MUSCULOSKELETAL DISORDERS AMONG NURSES IN VARIOUS SPECIALTY AREAS IN A TERTIARY HEALTHCARE INSTITUTION IN BENIN CITY EDO STATE

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IN PARTIAL FULFILLMENT OF THE AWARD OF "BACHELOR'S DEGREE IN NURSING SCIENCE " FACULTY OF NURSING SCIENCE , UNIVERSITY OF BENIN,BENIN CITY.

OCTOBER , 2025.

DECLARATION

This is to declare that this research project titled**MUSCULOSKELETAL DISORDERS AMONG NURSES IN VARIOUS SPECIALTY AREAS IN A TERTIARY HEALTHCARE INSTITUTION IN BENIN CITY EDO STATE** was carried out by **OFOEGBU CHIOMA SANDRA.** It will solely be the result of my work except where acknowledged as been derived from other person(s) or resources.

EXAMINATION NUMBER _____

FACULTY : NURSING SCIENCE, , UNIVERSITY OF BENIN, BENIN CITY.

Signature:_____

Date:_____

CERTIFICATION/APPROVAL

This is to certify that this project titled "**MUSCULOSKELETAL DISORDERS AMONG NURSES IN VARIOUS SPECIALTY AREAS IN A TERTIARY HEALTHCARE INSTITUTION IN BENIN CITY EDO STATE"** was carried out by **OFOEGBU CHIOMA SANDRA** with **MAT Number: BMS1906575** in the Faculty of Nursing Science, University of Benin,under the supervision of MRS. C. C. EDO OSAGIE.

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MRS C. C. EDO-OSAGIE **Date**

Supervisor's name

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PROF(MRS) C.E. OMOROGBE

Head of Department (MEDSURG) **Date**

_____ _____

External examiner **Date**

DEDICATION

This research study is dedicated to God Almighty, the master of the Day of Judgment whose mercy, grace, strength, wisdom and love has kept me through my period of training and also enabling me to carry out and complete this research work.

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ABSTRACT

Musculoskeletal disorders (MSDs) are a common occupational hazard among nurses, primarily due to the physically intensive nature of their duties. These disorders negatively affect the health, productivity, and quality of life of healthcare workers. In tertiary healthcare institutions, the workload and physical demands can vary significantly across different specialty areas, potentially influencing the prevalence and pattern of MSDs. This study aimed to assess the prevalence, types, and associated risk factors of musculoskeletal disorders among nurses across various specialty units in a tertiary healthcare institution in Benin City, Edo State. A descriptive cross-sectional study was conducted among nurses working in specialty units such as emergency, intensive care, surgery, internal medicine, pediatrics, and obstetrics and gynecology. Data were collected using a validated, self-administered questionnaire adapted from the Nordic Musculoskeletal Questionnaire. Descriptive and inferential statistics were used to analyze the data and identify significant associations. The findings revealed a high prevalence of MSDs among nurses, with the most affected body regions being the lower back (72%), neck (55%), and shoulders (48%). Emergency and intensive care unit nurses reported the highest incidence of MSDs. Key risk factors identified included manual lifting of patients, prolonged standing, awkward postures, and insufficient staffing. Nurses with longer years of service and those lacking ergonomic training were significantly more affected. Musculoskeletal disorders are widespread among nurses in this tertiary healthcare institution, with noticeable variations across specialty areas. There is a critical need for ergonomic interventions, routine training, and improved staffing policies to reduce the burden of MSDs among nurses.

Keywords: Musculoskeletal disorders, nurses, specialty areas, occupational health, tertiary healthcare, Benin City, Edo State, ergonomics

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Work-related musculoskeletal disorders (WRMSDs) are described by the National Institute for Workplace Safety and Health NIOSH in 1997 as those illnesses and injuries that impact the peripheral nerve, neurovascular, and musculoskeletal systems and are brought on by or made worse by workplace exposure to ergonomic hazards (Odebiyi & Okafor, 2023). This condition is the most common work related disorder (European Agency for Safety and Health at Work, 2020). It encompasses a broad spectrum of inflammatory and degenerative illnesses that arise from work-related activities or occupational exposure. Peripheral nerves, supporting blood vessels, muscles, tendons, ligaments, and joints are all impacted by WRMSDs (Pleho et al., 2021). These illnesses frequently have a direct financial impact on the individual and the workplace, and they can cause pain and functional impairment, disabling conditions, from low back pain, tendinitis, carpal tunnel syndrome, to epicondylitis, which are associated with an individual's current or prior occupation (Korhan & Memon, 2021). These disorders can result from sudden or prolonged exposure to physical stressors such as repetitive movements, forceful exertions, vibrations, or poor postures, which can cause micro-trauma to the musculoskeletal system (Odebiyi & Okafor, 2023).

WRMSDs are health-impairing physiological effects that move beyond symptoms, collectively causing discomfort and pain in the muscles and joints, functional impairment, and disability, impacting both the quality of life of the affected individuals and the efficiency of healthcare delivery (Lu et al., 2022). In the absence of appropriate work limitations, the pain can lead to an inability to function normally. It largely affects the lower back, shoulders, and arms, causing considerable morbidity and loss of work time, although symptoms may not be disabling or even

apparent until after 1-10 years of exposure (Okezue et al., 2020). A distinctive feature of WRMSDs is that they commonly manifest as muscle pain that can be fleeting or chronic, discomfort, tenderness, stiffness and swelling (Zenbaba et al., 2022; Nemera et al., 2024). The complaint of WRMSDS is one of the important safety and health concerns, and they are a common occupational hazard seen among various healthcare providers, of which nurses are the most affected (Sun et al., 2023).

Nurses are pivotal to the successful functioning of the health system, as they stand as the foundation around which healthcare revolves. Despite the fact that nurses are the bedrock of every healthcare setting, providing hands-on care to patients, administering medications, and performing various medical procedures; they are often overlooked when it comes to the hazards associated with their daily work. Nurses are disproportionately affected by WRMSDs, facing a higher prevalence and more severe occupational hazards compared to other professions (Sun et al., 2023). Research has shown that the prevalence of WRMSDs among nurses exceeds that of other occupations, including manufacturing workers and physicians, highlighting the need for targeted interventions to address this critical issue in the nursing workforce (Alnaser et al., 2020). Nursing is a physically demanding profession that requires prolonged standing, lifting, and moving of patients, which can lead to musculoskeletal disorders (MSDs); these work-related health problems in nurses were significantly associated with age, gender, body mass index (BMI), ward, work seniority, work content, working hours, exercise habits, and working in a hospital (Nguyen et al., 2020; Chen et al., 2020). Work-related musculoskeletal disorders (WRMSDs) are a significant concern among nurses, causing pain, discomfort, and decreased productivity. The most prevalent work related musculoskeletal condition associated with nurses' incapacity is low back pain (LBP), which affects an estimated 200,000 nurses annually and costs the National Health Service about

£45 million making it a costly occupational health problem (Nemera et al., 2024). By the time healthcare workers have been working for a few years, there is evidence of early degenerative changes in the lumbar intervertebral discs leading to chronic lower back pain and increased work-related disability (Olutende et al., 2022). Many WRMSDs result from high-repetition tasks such as patient lifting, reaching, cleaning, and operating or using hypermetrical muscles to force oneself (Odebiyi & Okafor, 2023). Studies showed that musculoskeletal disorders were most seen among operating room nurses and intensive care nurses, where the nursing staff is expected to carry out patient handling tasks such as lifting the patients up in beds, positioning them during nursing care, bathing, toileting, and transferring. In this circumstance, work performed is associated with WRMSDs and adverse effects on the workforce, the standard of nursing care provided, and related healthcare costs (Nguyen et al., 2020). Understanding the prevalence and factors associated with WRMSDs among nurses is crucial for healthcare administrators and workers to address this issue effectively.

