

Assessment of the Risk of Musculoskeletal Disorders and Effectiveness of Ergonomics Among Healthcare Workers in Selected Hospitals in Delta State

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Abstract- Musculoskeletal disorders (MSDs) are among the most common occupational health problems affecting healthcare workers, particularly in hospital settings where physical demands, repetitive tasks, and poor ergonomic conditions are prevalent. These disorders contribute to reduced work efficiency, increased absenteeism, and diminished quality of life. Despite growing global attention to workplace ergonomics, evidence on the prevalence of MSDs, associated risk factors, and the effectiveness of ergonomic practices among healthcare workers in Delta State, Nigeria, remains limited. This study therefore assessed the risk of musculoskeletal disorders and the effectiveness of workplace ergonomics among healthcare workers in selected hospitals in Delta State. This study adopted a cross-sectional descriptive design. A stratified random sampling technique was used to select 224 healthcare workers from Central Hospital Warri and Eku Government Baptist Hospital. Data were collected using a structured questionnaire. Of the 224 questionnaires distributed, 206 were properly completed and valid for analysis, yielding a response rate of 92%. Data were analyzed using descriptive and inferential statistics with the Statistical Package for the Social Sciences (SPSS) version 27.0. The findings revealed a high prevalence of musculoskeletal disorders among healthcare workers, with the majority reporting work-related pain or discomfort within the past 12 months. The most commonly affected body regions were the lower back, neck, and shoulders. Key occupational and personal risk factors identified included repetitive movements, awkward postures, heavy lifting, physically demanding workloads, stress, fatigue, inadequate staffing, and insufficient training on safe manual handling. Workplace ergonomic practices and existing ergonomic interventions were largely perceived as non-influential and non-effective in reducing MSD risks. The study concluded that musculoskeletal disorders are highly prevalent among healthcare workers in the selected hospitals, largely driven by occupational risk factors and compounded by ineffective ergonomic practices and interventions. The study recommends the implementation of comprehensive

ergonomic programs, provision of ergonomic equipment, regular training on safe work practices, improved staffing levels, and stronger institutional and policy support to reduce MSD risks and enhance workplace safety.

Keywords: Risk, Musculoskeletal Disorders, Effectiveness, Ergonomics, Healthcare workers, Selected Hospitals.

I. INTRODUCTION

Nigeria has a doctor-to-population ratio of 38.9 per 100,000 people, far exceeding the Sub-Saharan African average of 15 per 100,000 people (Akafa et al., 2023). The country's nurse/midwife population ratio is 148 per 100,000 inhabitants, which is much higher than the regional average of 72 per 100,000 (Afaka et al, 2023). Unfair distribution and brain drain afflict the workforce (Adejoro, 2022). The paucity and unequal distribution of skilled health workers in Nigeria, both between urban and rural health institutions and across states, severely impedes access to basic healthcare services in places where they are most needed. It is unable to provide a wide range of critical services, including prenatal, delivery, postnatal, infant care, HIV, malaria, and tuberculosis, due to the underutilization of many health facilities across the country. According to the information provided above, Nigeria has a manpower problem. This indicates that the healthcare workers' health and well-being are critical to the organization's continued operation.

Healthcare workers face a variety of work-related risks that can lead to occupational diseases such as musculoskeletal disorders (MSDs). Musculoskeletal diseases (MSDs) are painful structural anomalies caused by inflammation and degeneration in the

muscles, tendons, ligaments, joints, peripheral nerves, and supporting blood vessels (Bolarinde et al., 2019). Clinical syndromes include tendon inflammation and related illnesses (tenosynovitis, epicondylitis, bursitis), nerve compression disorders (carpal tunnel syndrome, sciatica), and osteoarthritis. Work-related musculoskeletal disease (WRMSD) refers to musculoskeletal injuries caused by workplace activities (Bolarinde et al., 2019). WRMSDs can affect the neck, shoulder, arms, elbows, wrists, hands, back, legs, and feet (Akrouf et al., 2010). The most frequently impacted body areas are the low back, neck, shoulder, forearm, and hand. Extrinsic occupational factors (manual handling activities, frequent bending and twisting, forceful movement, repetitive heavy lifting, and awkward working posture), intrinsic personal factors (age, gender, body mass variability, and tobacco smoking), and psychological factors (high job demand, low control, low mood, and poor job satisfaction) are all significant risk factors for WRMSDs (Bongers et al., 2002).

