
2. Motacki K, Motacki LM. Safe patient handling and movement in a pediatric setting. **JPN 2009**; 35(4): 221−225.
3. Tinubu BMS, Mbada CE, Oyeyemi AL, Fabunmi AA. Work-related musculoskeletal disorders among nurses in Ibadan, south-west Nigeria. **BMC Muscoskelet Disord 2010**; 11: 12.
4. Soric M, Golubic R, Milosevic M, et al. Shift work, quality of life and work ability among Croatian hospital nurses. **Coll Antropol 2013**; 37(2): 379−384.
5. Raithatha AS, Mishra DG. Musculoskeletal disorders and perceived work demands among female nurses at a tertiary care hospital in India. **IJCD 2016**: 1−6.
6. Seibt R, Spitzer S, Blank M, Scheuch K. Predictors of work ability in occupations with psychological stress. **J Public Health 2008**: 9−18.
7. Alavinia S, Van Duivenbooden C, Burdorf A. Influence of work-related factors and individual characteristics on work ability among Dutch construction workers. **Scand J Work Environ Health 2007**; 33: 351−357.
8. Mazloumi A, Rostamabadi A, Saraji G, Foroushani A. Work ability index (WAI) and its association with psychosocial factors in one of the petrochemical industries in Iran. **J Occup Health 2012**; 54: 112−118.
9. Pacheco A. Work ability and psychosocial factors among hairdresser workers, Rio de Janeiro, Brasil. **Cienc Trab Ene Abr 2015**; 17(57): 83−88.
10. Balakrishnan R, Chellappan EM, Changalai E. Prevalence of work-related musculoskeletal disorders among non-healthcare working population in different gender at Selangor. **Int J Phys Educ Sports health 2016**; 3(2): 30−34.

11. Airila A, Hakanen J, Punakallio A, et al. Is work engagement related to work ability beyond working conditions and lifestyle factors? **Int Arch Occup Environ Health 2012**; 85: 915−925.

12. Lelis CM, MBattaus MRB, Taubert de Freitas FCB, et al. Work-related musculoskeletal disorders in nursing professionals. **Acta Paul Enferm 2012**; 25(3): 477−482.

13. Anap DB, Iyer C, Rao K. Work related musculoskeletal disorders among hospital nurses in rural Maharashtra, India: a multi centre survey. **IJRMS 2013**; 1(2): 101−107.

14. Fabunmi AA, Oworu JO, Odunaiya NA. Prevalence of musculoskeletal disorders among nurses in University College hospital, Ibadan. **W Afr J Nurs 2008**; 19(1): 21−25.

15. Ajibade BL. Prevalence of musculoskeletal disorders among nurses in Osun State, Nigeria. **J Biol Agric Healthc 2013**; 3(7).

16. Souza AC, Alexandre NMC. Musculoskeletal symptoms, work ability, and disability among nursing personnel. **Workplace Health Saf 2012**; 60(8): 353−360.

17. Kuorinka I, Jonsson B, Kilbom A, et al. Standardised Nordic questionnaire for the analysis of musculoskeletal symptoms. **Appl Ergon 1987**; 18: 233−237.

18. Kiss P, Walgraeve M, Vanhoorne M. Assessment of work ability in aging fire fighters by means of the Work Ability Index: preliminary results. **Arch Public Health 2002**; 60: 233−243.

19. Silva Junior SH, Vasconcelos AG, Griep RH, Rotenberg L. Validity and reliability of the work ability index (WAI) in nurses' work. **Cad Saúde Pública 2011**; 27(6): 1077−1087.

20. Lipscomb J, Trinkoff A, Brady B, Geiger-Brown J. Health care system changes and reported musculoskeletal disorders among registered nurses. **Publ Health J 2004**; 94(8): 1431−1436.

21. Jin S, Srisaenpang S, Pinitsoontorn S, Eungpinichpong W. Prevalence of work-related musculoskeletal disorders among registered nurses in Srinagarind hospital, Thailand. **J Health Res 2011**; 25(2): 61−68.

22. Munabi IG, BuwemboW, Kitara DL, Ochieng J, et al. Musculoskeletal disorder risk factors among nursing professionals in low resource settings. **BMC Nurs 2013**; 13: 7.

23. Choobineh A, Movahed M, Tabatabaie SH, Kumashiro M. Perceived demands and musculoskeletal disorders in operating room nurses of Shiraz City hospitals. **Ind Health 2010**; 48: 74−84.

24. Yip YB. A study of work stress, patient handling activities and the risk of low back pain among nurses in Hong Kong. **JAN 2001**; 36: 794−804.

25. Sinha A, Chaitanya A, Wasim A, Runu R, et al. Caregivers need care too −work related musculoskeletal disorders in nursing staff. **J Med Sci Clin Res 2016**; 4(1): 8993−8998.

26. Miranda H, Viikari-Juntura E, Martikainen R, Riihimaki H. A prospective study on knee pain and its risk factors. **Osteoarthritis Cartilage 2002**; 10: 623−630.

27. Fischer FM, Da Silva BFN, Rotenberg L, et al. Work ability of health care shift workers: what matters? **Chronobiol Int 2006**; 23: 1165−1179.

28. Godinho MR, Greco MR, Teixeira TM, Teixeira RL, et al. Work ability and associated factors of Brazilian technical-administrative workers in education. **BMC Res Notes 2016**; 9: 1.

29. Tuomi K, Huuhtanen P, Nykyri E, Ilmarinen J. Promotion of work ability, the quality of work and retirement. **Occup Med 2001**; 51: 318−324.