Approximately 59% of the hospital workforce is made up of nurses (WHO, 2020) who face a significant risk with 68.5% of reported occupational injuries attributed to them at least once (Çelikkalp & Dilek, 2022). Each year, around 12% of nurses exit the profession, while 52% experience chronic lower back pain (Akodu & Ashalejo, 2020). It was discovered that 77.2% of nurses had WRMSDs annually (95% confidence interval: 0.725–0.819) and out of all the anatomical locations, the lower back (59.5%), neck (53.0%), and shoulder (46.8%) had the highest prevalence of WRMSDs among the nurses. Compared to nurses in poor nations, those in industrialised nations had a greater prevalence of WRMSDs (Sun et al., 2023). 82% of nurses working in maternity, surgical, and medical units in Zimbabwe had WRMSDs, according to a

study by Chiwaridzo, Makotore, Dambi, and Munambah. In contrast, 84.4% of nurses in Nigeria had WRMSDs or more over the course of their employment (Muthelo et al., 2023)

Nurse-hosted factors, environmental aspects, and physical work factors have all been linked to the onset of WRMSDs in Nigeria (Bolarinde et al., 2023). As a result, these nurses have been continually exposed to long working hours, heavy workloads, and predominantly stressful conditions in their workplaces. These challenging circumstances are believed to contribute to an increased likelihood of nurse burnout and poor patient-assessment skills, which are among the major factors that are related to WRMSDs among nurses in Nigeria (Godsday et al., 2023). In a study conducted by Bolarinde et al. (2023) in Ondo state, Nigeria, findings indicated that low back pain (LBP) was the most prevalent WRMSD among the nurses (60.0%), followed by neck pain (48.0%), and elbow pain (5.3%), which was the least common work-related musculoskeletal discomfort. The results showed that compared to responders in other specialist areas, those working in the intensive care unit (100.0%), dental unit (100.0%), accident and emergency (77.8%), orthopaedics (75.0%), ear, nose, and throat (75.0%), and medicine (72.7%) suffered from lower back pain (LBP). The findings also showed that frequent lifting of patients (48.0%), extended standing (49.3%), and frequent bending (64.0%) were the main causes of LBP in the responders. In another study by Akodu and Ashalejo (2020) among hospital nurses in South-west Nigeria, the point and 12-month prevalence of WRMSDs were 95 (70.4%) and 81 (60%) respectively. Pain in the lower back (35, 43.2%) was the most prevalent musculoskeletal disease associated with the job. This therefore indicates a high prevalence of WRMSDs among the nursing workforce in Nigeria.

Research has been carried out on work-related musculoskeletal disorders (WRMSDs) affecting nurses in various locations globally and within certain regions of Nigeria and there was a high

prevalence in each case. However, there is a lack of data concerning the condition in Benin City, Nigeria. Therefore, this study aims to investigate WRMSDs among nurses in a tertiary healthcare institution in Benin City.

1.2 Statement of the Problem

Despite the critical role nurses play in healthcare delivery, there is a growing concern about the prevalence of WRMSDs among them (Mailutha., 2020). These disorders not only affect the health and well-being of nurses but also lead to increased absenteeism, reduced productivity, and higher healthcare costs (Clari et al., 2021). It is estimated that about 12% of nurses exit the profession annually as a result of WRMSDs (Akodu & Ashalejo, 2020). Worldwide, there are substantial variations in the prevalence of WRMSDs throughout the continents. For example, WRMSDs range from 35.1% to 47% in America; 78.6% to 88% in Asia (Muthelo et al., 2023); and 44.1% to 94% in Africa (Kasa et al., 2020; Bediako et al., 2021).

University of Benin Teaching Hospital (UBTH) is one of the largest tertiary healthcare institutions in Nigeria, with a large workforce of nurses. In the context of UBTH, it is quite puzzling for an organisation of such scale to be lacking in empirical data on the extent and determinants of WRMSDs among nurses especially with the rate of high prevalence of WRMSDs among nurses in Africa and Nigeria. This gap in knowledge makes it challenging to develop targeted interventions to reduce the incidence of these disorders and improve the working conditions of the nurses. Therefore, this study aims to investigate WRMSDs among nurses at UBTH.

1.3 Aim of the Study .

The primary aim of this study is to assess work-related musculoskeletal disorders (WRMSDs) among nurses in a Tertiary Health Facility in Benin City, Edo-State.

The specific objectives are:

1. To assess the knowledge of work-related musculoskeletal disorders (WRMSDs) among nurses across different specialty areas in a tertiary healthcare institution, Benin City, Edo-State.
2. To identify the WRMSDs among nurses in a tertiary healthcare institution, Benin City, Edo-State
3. To ascertain the coping strategies for WRMSDs among nurses in a tertiary healthcare institution, Benin City, Edo-State.

1.4 Research Questions

To achieve the objectives of this study, the following research questions will be addressed:

1. What is the level of knowledge about work-related musculoskeletal disorders among nurses in different specialty areas in a tertiary healthcare institution, Benin City, Edo-State?
2. What are the common work-related musculoskeletal disorders experienced by nurses in a tertiary healthcare institution, Benin City, Edo-State?
3. What coping strategies are commonly employed by nurses in managing work-related musculoskeletal disorders in a tertiary healthcare institution, Benin City, Edo-State?

1.5 Research Hypothesis

H_0: There is no significant relationship between the knowledge of WRMSDs among nurses and their years of practice.

1.6 Significance of the Study

This study is significant for several reasons.

To Nursing Practice: This research will provide insights into the WRMSDs, enabling nurses to take proactive measures to prevent injuries and improve their overall well-being. It will inform the development of evidence-based guidelines for safe patient handling and movement, reducing the risk of WRMSDs.

To Nursing Education: This will highlight the need for inclusion of WRMSD prevention and management in nursing curricula, ensuring that future nurses are equipped with the knowledge and skills to prioritise their own safety and well-being.

TO Nursing Research: It will contribute to the body of knowledge on WRMSDs in nursing, providing valuable insights for future research and informing the development of interventions to address this critical issue.

1.7 Scope of the Study

The scope of this study is delimited to work-related musculoskeletal disorders (WRMSDs) among nurses in a Tertiary Health Facility in Benin City, Edo-State.

1.8 Definition of Terms

Musculoskeletal Disorders (MSDs): Inflammatory and degenerative conditions affecting muscles, tendons, ligaments, joints, peripheral nerves, and supporting blood vessels.

Work-related Musculoskeletal Disorders (WRMSDs): Impairments of bodily structure resulting from exposure to ergonomic hazards in the workplace (hospital), leading to discomfort, pain, and functional impairment.

Nurses: Registered nurses (RNs) or Licensed practical nurses (LPNs) who provide direct patient care in a healthcare setting.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter provides an overview of previous research on the WRMSDs amongst nurses. It introduces the framework for the case study that comprises the main focus of the research described in this thesis.

2.1 Conceptual Review of WRMSDs

Health care personnel, especially nurses, around the globe suffer from a continuous increase in work-related musculoskeletal disorders (WRMSDs) distressing their personal life due to sometimes lifelong physical and psychological impairments, decreasing their work ability and productivity, and ultimately increasing adverse outcomes in form of lessened patients' care quality (Tariah et al., 2020). The World Health Organization (WHO) states that when nurses' everyday work duties become stressful, the problems associated with WRMSDs worsen (Krishnan et al., 2021). WRMSDs are illnesses and injuries that impact the musculoskeletal system, which includes the muscles, tendons, ligaments, nerves, discs, blood vessels, and so on, as well as how the human body moves. There are multiple agents involved in these injuries (Heidari et al., 2023). Moreover, WRMSDs have an impact on the bodily organs that are utilised for the task. The most vulnerable organs to the risk of WRMSDs are the upper organs, including the hands and spinal vertebrae (Heidari et al., 2022). Regional musculoskeletal diseases, repetitive motion injuries, overuse syndromes, cumulative trauma condition or illness, and soft tissue disorders are among other names for WRMSDs (Jakovljević, 2024).