Nurses are more prone than other healthcare workers to develop work-related musculoskeletal diseases (WMSDs) (Krishnan et al., 2021). Nurses serve critical responsibilities in the healthcare system because they routinely assist patients in moving around, changing positions, and completing other everyday duties, which can be physically demanding (Jradi et al., 2020). Numerous factors have been identified as increasing the incidence of WMSDs among nurses, including physical strain and work posture (Ciezar-Andersen et al., 2021), psychosocial factors such as psychosomatic symptoms and personality, work duties, and work organizational elements (Jradi et al., 2020). Nursing staff stationed in the operating room reported a higher rate of occupational injuries than intensive care nurses, non-specialized nurses, and other healthcare professionals, which is unsurprising. Events such as static body posture, prolonged standing, utilizing instruments such as retractors during surgery, and manual chores such as pushing, pulling, and lifting patients and surgical sets may cause discomfort and WMSDs, especially among nurses working in operating rooms (Abdollahi et al., 2020).

WRMSDs have a significant impact on the performance and well-being of healthcare personnel. WRMSDs are linked to absenteeism, reduced productivity, higher health-care, disability, and worker's compensation expenditures. Mbada et al. (2012) found that the incidence of WRMSDs among HCPs in a Nigerian teaching hospital increased workers' requests for sick absence. Aside from job performance, WRMSDs have a substantial impact on their quality of life (QoL). Work-related musculoskeletal diseases (WRMSDs) are a major cause of morbidity in many workplaces. Healthcare workers are at high risk of MSDs due to their physical demands, which include all ranges of motion and awkward postures while performing procedures on or around the patient, such as bathing, dressing wounds, administering medication, and transferring patients by lifting or wheeling, among others (Ozen et al., 2021).

Improving workers' lives by tackling the issue of WRMSDs benefits both employers and employees (European Agency for Safety and Health at Work, 2020). Worker health and safety is an important part of people's overall well-being and daily activities. When it comes to occupational health and safety, which requires a multidisciplinary approach, it is typically enough to simply stop exposure, lower the duration or intensity of exposure, and return the person to modified working circumstances or an adapted workplace. Workplace safety and health are critical components of sustainable growth. Several research studies have indicated that good management of workplace safety and health improves both organizational productivity and growth.

Ergonomics in the workplace is critical for reducing musculoskeletal disorders (MSDs) and creating a safe and healthy work environment. The International Labour Organization (ILO) defines ergonomics as the science of tailoring the workplace to the worker rather than the worker to the workplace (ILO, 2019). This approach emphasizes the necessity of tailoring jobs, workplaces, and equipment to workers' strengths and requirements. Ergonomics is critical for preventing musculoskeletal disorders (MSDs) and promoting a safe and healthy work environment.

Given the rising prevalence of MSDs on a national, regional, and global scale, it is necessary to comprehensively identify risk factors and assess the efficacy of ergonomic therapies among Delta State healthcare workers.

Statement of problem

Musculoskeletal disorders (MSDs) are becoming increasingly common, affecting around 1.63 billion individuals globally (Gill et al., 2023). This is especially true in many Sub-Saharan African nations where work is primarily performed manually or requires physical human strength (Abla et al., 2021). The global prevalence of MSDs among nurses and midwives is around 17%, with an annual prevalence of 40-50% (Woodman et al., 2020). Recent research has also identified low educational attainment, increasing age, high BMI, and lifestyle as predictors of WMSDs among healthcare workers (Krishnan et al., 2021). Working in an ergonomically suitable setting improves production efficiency while also increasing comfort, safety, and lowering the risk of musculoskeletal problems (Ali et al., 2024). However, there is limited empirical evidence on the effectiveness of ergonomic practices among healthcare workers in selected hospitals in Delta State. This study therefore assessed the risk of musculoskeletal disorders and the effectiveness of ergonomics in the study area.