At the Central Hospital of Harare, Zimbabwe, nurses' lifetime prevalence of WRMSDs was assessed to be 95.7% (Meh et al., 2023). The high frequency of musculoskeletal problems among

nurses is believed to result from organisational aspects at work, including scheduling, as well as physical and psychological demands of the job (Nguyen et al., 2020). Given that work-related musculoskeletal disorders (WRMSDs) are a frequent occupational health problem that affects other nurses worldwide, the rising prevalence of WRMSDs among nurses is indicative of a global trend (Olutende et al., 2022). The National Institute for Occupational Safety and Health (NIOSH), classified WRMSDS as the second most common work related disease, after occupational respiratory diseases, these disorders account for nearly 48% of all diseases and such disturbances may occur gradually during a long process due to long-term exposure to the agents causing these disturbances (Heidari et al., 2023).

2.1.1 Mechanism Of WRMSD Development

Musculoskeletal problems related to the workplace arise from repetitive straining of the body at work. Stress and irritability can be brought on by prolonged postures or repetitive movements, especially over an extended period of time. The main cause of WRMSDs is exposure to (ergonomic) “Risk Factors” at the work-place. Thus, the disposition for developing WRMSDs is related more to the difference between the demands of work and the worker’s physical work capacity, which decreases with age (Odebiyi & Okafor, 2023). Because their jobs require a lot of physical labour, certain professions are more likely to have a higher prevalence of musculoskeletal illnesses related to the workplace. One of the most frequent employment groups impacted by WRMSDs is the healthcare industry (Gasnick., 2020)

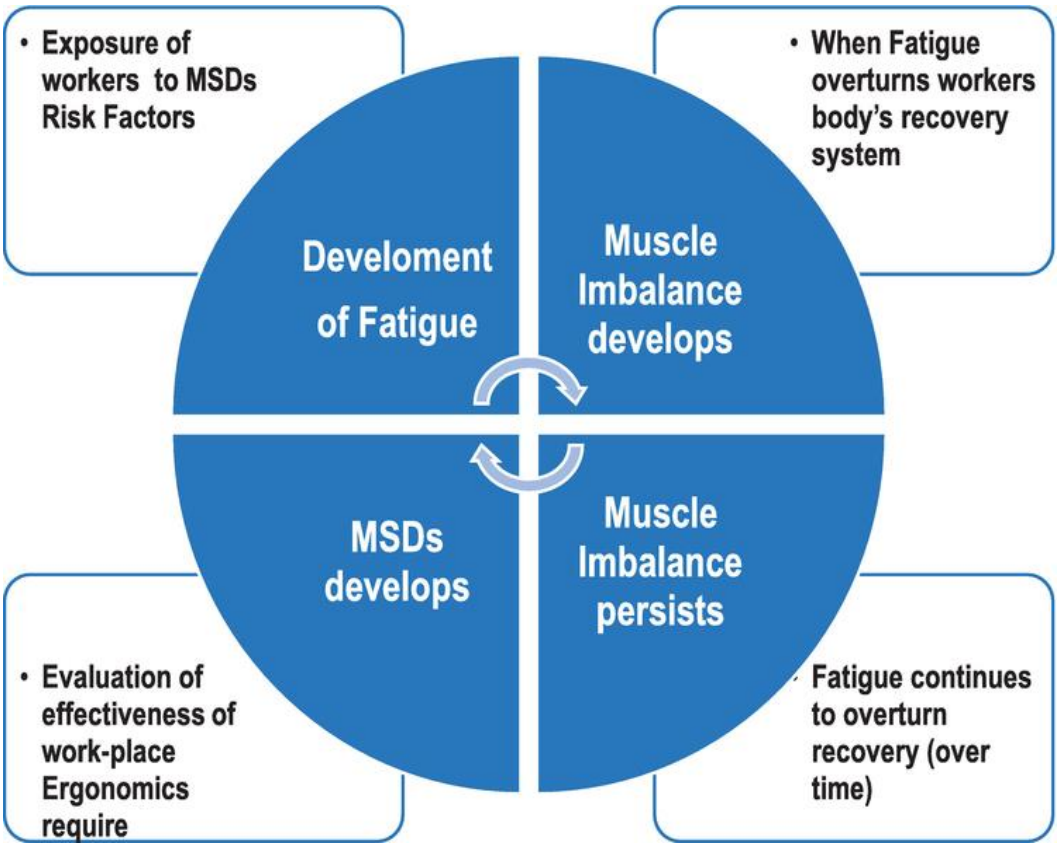

Figure 2.1. Mechanism Development of WRMSDS (Odebiyi & Okafor, 2023).

WRMSDs typically include three types of injuries:

1. Muscle injury.
2. Tendon injury.
3. Nerve injury.

Muscle Injury: Muscle contractions generate lactic acid and other byproducts that are eliminated by the blood while using chemical energy from glucose. An extended period of muscle contraction lowers blood flow. Because they are not eliminated from the muscles quickly enough, the chemicals that the muscles create build up inside the muscles. These materials build up and aggravate muscles, producing discomfort. The duration of the muscle contractions and the intervals between activities that allow the muscles to release those irritating substances determine the severity of the pain (CCOHS., 2024)

Tendon Injury: Tendons consist of numerous bundles of fibres that attach muscles to bones. Tendon disorders related to repetitive or frequent work activities and awkward postures occur in two major categories – tendons with sheaths (Fig. 1), found mainly in the hand and wrist; and tendons without sheaths (Fig. 2), generally found around the shoulder, elbow, and forearm. The tendons of the hand are encased in sheaths through which the tendon slides.

To lubricate the tendon, cells in the inner walls of the sheaths generate a slick fluid. Excessive or repetitive hand movements can cause the lubricating system to break down. It might not generate enough fluid or might generate a fluid with inadequate lubricating properties. The tendon area becomes inflamed and swollen when the lubrication mechanism fails because friction is created between the tendon and its sheath. Fibrous tissue develops when inflammation recurs frequently (CCOHS., 2024)

Tendon sheath thickening and restricted tendon movement are caused by the fibrous tissue. Tenosynovitis is the term for inflammation of the tendon sheath. Uncomfortable postures and repetitive actions might harm tendon sheaths. In reality, some tendon fibres can break apart under repetitive tensing. Inflammation results from the thickening and bumping of the tendon. The general word used to describe tendon irritation is tendinitis. Tendons can occasionally travel through a small gap between bones, as in the shoulder. An anti-friction device called a bursa is put between the tendons and the bones. It is filled with lubricating fluid. The bursa experiences high levels of friction and inflammation as the tendons get thicker and more uneven. Bursitis is the term for bursa inflammation (CCOHS., 2024)

Nerve Injury: The brain sends information through nerves to regulate muscle activity. They also regulate physiological processes like sweating and salivation and transmit information about touch, pain, and temperature from the body to the brain. Muscles, tendons, and ligaments encircle nerves. Nerves can be crushed by awkward postures, repetitive motions, and other demanding activities if the tissues around them swell. The symptoms of "pins and needles," numbness, and muscle weakness are brought on by nerve compression. There may also be skin dryness and reduced circulation to the limbs (CCOHS., 2024)

2.1.2 Symptoms of WRMSDS

Affected body parts' musculoskeletal symptoms might include discomfort, pain, and swelling, all of which can become incapacitating (Zenbaba et al., 2022).