Objectives of the study

The study aim in assessing the risk of musculoskeletal disorders and evaluate the effectiveness of ergonomic interventions among healthcare workers in selected hospitals in Delta State, with the below specific objectives;

1. Determine the prevalence of musculoskeletal disorders (MSDs) among healthcare workers in selected hospitals in Delta State.
2. Identify the key occupational and personal risk factors contributing to the development of MSDs among healthcare workers in selected hospitals in Delta State.
3. Highlight workplace ergonomic practices and their role in musculoskeletal disorder risks among healthcare workers in selected hospitals in Delta State

4. Assess the effectiveness of existing ergonomic interventions in reducing MSD-related risks and improving workplace safety among healthcare workers in selected hospitals in Delta State

II. METHODOLOGY

2.1 Study Area

The study was conducted in mix of tertiary, secondary, and primary healthcare facilities in Central Hospital, Warri Local Government Area and Eku Government Baptist Hospital Ethiope East Local Government Area, both in Delta state, Nigeria. The hospitals were chosen to reflect a range of sizes, specialties, and resource levels, thereby enhancing the generalizability of findings to the broader healthcare workforce in the region.

2.2 Research Design and Data Collection

This study used a cross-sectional descriptive design. Primary data were obtained through a structured questionnaire, One-on-One interview and on the site inspection of the public hospital, while secondary data was through relevant literature. A total of Two hundred and twenty-four (224) questionnaires were distributed to healthcare workers. Out of the 224 questionnaires distributed, 206 were properly filled and valid for data analysis, giving a response rate of 92%, which were used for analysis.

2.3 Study Population

The total number of healthcare workers in Central Hospital Warri is 311 while the total number of healthcare workers in Eku Government Baptist Hospital is 102.

2.4 Method of Analysis

Data obtained from the questionnaire were analyzed using SPSS and descriptive statistics (means, standard deviations, frequencies, and percentages) summarized participant characteristics, MSDs risk factors and ergonomic effectiveness. Inferential statistics including chi-square tests for associations between categorical variables and logistic regression analyses to identify risk factors of MSDs was conducted. Statistical significance was set at $p < 0.05$.

Where appropriate, subgroup analyses (e.g., by profession or facility type) were performed.

III. RESULTS AND DISCUSSION

3.1 Socio-demographic data of respondents

Table 3.1: Socio-demographic data of respondents

Items	Frequency (n = 206)	Percent (%)
Age (in years)		
20–25	28	13.6
26–30	52	25.2
31–35	61	29.6
36–40	38	18.4
41–45	16	7.8
46–50	8	3.9
51 and above	3	1.5
Gender		
Male	71	34.5
Female	135	65.5
Job Category		
Doctor	24	11.7
Nurse	98	47.6
Pharmacist	22	10.7
Physiotherapist	18	8.7
Dentist	12	5.8
Laboratory Scientist	32	15.5
Years on the Job		
1–3 years	64	31.1
4–6 years	71	34.5
7–10 years	48	23.3
11 years and above	23	11.1
Hospital		
Central Hospital Warri	155	75.2
Eku Government Baptist Hospital	51	24.8

Table 3.1 shows the sociodemographic characteristics of the respondents (n = 206). The age distribution indicates that the largest proportion of healthcare workers were between 31–35 years (29.6%), followed by those aged 26–30 years (25.2%) and 36–40 years (18.4%), while respondents aged 51 years and above constituted the least proportion (1.5%). In terms of gender, females were predominant, accounting for 65.5% of the respondents, compared with 34.5% males. Regarding job category, nurses formed the highest group (47.6%), followed by laboratory scientists (15.5%) and doctors (11.7%), whereas dentists constituted the smallest proportion

(5.8%). Concerning years on the job, most respondents had worked for 4–6 years (34.5%) and 1–3 years (31.1%), while only 11.1% had 11 years and above of work experience. With respect to hospital distribution, the majority of respondents were drawn from Central Hospital Warri (75.2%), while 24.8% were from Eku Government Baptist Hospital.

3.1 Answering Research Questions

Research Question 1: What is the prevalence of musculoskeletal disorders (MSDs) among healthcare workers in selected hospitals in Delta State?