The most prevalent symptom of WRMSDS is pain. In rare instances, the affected area may enlarge, become red, and exhibit muscle and joint stiffness. In addition, some workers may report feeling "pins and needles," numbness, changes in skin tone, and less hand perspiration.

Other symptoms of work-related musculoskeletal disorders include (Gasnick., 2020)

Stiff joints, taut muscles, and limited range of motion

Combined instability

Burning, tingling, or numbness

Weakened muscles

Having trouble moving or staying in specific positions

WRMSDS can develop in phases, ranging from moderate to severe (CCOHS., 2024). They include:

Early stage: During the work shift, the affected limb experiences pain and fatigue, but they go away at night and on days off. No decrease in productivity is observed.

Intermediate Stage: Exhaustion and aches start early in the workday and last through the night. decreased ability to do repetitive tasks.

Late stage: Weakness, exhaustion, and aching continue while at rest. incapacity to sleep and do simple tasks.

These phases are not felt by everyone in the same way. It could actually be challenging to determine the precise boundary between one stage and the next. The initial signs of discomfort, tingling, or numbness indicate that the tendons and muscles need time to heal and relax. If not, an injury may become chronic and occasionally irreparable. People should react to symptoms as soon as they are recognized, if possible.

2.1.3 Risk Factors Associated with WRMSDS Among Nurses

For nurses, the growth and generation of work-related musculoskeletal disorders (WRMSDS) happens because of personal, occupational, and organisational determinants/factors that are convoluted and interconnected. In order to prevent and manage WRMSDs effectively, it is

necessary to take this comprehensive approach into account and deal with these interrelated factors.

Personal/Individual Factors: The individual factors include age, sex, body mass index (BMI), physical fitness, and pre-existing health conditions (Nguyen et al., 2020). WRMSDs are associated with increased risk among elderly nurses, those with higher BMIs, and those who have musculoskeletal diseases that already exist (Jakovljević, 2024). Epidemiologic research has looked closely at how ageing affects WMSDs. Age has been linked in a number of studies to an increasing linear trend in the incidence or prevalence of WMSDs in the low back and upper extremities (Lu et al., 2022). Furthermore, gender disparities could also affect the incidence and severity of these disorders; female nurses tend to have a higher prevalence because of differences in physiology and ergonomics at workstations (Barnard et al., 2021; Sun et al., 2023)

Work-related/Occupational Factors: Work-related factors are inherent in the nursing profession including physical stresses from patient handling activities, repetitive tasks prolonged standing or walking without adequate rest periods (Olutende et al., 2022). Most commonly nurses perform tasks like lifting, transferring and repositioning patients which put a lot of strain on their muscles. Cumulative trauma as well as other WRMSDs is as a result of these repetitive actions since there is not enough time for recovery between them. Also,the nursing shift system which nurses have no control over is an occupational factor that increases the likelihood of WRMSDs (Sun et al., 2023). They frequently put in a great deal of overtime and have lengthy workdays, which makes nursing work even more challenging. The body finds it difficult to get enough sleep, which raises the possibility of WRMSDs (Sun et al., 2023)

Organisational Factors: Organisational factors include a wider working environment and numbers of staff, work load, presence of ergonomic facilities, and workplace ethos. When patient-

nurse ratio is high, there is inadequate staffing and large workload, it causes greater physical pressure on nurses resulting in more possibilities for WRMSDs (Olutende et al., 2022; Jakovljević, 2024). High workload and stress in nursing can lead to muscle tension, fatigue, and decreased focus, increasing the risk of WRMSDs. According to Jakovljević (2024), the phrase "organisational factors" refers to all of the aspects that influence how an organisation and its members behave. Typically, these elements are: Formal management systems (such as safety and competence management), assurance processes (monitoring, auditing, and reviewing), work practices (whether formally documented or not), risk awareness, how has the organisation learned from experience, the safety culture of the organisation.

2.1.4 Treatment Of WRMSDS

The treatment of WRMSDS involves several approaches, including the following:

1. Restriction of movement.
2. Application of heat or cold.
3. Exercise.
4. Medication and surgery.

Restriction of Movement:- Avoiding the activities that are causing the injury is the first step in treating WMSDs. Work limits are often necessary with this technique. In certain situations, switching careers should be taken into consideration. A splint can also be used to immobilise the injured joint or limit movement. Splint use in work environments, however, necessitates the utmost prudence. Inappropriate usage of splints can do more harm than benefit. Splints are typically used for one of two purposes: either to limit movement of the wounded joint or to mechanically support a joint when an excessive load is expected on the joint. Splints shouldn't be used as a mechanical joint support in an occupational setting. Rather, a modification of the position is necessary to

prevent the extreme. Splints shouldn't be used as a mechanical joint support in an occupational setting. Rather, the task ought to be restructured to prevent the excessive strain on the employee's joint in the first place. The work activity that resulted in the injury must be ceased or modified in order for the use of splints to immobilise an injured joint to be successful. The worker runs the danger of hurting other joints that must heal to make up for the splinted one if a hazardous job is left undone (CCOHS., 2024)

Application of Heat or Cold: Both heat and cold applications tend to reduce discomfort and could hasten the healing process. For injuries and inflammations (tissues that are swollen, red, heated, and inflamed), cold is advised as it lowers pain and swelling. However, because freezing temperatures will cause the muscle to tense even more, using ice is not advised in cases of muscle pain (spasms). Ice should only be used as soon as possible after an accident and for a short period of time. It is advised to use heat to relieve muscle soreness. It improves blood flow, which helps the body get rid of lactic acid accumulation. It is not advised, although, for wounds that have a great deal of edema and irritation (CCOHS., 2024)

Exercise: Stretching helps because it eases tense muscles and increases circulation. Before exercising, though, those with WMSDs should speak with a physical therapist. If a workout program or stretching regimen is not developed properly, it can worsen the current condition (CCOHS., 2024)

Medication and Surgery: Anti-inflammatory medications help lessen inflammation and pain. Injecting cortisone directly into the afflicted area in the case of localised pain that is not improving with medication in order to help reduce pain and inflammation can also be done as a treatment regime (Villa-Forte., 2023). When all other options are exhausted, a physician might attempt more

complex therapies or even surgery. Surgery could be an option to fix or clean up a damaged body part, depending on the extent of the injury and the afflicted area (Prall & Ross, 2022).

2.1.5 Body Regions Affected by WRMSDS

Work-related musculoskeletal disorders (WRMSDs) among nurses can impact various body regions due to the physical demands of their job (Jakovljević, 2024). The most commonly affected areas include:

1. **Lower Back (LBP):** The lower back is the most frequently affected region among nurses (Akodu & Ashalejo, 2020). Lower back pain (LBP) can result from activities such as lifting and transferring patients, bending, and prolonged standing (Akodu & Ashalejo, 2020). Nurses often report symptoms such as pain, stiffness, and limited mobility in the lower back. The high prevalence of lower back pain among nurses is attributed to the repetitive and strenuous nature of their tasks, leading to cumulative stress on the lumbar spine (Nair & P, 2020). When affected it can lead to herniated discs, sprain and strain,etc
2. **Neck and Shoulders (NSS):** The neck and shoulder region is another common area affected by WRMSDs (Lin et al., 2020). Nurses frequently experience pain, tension, and limited range of motion in these areas due to tasks that involve reaching, lifting, and positioning patients. Prolonged periods of looking down at patient records or screens can also contribute to neck strain. A study noted that the prevalence of neck and shoulder pain among nurses is high (61.2% & 59.6% respectively), with ergonomic factors and poor posture being significant contributors (Kalkim et al., 2021). Disorders like rotator cuff injuries, tendinitis and bursitis are common disorders of this body region.
3. **Hands and Wrists (HW):** Repetitive tasks can lead to musculoskeletal issues in the hands and wrists, examples of such are charting, typing, and handling medical

instruments, as well as the prolonged use of gloves. Symptoms often include pain, numbness, and tingling, which can be indicative of conditions like carpal tunnel syndrome. A review by the Centers for Disease Control and Prevention (2023) highlighted that these repetitive motions and the need for precision in tasks exacerbate stress on the hand and wrist muscles and tendons, increasing the risk of WRMSDs.