Table 3.2. Prevalence of musculoskeletal disorders (MSDs) among healthcare workers

Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Remark
I have experienced pain or discomfort in my neck, shoulders, or back during the past 12 months.	104 (50.5)	78 (37.9)	6 (2.9)	10 (4.9)	8 (3.9)	4.3	High
Musculoskeletal symptoms have affected my ability to perform routine tasks at work.	88 (42.7)	80 (38.8)	8 (3.9)	18 (8.7)	12 (5.8)	4.0	High
I have noticed an increase in joint or muscle discomfort since starting my current job.	94 (45.6)	76 (36.9)	10 (4.9)	16 (7.8)	10 (4.9)	4.1	High
I have missed work or restricted my activities due to musculoskeletal pain in the past year.	56 (27.2)	64 (31.1)	12 (5.8)	48 (23.3)	26 (12.6)	3.4	High
Pain or discomfort in my upper or lower limbs has persisted for more than one week at a time.	74 (35.9)	70 (34.0)	14 (6.8)	32 (15.5)	16 (7.8)	3.7	High
My musculoskeletal symptoms tend to worsen after a typical work shift.	98 (47.6)	80 (38.8)	6 (2.9)	14 (6.8)	8 (3.9)	4.2	High
I have sought medical treatment for work-related musculoskeletal issues in the past 12 months.	52 (25.2)	60 (29.1)	16 (7.8)	50 (24.3)	28 (13.6)	3.3	High
My sleep has been disturbed by pain or discomfort related to my work.	64 (31.1)	68 (33.0)	12 (5.8)	42 (20.4)	20 (9.7)	3.6	High
My quality of life has been negatively impacted by musculoskeletal symptoms.	82 (39.8)	74 (35.9)	10 (4.9)	26 (12.6)	14 (6.8)	3.9	High
I frequently use over-the-counter medication to manage work-related pain or discomfort.	70 (34.0)	64 (31.1)	14 (6.8)	40 (19.4)	18 (8.7)	3.6	High
				Grand Mean		3.8	High

Mean cut-off = 3.0

Table 3.2 shows a high prevalence of musculoskeletal disorders among healthcare workers in selected hospitals in Delta State. The highest mean scores were recorded for pain or discomfort in the neck, shoulders, or back (mean = 4.3), worsening of

musculoskeletal symptoms after a typical work shift (mean = 4.2), and increased joint or muscle discomfort since starting the current job (mean = 4.1). The remaining indicators recorded mean scores ranging from 3.3 to 4.0, with an overall grand mean

of 3.8, indicating a high prevalence of musculoskeletal disorders among the respondents.

Table 3.3. Area of the body mostly affected because of the job

Body Area	Yes	No
Lower back	158 (76.7)	48 (23.3)
Neck	142 (68.9)	64 (31.1)
Shoulders	136 (66.0)	70 (34.0)
Upper back	112 (54.4)	94 (45.6)
Wrists/Hands	98 (47.6)	108 (52.4)
Knee	82 (39.8)	124 (60.2)
Feet/Ankles	76 (36.9)	130 (63.1)
Hips/Thighs	64 (31.1)	142 (68.9)
Elbows	52 (25.2)	154 (74.8)

Table 3.3 shows the areas of the body mostly affected due to work among healthcare workers. The lower back was the most affected area, reported by 158 (76.7%) of respondents, followed by the neck (142, 68.9%) and shoulders (136, 66.0%). The upper back was affected in 112 (54.4%) of respondents, wrists/hands in 98 (47.6%), and knees in 82 (39.8%). Fewer respondents reported discomfort in the

feet/ankles (76, 36.9%), hips/thighs (64, 31.1%), and elbows (52, 25.2%).

Research Question 2: What are the key occupational and personal risk factors contributing to the development of MSDs among healthcare workers in these hospitals?

Table 3.4. Occupational and personal risk factors contributing to the development of MSDs among healthcare workers

Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Remark
I frequently lift or carry heavy objects as part of my job duties.	92 (44.7)	78 (37.9)	10 (4.9)	18 (8.7)	8 (3.9)	4.1	Factor
My work requires repetitive movements for extended periods.	98 (47.6)	82 (39.8)	8 (3.9)	12 (5.8)	6 (2.9)	4.2	Factor
I often work in awkward or uncomfortable postures.	96 (46.6)	76 (36.9)	10 (4.9)	16 (7.8)	8 (3.9)	4.1	Factor
I have limited opportunities to take breaks or change position during my shift.	88 (42.7)	74 (35.9)	12 (5.8)	22 (10.7)	10 (4.9)	4.0	Factor