4. **Feet and Ankles (FA):** Nurses spend a significant amount of time on their feet, walking and standing for long periods, which can cause pain, fatigue, and inflammation in the feet and ankles. The physical demands of lifting patients and moving equipment also contribute to strain in this region. Prolonged standing and walking, combined with inadequate footwear and insufficient rest periods, are key factors leading to musculoskeletal pain in the feet and ankles.

2.1.6 WRMSDS Among Nurses

The most prevalent WRMSDs experienced by nurses include:

1. **Lower Back Pain:** This is the most common musculoskeletal disorder among nurses. The repetitive bending, lifting, and transferring of patients contribute to significant strain on the lower back. It can be caused by patient handling, prolonged standing, poor posture, and inadequate ergonomic support during tasks.
2. **Neck Pain:** Nurses frequently report neck pain, particularly those working in intensive care units or surgical wards where head and neck postures are often static or awkward. It could be as a result of prolonged periods of looking down at patient charts, monitors, or during procedures, as well as poor ergonomics in workstations.
3. **Shoulder Pain:** Shoulder disorders are common among nurses who are involved in lifting, pushing, or pulling tasks, particularly those who work in environments that require

repetitive overhead movements such as reaching for supplies or equipment, assisting with patient mobility, and repetitive overhead tasks.

4. **Wrist and Hand Disorders**: Nurses often experience conditions like carpal tunnel syndrome due to the repetitive use of their hands and wrists such as charting, typing, handling medical instruments, and prolonged use of gloves can lead to strain and overuse injuries in the wrists and hands.
5. **Knee Pain: Knee** pain is also prevalent, particularly among nurses who spend long hours standing or walking on hard surfaces.
6. **Hip Pain:** Nurses may develop hip pain due to the repetitive strain from patient handling tasks such as lifting, transferring patients, and prolonged periods of standing.
7. **Ankle and Foot Pain:** Nurses often report pain and discomfort in their feet and ankles, particularly those who are on their feet for most of their shifts.
8. **Upper Back Pain:** Upper back pain is less common than lower back pain but still affects a significant number of nurses. Poor posture, repetitive lifting, and the strain from holding awkward positions during patient care are possible causes
9. **Elbow Pain:** Conditions such as tennis elbow can occur among nurses, although they are less common compared to other WRMSDs. It could be due to repetitive arm and hand movements, such as those involved in patient handling or during certain medical procedures.
10. **Generalised Muscle Fatigue**: This can occur as a result of overall physical exhaustion from long shifts and high physical demands as well as insufficient rest periods.

2.1.7 Coping Strategies For WRMSDS

Certain tactics/strategies can lessen the incidence or recurrence of WRMSDs. They include:

1. **Ergonomic Training:** Providing training on proper body mechanics, posture, and ergonomic practices to reduce strain during tasks such as lifting, bending, and repetitive motions.
2. **Use of Assistive Devices**: Utilising tools like patient lifts, transfer belts, and adjustable beds to minimise the physical strain on nurses during patient handling.
3. **Stretching and Exercise:** Incorporating regular stretching exercises and strength training to improve flexibility and muscle strength, reducing the risk of injury.
4. **Workplace Modifications:** Adjusting the work environment, such as the height of workstations, chairs, and computer screens, to promote better posture and reduce strain.
5. **Job Rotation**: Rotating nurses through different tasks and departments to avoid repetitive strain on specific muscle groups.
6. **Adequate Rest Breaks**: Encouraging frequent short breaks to reduce fatigue and prevent the buildup of muscle strain during long shifts.
7. **Proper Footwear**: Wearing supportive, well-cushioned shoes to reduce stress on the lower back, legs, and feet during prolonged standing and walking.
8. **Stress Management Techniques**: Implementing relaxation techniques such as deep breathing, meditation, and mindfulness to manage stress, which can exacerbate musculoskeletal pain.
9. **Hydration and Nutrition:** Maintaining proper hydration and a balanced diet to support overall musculoskeletal health.

10. **Early Intervention:** Seeking medical attention at the first sign of discomfort or pain to prevent minor issues from developing into more serious conditions.
11. **Physical Therapy**: Engaging in physical therapy programs to manage pain, improve mobility, and strengthen affected muscles.
12. **Supportive Workplace Culture**: Fostering a workplace culture that prioritises health and safety, encourages reporting of discomfort, and supports modifications and accommodations.
13. **Mindfulness and Relaxation Techniques**: Using mindfulness, yoga, and relaxation exercises to reduce muscle tension and improve overall well-being.
14. **Cold and Heat Therapy:** Applying ice packs or heating pads to alleviate muscle pain and inflammation.

2.2 Theoretical Framework

Understanding work-related musculoskeletal disorders (WRMSDs) among nurses requires a comprehensive theoretical framework that integrates various perspectives on occupational health, ergonomics, and stress. This framework draws on multiple theories to explain why the research problem under this study exists. It will also relate the topic under study to the theory and explain why postulated solutions may work.

2.2.1 Ergonomics Theory

Ergonomics is the scientific discipline concerned with understanding the interactions among humans and other elements of a system. It applies theory, principles, data, and methods to design in order to optimise human well-being and overall system performance. The core of ergonomics is about fitting the job to the worker, rather than forcing the worker to fit the job. It recognizes that

people have physical, cognitive, and organisational needs that must be taken into account in the design of tasks, equipment, and work environments.

The foundation of ergonomics theory is rooted in the human body's capabilities and limitations (physical ergonomics). It explores how people interact with their environment and the tools they use, focusing on designing systems and products that improve efficiency, safety, and comfort. This approach helps to reduce the risk of injuries and musculoskeletal disorders (MSDs) that can arise from repetitive motions, awkward postures, and excessive force. Ergonomics considers factors such as body size, strength, endurance, and the sensory and cognitive abilities of individuals, which vary greatly among different populations.

Another critical aspect of ergonomics theory is cognitive ergonomics, which deals with mental processes such as perception, memory, reasoning, and motor response as they affect interactions among humans and other elements of a system. This includes understanding how people process information and make decisions in complex environments. Cognitive ergonomics aims to design systems that reduce mental workload, improve decision-making, and prevent human error.

Organisational ergonomics is another dimension that examines how work systems are structured and managed. It considers how organisational policies, procedures, and culture impact employee well-being and performance. This area of ergonomics seeks to create workplaces that promote cooperation, communication, and job satisfaction, which in turn leads to better productivity and reduced risks of workplace injuries.

In summary, ergonomics theory is a multidisciplinary field that integrates knowledge from anatomy, physiology, psychology, engineering, and design to create environments that support human health, safety, and performance. It emphasises a proactive approach to designing work

environments and systems that accommodate the diversity of human capabilities, thereby minimising the potential for injury and enhancing overall efficiency and well-being.

Ergonomics theory in relation to WRMSDS among nurses

Ergonomics theory, when applied to the context of work-related musculoskeletal disorders (WRMSDs) among nurses, emphasises the importance of designing work environments and tasks that align with the physical and cognitive capabilities of nurses. The primary goal is to minimise the strain and physical demands placed on nurses, thereby reducing the incidence of WRMSDs.

Nurses are often required to perform physically demanding tasks, such as lifting and transferring patients, bending over beds, reaching for equipment, and standing for extended periods. These tasks, if not ergonomically optimised, can lead to excessive physical strain on the musculoskeletal system, particularly in the back, neck, shoulders, and wrists. According to ergonomics theory, these risks can be mitigated by designing tasks and work environments that account for the natural movements and limits of the human body. For instance, the theory advocates for the use of assistive devices like patient lifts to reduce the physical effort required from nurses when handling patients. This reduces the risk of injury to the lower back and shoulders, which are common sites for WRMSDs in the nursing profession.

Another aspect of ergonomics theory is the importance of proper posture and movement during work. Ergonomics encourages the design of workspaces that allow nurses to maintain neutral body posture positions where the body is aligned and balanced, reducing stress on the muscles and joints. For example, adjustable beds and workstations can help nurses maintain proper posture when attending to patients, which in turn decreases the likelihood of developing WRMSDs.

Cognitive ergonomics also plays a role in preventing WRMSDs among nurses. This branch of ergonomics focuses on optimising the mental processes involved in work, such as decision-making

and workload management. By designing systems that reduce cognitive load, nurses can perform tasks more efficiently and with less mental stress, which indirectly reduces physical strain. For example, clearly organised and easily accessible equipment reduces the need for repetitive reaching or awkward postures.

In summary, ergonomics theory provides a framework for understanding and addressing the physical and cognitive demands of nursing work. By applying ergonomic principles, healthcare institutions can design work environments and practices that reduce the risk of WRMSDs, thereby improving the health, safety, and productivity of nurses. This is crucial in a profession where the physical demands are high and the risk of musculoskeletal injury is significant.

2.3 Empirical Review

The purpose of this empirical review is to assess previous research done by various researchers related to this study. It also identifies research gaps that require further investigation. The empirical review of the study would be discussed under the following heads.

2.3.1 Empirical Review on the knowledge of WRMSDs among nurses

In a study by Attia et al. (2023), 200 staff nurses at the Royal Hospital in Muscat were assessed for musculoskeletal disorders and ergonomic awareness using the Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) and a separate ergonomic awareness survey. The study found that 50.3% of nurses reported low back discomfort, while awareness of ergonomic principles was rated as fair, with a mean score of 3.2±0.6. Although there was a weakly positive but significant correlation between ergonomic awareness and working capacity, no significant correlations were found between ergonomic awareness and overall discomfort or frequency of symptoms. The study

concluded that high ergonomic awareness is crucial for maintaining a safe and sustainable work environment for nurses.

Olutende et al. (2022) conducted a descriptive cross-sectional study in Kakamega County, Kenya, to assess nurses' awareness of work-related musculoskeletal disorders (WRMSDs). Using a self-administered questionnaire among 130 randomly selected nurses, the study found that 51% were aware of WRMSDs, with an average age of 35 years. No significant correlation was found between gender and WRMSD awareness, but a statistically significant relationship was observed between years of experience and frequency of WRMSDs. The study concluded that nurses had moderate awareness of WRMSDs and recommended brief courses and retraining to enhance their knowledge and preventative practices.

Another study by Abbas et al. (2019), the relationship between nurses' knowledge of ergonomics, workplace conditions, and musculoskeletal disorders (MSDs) was examined among 260 nurses in Kashan, Iran. The study found that the nurses had a low level of ergonomic knowledge, with a mean score of 2.20 ± 0.68, and that their work environments were poorly ergonomically designed, with a mean score of 2.50 ± 0.76. Nearly 77% of the nurses reported MSDs, particularly in the neck (62.7%) and shoulders (49.2%). The study revealed an inverse relationship between MSDs and both ergonomic knowledge and workplace conditions, highlighting the need for improved training and adherence to ergonomic principles to reduce the prevalence of MSDs among nurses.

2.3.2 Empirical Review on WRMSDS among nurses

In a 2021 study by Krishnan et al., the prevalence and risk factors for musculoskeletal disorder (MSD) pain among nurses were examined. It was a cross-sectional investigation using a self-administered questionnaire with 300 nurses. The study found that 97.3% had experienced work-related pain in the previous year, with the lower back, ankles, neck, shoulders, lower legs, and

upper back being the most affected areas. Frequent pain was reported in most regions, while the neck and upper back had occasional discomfort indicating an occurrence of sprain and strain. Factors such as age, low education, female gender, high BMI, job tenure, and lifestyle were linked to a higher risk of MSD symptoms. The study emphasised the importance of addressing nurses' WRMSD complaints to reduce future risks.

Tariah et al. (2020) investigated the extent of WRMDs among nurses in the Kingdom of Saudi Arabia (KSA) was the aim of this study; investigating how Occupational therapist (OT) can help nurses become more conscious of and prevent WRMDs. A cross-sectional questionnaire methodology was used to carry out the study. The Nordic Musculoskeletal Questionnaire (NMQ) was used to gather data. The study's target population was the nurses at King Abdulaziz Medical City in Riyadh, Saudi Arabia. In all, 94 nurses took part in the research. The majority of them (63.8%) said that they had pain in their lower back over the past 12 months, with shoulders coming in second with 50% and the upper back with 48.9%. Out of the participants, 24 (25.5%) reported having low back pain. These same individuals also said that their level of work and leisure activity decreased due to their discomfort. WRMDs pose a serious risk to nurses. Occupational therapists are crucial to the preventative effort. Hospital management, rehabilitation departments, and nurses themselves should take action to address this worldwide issue. To reduce their risk of suffering from WRMDs, extra precautions should be taken to ensure that they operate in an ergonomically suitable setting and use good body mechanics.

Bediako et al. (2021) investigated that Nurses are at a higher risk of work-related musculoskeletal disorders (WRMSDs), particularly in poorer nations where assistive equipment to mitigate the negative effects of manual handling and improper patient lifting is limited. A cross-sectional study design was utilised to assess the prevalence of WRMSDs among nurses at Ghana's Ho Teaching

Hospital, using the Nordic musculoskeletal questionnaire. The results showed a 94% prevalence of WRMSDs, with females having a considerably higher prevalence (p=0.031) than males. Age and working hours had a significant association with MSDs (p=0.048 and p=0.001, respectively). The most common WRMSDs by body area were low back pain (73.3%), upper back pain (55.7%), ankle/foot pain (55.0%), and neck pain (35.5%).

In a study by Clari et al. (2021), the prevalence of work-related musculoskeletal disorders (WRMSDs) among perioperative nurses and their correlation with personal traits were assessed through a systematic review of 22 studies involving 3,590 nurses. The meta-analysis revealed that the lower back had the highest prevalence of WRMSDs (62%), followed by the knee, shoulder, waist, neck, and other body regions. However, age, sex, and BMI were not significant predictors of low-back problems. The study highlighted the frequent occurrence of WRMSDs among perioperative nurses and emphasised the need for targeted interventions like ergonomic education and physical therapy to reduce their impact.

2.3.3 Empirical Review on Coping Strategies for WRMSDs among Nurses

Manzoor et al. (2020) conducted research on Work Related Musculoskeletal Disorders (WRMSDs) And Their Coping Strategies Among Nurses of Services Hospital Lahore. This cross-sectional study included 200 nurses from the indoor departments of Services Hospital in Lahore. The study aimed to identify work-related factors of musculoskeletal disorders, the frequency of WMSDs, and the use of coping strategies to prevent WRMSDs. The Nordic Standardised Musculoskeletal Symptom Assessment was used to assess musculoskeletal symptoms over the previous year and week. One hundred ninety four (97%) of the nurses had WRMSDs once or more in the recent 12 months or last 7 days' time frame. The top two coping techniques were getting help with heavier patients (80.7%) and modifying nursing procedures to avoid re-injury (65.1%).