My workload is physically demanding most days.	94 (45.6)	80 (38.8)	8 (3.9)	16 (7.8)	8 (3.9)	4.1	Factor
I feel that stress or fatigue contributes to my risk of musculoskeletal problems.	100 (48.5)	78 (37.9)	10 (4.9)	12 (5.8)	6 (2.9)	4.2	Factor
*I receive adequate training on safe manual handling and body mechanics.	18 (8.7)	32 (15.5)	14 (6.8)	86 (41.7)	56 (27.2)	3.6	Factor
*My personal health habits (e.g., exercise, diet) reduce my risk of MSDs.	24 (11.7)	38 (18.4)	16 (7.8)	78 (37.9)	50 (24.3)	3.4	Factor
*There is sufficient staffing to distribute physical tasks evenly among workers.	16 (7.8)	28 (13.6)	12 (5.8)	92 (44.7)	58 (28.2)	3.7	Factor
My age or previous injuries increase my susceptibility to musculoskeletal disorders.	68 (33.0)	62 (30.1)	18 (8.7)	40 (19.4)	18 (8.7)	3.6	Factor
				Grand Mean		3.9	Factor

Mean cut-off = 3.0 (*reverse coding)

Table 3.4 shows that occupational and personal factors substantially contribute to the development of musculoskeletal disorders among healthcare workers. The highest mean scores were recorded for repetitive movements over extended periods and stress or fatigue contributing to musculoskeletal problems (mean = 4.2 each), while the remaining factors recorded mean scores ranging from 3.4 to 4.1. The

grand mean of 3.9 indicates that these factors substantially contribute to musculoskeletal disorders among the respondents.

Research Question 3: What is the role of workplace ergonomics practices in influencing musculoskeletal disorder risks among healthcare workers in selected hospitals in Delta State?

Table 3.5. Role of workplace ergonomics practices in influencing musculoskeletal disorder risks among healthcare workers in selected hospitals in Delta State

Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Remark
My workplace provides adequate training on safe patient handling techniques to reduce musculoskeletal strain	20 (9.7)	45 (21.8)	21 (10.2)	70 (34.0)	50 (24.3)	2.6	Non-Influential
Safety guidelines for lifting, transferring, and positioning patients are consistently followed in my department.	15 (7.3)	40 (19.4)	21 (10.2)	75 (36.4)	55 (26.7)	2.4	Non-Influential

My supervisors emphasize the importance of ergonomics and workplace safety in daily routines	18 (8.7)	42 (20.4)	20 (9.7)	70 (34.0)	56 (27.2)	2.5	Non-Influential
The workload and staffing levels in my unit allow me to perform tasks without excessive physical strain	10 (4.9)	30 (14.6)	24 (11.7)	80 (38.8)	62 (30.1)	2.3	Non-Influential
*I frequently experience discomfort or pain in my neck, shoulders, or back related to work activities	69 (33.5)	65 (31.6)	12 (5.8)	35 (17.0)	25 (12.1)	2.4	Non-Influential
*I feel that my workplace environment (e.g., space, equipment design) contributes to musculoskeletal strain	61 (29.6)	70 (34.0)	15 (7.3)	40 (19.4)	20 (9.7)	2.5	Non-Influential
Ergonomic principles (e.g., proper posture, workstation adjustments) are actively applied in my daily tasks	15 (7.3)	45 (21.8)	20 (9.7)	68 (33.0)	58 (28.2)	2.5	Non-Influential

Table 3.5 Cont'd

Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Remark
My workplace regularly evaluates and improves ergonomic practices to reduce musculoskeletal risks among healthcare workers	12 (5.8)	40 (19.4)	18 (8.7)	75 (36.4)	61 (29.6)	2.4	Non-Influential
I have access to mechanical aids (e.g., hoists, transfer belts) that reduce physical strain during patient care.	10 (4.9)	25 (12.1)	20 (9.7)	78 (37.9)	73 (35.4)	2.1	Non-Influential
*My job requires repetitive movements (e.g., bending, twisting, lifting) that increase my risk of musculoskeletal disorders.	58 (28.2)	60 (29.1)	18 (8.7)	40 (19.4)	30 (14.6)	2.6	Non-Influential
				Grand mean		2.4	Non-Influential

Mean cut-off = 3.0 (*reverse coding)

Table 3.5 shows the role of workplace ergonomic practices in influencing musculoskeletal disorder risks among healthcare workers. The highest mean scores were recorded for adequate training on safe patient handling techniques and repetitive job movements increasing musculoskeletal risk (mean = 2.6 each), while the remaining practices recorded

mean scores ranging from 2.1 to 2.5. The overall grand mean of 2.4 indicates that workplace ergonomic practices were non-influential in reducing musculoskeletal disorder risks among the respondents.