In conclusion one hundred and ninety-four (97%) of nurses experienced WRMSD, which primarily affected their lower back. The majority of nurses adopted two coping strategies: seeking aid with heavy patients and modifying care practices.

Kashif et al. (2022) carried out a study on health care workers in five hospitals in Faisalabad, Pakistan. The purpose of this research was to assess the prevalence of work-related musculoskeletal illnesses, related occupational risk factors, and coping mechanisms among healthcare workers employed by five hospitals in Faisalabad, Pakistan. Methods: Health workers employed in five hospitals in the Faisalabad District were surveyed using a previously used, validated questionnaire that had four sections: questions about occupational health, questions about demographics, and questions about related occupational risk factors and coping mechanisms. The results of this study showed that the prevalence rates of WRMSDs among HCWs at the 7-day and 12-month time points were 1226 (83.45%) and 1107 (75.35%), respectively. The most prevalent WRMSD among body sites was low back pain, which accounted for 576 (39.2%) cases, followed by neck 217 (15%) and ankles 186 (13%). Among those with rank 18 (OR = 4.17, 95% CI: 2.18-7.96), physiotherapists (OR = 3.63, 95% CI: 1.39-9.51), and healthcare workers employed in primary care (OR = 8.94, 95% CI: 3.47-23.04) had increased odds of acquiring WRMSDs. Treating too many patients in a single day was the most significant risk factor mentioned (66.8%). Getting assistance from a caregiver when managing a heavy patient was the most common coping strategy mentioned in this study (90%).

A study was conducted on the midwives by Dartey et al. (2024) in order to better understand work-related musculoskeletal diseases, predisposing variables, repercussions, and coping mechanisms to lessen the symptoms of these conditions, the study looked at the experiences of midwives at a few hospitals in the Ho municipality. Methods: This study used a phenomenological study design

in conjunction with a qualitative research approach. In order to choose participants for this study, purposeful sampling was used. Using a semi-structured interview guide, fifteen (15) midwives participated in an interview where data was gathered and recorded on voice recording devices. Thematic content analysis was used to assess the handwritten transcriptions of the data. The four themes that are beginning to emerge are: midwives' lived experiences with musculoskeletal diseases; predisposing variables that lead to musculoskeletal disorders; the effect of musculoskeletal disorders; and midwives' coping mechanisms. The musculoskeletal issues, onset, understaffing of midwives, awkward posture assumed during care delivery, inadequate logistics, struggle with quality of life, poor work performance, rest and excellent body mechanics, and teamwork were sub-themes that further enlarged these topics. The coping mechanism adopted by these midwives include adequate rest, good body mechanics, teamwork and self medication. In conclusion, midwives should be required to participate in educational programs on musculoskeletal disease prevention and coping methods in order to reduce the incidence of work-related musculoskeletal illnesses among them and to improve work efficiency and productivity.

Another study by Kum Meh et al. (2023) examined the prevalence and coping strategies for work-related musculoskeletal disorders (WRMSDs) among healthcare workers, specifically laboratory technicians (LTs) and nurses, in Douala, Cameroon. The cross-sectional study involved 250 distributed questionnaires, with a 62% response rate, leading to 155 participants (74 LTs and 81 nurses). The findings revealed a high overall prevalence of WRMSDs at 78.7%, with nurses experiencing a higher prevalence (90.1%) compared to LTs (66.2%). The most affected body regions were the lower back (29.6%) and upper neck (31.0%). A significant association was found between working more than eight hours a day and the occurrence of WRMSDs. Common coping strategies included regular exercise (74.2%), prayer and faith in God for healing (83.2%), using

painkillers (57.4%), and taking time off from work (52.3%). The study concluded that WRMSDs were prevalent among nurses and LTs, with long working hours, repetitive tasks, single shifts, and prolonged positions being key contributing factors.

2.4 SUMMARY OF RELATED LITERATURE REVIEW

Healthcare personnel, particularly nurses, face a high prevalence of work-related musculoskeletal disorders (WRMSDs), which cause significant physical and psychological distress. These disorders, which affect the musculoskeletal system including muscles, tendons, and nerves, result from repetitive strain and poor ergonomic practices at work. WRMSDs are common globally and are the second most frequent work-related health issue after respiratory diseases. At the Central Hospital of Harare, Zimbabwe, nearly 96% of nurses have experienced WRMSDs. These disorders are influenced by personal factors (age, BMI, pre-existing conditions), work-related factors (physical stress, repetitive tasks, shift patterns), and organisational factors (staffing levels, workload, and ergonomics).WRMSDs can manifest as muscle, tendon, or nerve injuries. Symptoms include pain, swelling, numbness, and reduced range of motion. They typically progress through stages from mild discomfort to severe pain and disability. Treatment options include rest, heat/cold application, exercise, medication, and sometimes surgery. Prevention and management strategies involve ergonomic training, use of assistive devices, job rotation, and stress management techniques. Common affected areas among nurses include the lower back, neck, shoulders, hands, wrists, feet, and ankles. Addressing these issues requires a multifaceted approach involving both individual and organisational changes to improve workplace ergonomics and support staff health.

Understanding work-related musculoskeletal disorders (WRMSDs) among nurses requires an integrative theoretical framework that incorporates occupational health, ergonomics, and stress theories. Ergonomics theory, which focuses on designing work environments and tasks to align with human capabilities and limitations, is crucial in this context. It emphasises adapting job design to fit the worker's physical and cognitive needs, thereby reducing risks of injuries such as musculoskeletal disorders. By optimising physical tasks, workspaces, and cognitive load, ergonomics aims to minimise strain and discomfort. This includes using assistive devices, promoting proper posture, and improving mental workload management to prevent WRMSDs among nurses who face physically demanding and repetitive tasks.

The empirical review highlights various studies on WRMSDs among nurses, revealing significant prevalence rates and identifying gaps in ergonomic knowledge and coping strategies. For instance, recent studies have shown high rates of musculoskeletal pain among nurses, particularly in the lower back and shoulders. The research underscores a need for improved ergonomic education and training to enhance awareness and preventive practices. Coping strategies such as seeking assistance with patient handling and modifying procedures are commonly employed, yet there's a call for better formal training and ergonomic improvements in work environments to mitigate the risks and enhance overall well-being in the nursing profession.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0. INTRODUCTION

This chapter outlines the research methodology used by the researcher to conduct the study. Research methodology refers to the steps, procedures, and strategies taken to investigate the problem being studied and to analyse the collected data. The various components of research methodology are discussed under their respective headings which include: research design, research setting, target population, sampling technique, instrument for data collection, pilot study and reliability test, validity of the instrument, data collection method, data analysis, ethical consideration

3.1 Research Design

This study has employed a descriptive cross-sectional research design to investigate work-related musculoskeletal disorders (WRMSDs) among nurses at the University of Benin Teaching Hospital (UBTH). A cross-sectional design was particularly suited for this research as it allowed for the collection and analysis of data from a specific population at a single point in time, facilitating the assessment of WRMSDs and associated factors without requiring a longitudinal study.

3.2 Research Setting

The setting that was used for this study is Benin City, Edo-State, Nigeria. Edo, sometimes referred to as Edo State, is a state in the Federal Republic of Nigeria's South-South geopolitical zone. The state has the 22nd highest population in Nigeria as of 2022. In 2022, the state is estimated to have 4,777,000 residents (NPC, 2022). Edo State has 34 State hospitals and 3 Federal health institutions. University of Benin Teaching Hospital (UBTH) will be sampled in this study.