Research Question 4: How effective are existing ergonomic interventions in reducing MSD-related

risks and improving workplace safety among healthcare workers in selected hospitals in Delta State?

Table 3.6: Effectiveness of existing ergonomic interventions in reducing MSD-related risks and improving workplace safety among healthcare workers in selected hospitals in Delta State.

Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Remark
My workplace provides ergonomic equipment (e.g., adjustable chairs, lifting aids) to reduce MSD risk	15 (7.3)	19 (9.2)	20 (9.7)	60 (29.1)	92 (44.7)	2.1	Non-effective
I have received training on the correct use of ergonomic tools and devices	12 (5.8)	15 (7.3)	25 (12.1)	60 (29.1)	94 (45.6)	2.0	Non-effective
Ergonomic interventions at my workplace are regularly reviewed and updated	10 (4.9)	20 (9.7)	20 (9.7)	65 (31.6)	91 (44.2)	2.0	Non-effective
I feel comfortable reporting ergonomic concerns to management	18 (8.7)	15 (7.3)	22 (10.7)	55 (26.7)	96 (46.6)	2.0	Non-effective
Changes implemented to improve ergonomics have reduced my discomfort at work	12 (5.8)	15 (7.3)	25 (12.1)	60 (29.1)	94 (45.6)	2.0	Non-effective
There are clear protocols for managing MSD symptoms and seeking support	10 (4.9)	27 (13.1)	25 (12.1)	55 (26.7)	89 (41.3)	2.1	Non-effective
My supervisors actively promote safe work practices to prevent MSDs	15 (7.3)	20 (9.7)	30 (14.6)	60 (29.1)	81 (39.3)	2.2	Non-effective
Workstations are designed to accommodate different body sizes and needs	12 (5.8)	15 (7.3)	25 (12.1)	60 (29.1)	94 (45.6)	2.0	Non-effective
I am encouraged to participate in workplace health and safety programs	10 (4.9)	15 (7.3)	30 (14.6)	65 (31.6)	86 (46.6)	2.0	Non-effective
The current ergonomic measures effectively minimize my risk of developing MSDs	15 (7.3)	15 (7.3)	20 (9.7)	60 (29.1)	96 (46.6)	2.0	Non-effective
Collaborating with external experts could enhance ergonomic interventions in our hospital	20 (9.7)	25 (12.1)	20 (9.7)	55 (26.7)	86 (41.7)	2.2	Non-effective
				Grand Mean		2.0	Non-effective

Mean cut-off = 3.0

Table 3.6 shows the effectiveness of existing ergonomic interventions in reducing MSD-related

risks and improving workplace safety among healthcare workers. The highest mean scores were recorded for supervisors actively promoting safe

work practices to prevent MSDs and collaboration with external experts to enhance ergonomic interventions (mean = 2.2 each), while the remaining interventions recorded mean scores ranging from 2.0 to 2.1. The overall grand mean of 2.0 indicates that existing ergonomic interventions were non-effective in reducing musculoskeletal disorder risks and improving workplace safety among the respondents.

3.1.2 Hypothesis 1

There is no significant association between job category (e.g., nurses, doctors, allied health staff) and the prevalence of musculoskeletal disorders (MSDs) among healthcare workers in selected hospitals in Delta State.

Table 3.7: Association between job category and the prevalence of musculoskeletal disorders (MSDs) among healthcare workers in selected hospitals in Delta State.

Job Category	High Prevalence n (%)	Low Prevalence n (%)	χ^2	df	p-value	Decision
Doctor	16 (66.7)	8 (33.3)	12.38	5	0.030	Rejected
Nurse	74 (75.5)	24 (24.5)				
Pharmacist	15 (68.2)	7 (31.8)				
Physiotherapist	12 (66.7)	6 (33.3)				
Dentist	7 (58.3)	5 (41.7)				
Laboratory Scientist	26 (81.3)	6 (18.8)				

Key: n = Frequency; % = Percentage; χ^2 = Chi-square; df = Degrees of freedom

Source: Researcher's computation using IBM SPSS Statistics version 27 (2025).

Table 3.7 presents the association between job category and the prevalence of musculoskeletal disorders among healthcare workers in selected hospitals in Delta State. The findings show that laboratory scientists had the highest prevalence of MSDs (81.3%), followed by nurses (75.5%), pharmacists (68.2%), doctors and physiotherapists (66.7% each), while dentists had the lowest prevalence (58.3%). The chi-square test ($\chi^2 = 12.38$, df = 5, p = 0.030) revealed a statistically significant

association between job category and MSD prevalence ($p < 0.05$). Therefore, the null hypothesis (H_0) was rejected, indicating that job category significantly influenced the prevalence of

musculoskeletal disorders among healthcare workers in the selected hospitals.

3.1.3 Hypothesis 2

There is no significant relationship between the number of years of professional experience and the risk of developing MSDs among healthcare workers in selected hospitals in Delta State.

Table 3.8: Relationship between the number of years of professional experience and the risk of developing MSDs among healthcare workers in selected hospitals in Delta State.

Years of Experience	High Prevalence n (%)	Low Prevalence n (%)	χ^2	df	p-value	Decision
1–3 years	42 (65.6)	22 (34.4)				
4–6 years	52 (73.2)	19 (26.8)	8.76	3	0.033	Rejected

7–10 years	38 (79.2)	10 (20.8)
11 years and above	18 (78.3)	5 (21.7)

Key: n = Frequency; % = Percentage; χ^2 = Chi-square; df = Degrees of freedom

Source: Researcher's computation using IBM SPSS Statistics version 27 (2025).

Table 3.8 shows the relationship between years of professional experience and the risk of developing musculoskeletal disorders among healthcare workers. Healthcare workers with 7–10 years of experience had the highest prevalence of MSDs (79.2%), followed by those with 11 years and above (78.3%), 4–6 years (73.2%), and 1–3 years (65.6%). The chi-square test ($\chi^2 = 8.76$, $df = 3$, $p = 0.033$) revealed a statistically significant relationship, indicating that years of professional experience significantly influenced the risk of developing musculoskeletal disorders among healthcare workers in the selected hospitals.

3.2 Discussion of the findings

The demographic profile of healthcare workers in this study generally aligns with previous research on musculoskeletal disorder (MSD) risk populations. The predominance of female participants reflects the gender distribution commonly observed in healthcare settings and is consistent with findings by Ait Ali et al. (2024), Lin et al. (2020), and Ankomah et al. (2025). The age distribution and years of professional experience also correspond with previous studies identifying young to middle-aged healthcare workers as being at risk of MSDs (Batham & Yasobant, 2016; Doda et al., 2020; Aleid et al., 2021; Sagahutu & Nuhu, 2019). Furthermore, the predominance of nurses and the inclusion of other healthcare professionals are consistent with earlier studies reporting varying MSD prevalence across healthcare professions (Ganiyu et al., 2015; Jacquier-Bret et al., 2023; Sun et al., 2023; Suganthirababu et al., 2023).

3.2.1 Prevalence of musculoskeletal disorders (MSDs) among healthcare workers

The findings reveal a high prevalence of musculoskeletal disorders among healthcare workers in Delta State, consistent with previous studies by Ait Ali et al. (2024) and Motuma et al. (2023). The

predominant symptoms involving the neck, shoulders, and back correspond with findings by Jacquier-Bret et al., Lin et al., Clari et al. (2021), and Sun et al. (2023), who similarly identified these anatomical regions as the most vulnerable among healthcare workers.

3.2.2 Key occupational and personal risk factors contributing to the development of MSDs among healthcare workers.

The findings reveal that most healthcare workers identified multiple occupational and personal factors as contributors to musculoskeletal disorder development, with physical work demands and psychosocial stressors emerging as predominant concerns. The prominence of repetitive movements, awkward postures, and heavy lifting as risk factors directly corroborates the extensive evidence presented by Jacquier-Bret et al., who identified maintenance and repetition of difficult postures as the primary cause across all healthcare professions, and aligns with Kamijantono et al. (2024) identification of heavy lifting, repetitive motions, and unergonomic work postures as principal risk factors. The significant role of stress and fatigue in contributing to MSD risk, as recognized by nearly all respondents, validates findings from Bernal et al.'s meta-analysis linking psychosocial workplace factors to work-related musculoskeletal disorders among hospital nurses. This psychosocial dimension was further substantiated by Krishnan et al., who documented mental weariness and physical exhaustion among nurses with WRMSDs, and by Doda et al., (2020) who established psychosocial effort as significantly associated with work-related low back pain. The physically demanding nature of healthcare work reported by most participants mirrors observations from Yang et al., who found that higher perceived risk of injury was independently associated with increased WRMD prevalence.

3.2.3 Workplace ergonomic practices and their role in musculoskeletal disorder risks among healthcare workers

The findings reveal a critical deficiency in workplace ergonomics implementation, with most healthcare workers reporting that ergonomic practices were non-influential in mitigating musculoskeletal disorder risks. This pattern starkly contrasts with the evidence-based recommendations from previous research and highlights a substantial implementation gap in healthcare settings. The inadequacy of training on safe patient handling techniques reported by most respondents directly contradicts the protective role of ergonomic education documented by Esmaili et al., (2023) who demonstrated that combined training and workstation intervention significantly reduced musculoskeletal symptoms across multiple body regions. The lack of mechanical aids and assistive devices identified by a substantial majority represents a critical failure in organizational support, particularly concerning given that numerous studies, including Weiner et al. and Freidenberg et al., identified patient lifting and transfers as major contributors to WRMSDs. This absence of mechanical assistance aligns with Motuma et al.'s (2023) finding that lack of materials for patient manual handling was significantly associated with work-related musculoskeletal illnesses, and contrasts sharply with protective factors identified by Li et al., (2024) who found that adjustable work chairs and comfortable workplace temperatures reduced WMSD likelihood.

3.2.4 Effectiveness of existing ergonomic interventions in reducing MSD-related risks and improving workplace safety among healthcare workers

The findings reveal that existing ergonomic interventions were non-effective in reducing MSD-related risks and improving workplace safety among healthcare workers. The deficiency in ergonomic equipment provision and the absence of training on ergonomic tools and devices contrast with previous studies by Esmaili et al. (2023), Krishnanmoorthy et al. (2025), and Andhale et al. (2025), which demonstrated that well-implemented ergonomic interventions and comprehensive training

significantly reduce musculoskeletal disorders and improve workplace safety.

IV. CONCLUSION

The study concludes that musculoskeletal disorders are highly prevalent among healthcare workers in selected hospitals in Delta State, with nurses being particularly affected due to the physically demanding nature of their work. The findings demonstrate that MSDs are largely driven by a combination of occupational and personal risk factors, including repetitive movements, awkward postures, heavy lifting, high workload, stress, fatigue, inadequate staffing, and insufficient training on safe manual handling. Despite the well-documented benefits of ergonomics, workplace ergonomic practices and existing ergonomic interventions in the studied hospitals were perceived as largely non-influential and non-effective in reducing MSD risks and improving workplace safety.

V. RECOMMENDATIONS

- Hospitals and healthcare administrators should prioritize the development and implementation of comprehensive ergonomic programs tailored to the specific needs of healthcare workers, particularly nurses who are most exposed to physical strain. This should include routine ergonomic risk assessments, redesign of work processes, and modification of work environments to minimize awkward postures, repetitive movements, and excessive physical demands.
- Healthcare institutions should ensure the provision and maintenance of appropriate ergonomic equipment such as patient lifting and transfer aids, adjustable chairs and workstations, and supportive devices that reduce physical strain during clinical tasks. Access to mechanical aids should be equitable across departments, and their availability should be integrated into standard patient care procedures.
- Regular and mandatory training on safe manual handling, body mechanics, and ergonomic principles should be instituted for all healthcare workers. Such training should be incorporated

into staff orientation programs and reinforced through periodic refresher courses to promote sustained adherence to safe work practices.

- Hospital management should address organizational factors contributing to MSDs by ensuring adequate staffing levels and reasonable workloads. Improving staff-to-patient ratios will reduce physical overexertion, allow opportunities for rest and position changes, and enhance compliance with ergonomic practices.
- Policy makers, professional bodies, and regulatory agencies should integrate occupational health and ergonomics into healthcare policies, accreditation standards, and nursing practice guidelines. Enforcement of these policies will ensure institutional accountability for the protection of healthcare workers' musculoskeletal health.

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