UBTH is a prominent tertiary healthcare institution that serves as a referral center for various regions within and beyond Edo State. It is located in Benin City, Edo-State, Nigeria and was established on May 12th,1973. It has a bed capacity of over 900 and 36 departments and services. It is affiliated with the University of Benin. The hospital has multiple departments, including surgical wards, intensive care units, emergency services, and outpatient clinics, all of which are staffed by a diverse nursing workforce. The setting is relevant for this research as the hospital's high patient load and the physical demands on its nursing staff provide a critical context for studying the prevalence and impact of WRMSDs.

3.3 Target Population

This is the group of individuals that the researcher wants to generalise the findings of the study to. The target population for this study includes all registered nurses working at UBTH who have been employed for the past 12 months. This group comprises nurses from various departments, covering different specialties such as surgery, emergency care, intensive care, etc.

Table 3.1 Population of nursing staff in different specialty areas

Specialty Areas	Total number of nurses
Accident and Emergency Unit A	58
Accident and Emergency Unit B	56
Surgical Unit	72
Obstetrics and gynaecology	70
Medicine Unit A	52
Medicine Unit B	67
Theatre Complex	63
Pediatrics	53
Clinic Unit A	41
Clinic Unit B	33
Total	**565**

Determination of Sample

This was done using Taro Yamane (1967) formula which is stated as below:

$n = N/1 + N(e^2)$

Where:

n = the sample size

N = the population size (total number of nurses in UBTH)

e = the margin of error (commonly set at 0.05 for a 95% confidence level)

N = 565

e = 0.05

Thus, $n = 565/1+ 565(0.05^2)$

n= 565/1+ 565 (0.0025)

n= 234

Adding an attrition of 10%;

10% × 234.= 23.4

234 + 23.4= 257.4

~257

3.4 Sampling Technique

The study participants was chosen using a stratified random sampling technique. Initially, the nursing staff was categorised according to their departments to guarantee representation in all hospital units, including high-risk areas like the ICU and surgical wards. From each stratum, a random sample of nurses has been selected to participate in the study. This method was considered appropriate because it ensures that the sample is representative of the diverse nursing workforce at UBTH, thus enhancing the generalizability of the study findings. The specialty areas was treated as strata, and nurses was randomly selected from each stratum. In addition to this, proportionate sampling was used to get the number of nurses to be used in each ward

Table 3.2 Proportional Sampling Distribution of Nurses by Specialty Area

Specialty Areas	Total number of nurses	Proportion
Accident and Emergency Unit A	58	**10%**
Accident and Emergency Unit B	56	**10%**
Surgical Unit	72	**13%**
Obstetrics and gynaecology	70	**12%**
Medicine Unit A	52	**9%**
Medicine Unit B	67	**12%**
Theatre Complex	63	**11%**
Pediatrics	53	**9%**
Clinic Unit A	41	**7%**
Clinic Unit B	33	**6%**
Total	**565**	**100%**

3.4.1. Inclusion Criteria: This is the population that met the criteria to be subjects of the study and they include Registered nurses with a minimum of one year of work experience at UBTH, nurses with active employment and those available during the data collection period, nurses who voluntarily consented to participate in the study

3.4.2. Exclusion Criteria: These are the population that did not meet the criteria to be subjects of the study and they include nurses on extended leave (e.g., maternity, medical leave), those with non-work-related injuries that might influence their musculoskeletal health (e.g., recent traffic accidents or sports injuries), nurses not directly involved in patient care (e.g., educators, administrators), pregnant and postpartum nurses and those who are not willing to participate in the study.

3.5 Instrument for Data Collection

Data was collected using a self-structured questionnaire developed based on the study's objectives. The questionnaire was divided into four sections. Section A on Socio-Demographic and Work History Information which will gather data on participants' age, gender, years of experience, specialty area, and other relevant personal and professional characteristics, Section B on Knowledge of WRMSDs to assess the nurses' knowledge regarding the causes, symptoms, and prevention of WRMSDs, Section C on Identification of WRMSDs which included questions related to the types of musculoskeletal disorders experienced by the nurses, the frequency and severity of symptoms, and the impact on their work and Section D explored the various Coping Strategies used by the nurses to manage and cope with WRMSDs, including personal and institutional measures.

The questionnaire used a combination of Likert scales, multiple-choice questions, and open-ended questions to capture both quantitative and qualitative data.

3.6 Reliability of the Instrument

A pilot study was conducted with a small sample of 28 nurses who were not included in the final study. The purpose of the pilot study was to test the feasibility of the data collection process, identify any issues with the questionnaire items, and estimate the time required to complete the

questionnaires. Feedback from the pilot study participants was then used to refine the questions and improve the overall clarity and flow of the questionnaire.

A reliability test was conducted using Cronbach's alpha to assess the internal consistency of the questionnaires. A Cronbach's alpha coefficient of 0.70 or higher was considered acceptable for establishing the reliability of the instrument. The reliability test results were analysed to ensure that the questionnaire items consistently measure the same construct and produce stable and consistent results over repeated administrations.

3.7 Validity of Instruments

To ensure the validity of the instruments used in this study, the content validity of the questionnaires was established through expert review. The questionnaires were reviewed by a panel of experts in occupational health, ergonomics, and nursing to ensure that the questions adequately covered all relevant aspects of WRMSDs and ergonomic practices. The experts provided feedback on the clarity, relevance, and comprehensiveness of the items, leading to revisions where necessary to improve the instruments' validity. Additionally, construct validity was assessed by correlating the questionnaire outcomes with known indicators of WRMSDs, ensuring that the instruments accurately measured the intended constructs.

3.8 Method of Data Collection

Data was collected during a four week period. The questionnaires was distributed to the selected nurses during their shifts, after the introduction of the topic and participants had enough time to complete them. Research assistants was present to provide help and answer any questions, ensuring that participants completely comprehend the items. The completed questionnaires will be collected and securely stored for data input and analysis.

3.9 Method of Data Analysis

The data collected was entered into Statistical Package for Social Sciences (SPSS) software version 26 for analysis. Descriptive statistics, including frequencies, percentages, means, and standard deviations, was used to summarise the demographic characteristics of the respondents, the prevalence of WRMSDs, and the levels of ergonomic awareness and practice. Inferential statistics, such as Chi-square tests and Pearson's correlation coefficients, were also used to explore the relationships between demographic variables (e.g., age, gender, years of experience), ergonomic practices, and the prevalence of WRMSDs. A p-value of less than 0.05 was considered statistically significant, indicating a meaningful relationship between the variables.

3.10 Ethical Consideration

The study received ethical approval from the Ethics Committee of UBTH before data collection commenced and all participants were fully informed about the study's purpose, procedures, and potential risks and benefits. Written informed consent was also obtained from each participant, ensuring that participation was voluntary and that participants could withdraw from the study at any time without consequence. Confidentiality has been preserved by anonymizing the data, and only aggregated results were shared to protect participants' privacy. Throughout the research process, the study respected the ethical principles of beneficence, non-maleficence, autonomy, and justice. Plagiarism was also avoided by properly citing all authors both in the body of the paper and on the reference page. The study also evaluated ethical issues like debriefing, informed consent, and privacy. A copy of the ethical approval certificate is added to the appendix.

CHAPTER FOUR

DATA ANALYSIS, TESTING OF HYPOTHESIS AND ANSWERING OF RESEARCH QUESTIONS

4.0 Introduction

The data analysis, hypothesis testing and answering of the research questions were done in this chapter using responses obtained from the questionnaires administered to nurses working in selected wards at the University of Benin Teaching Hospital, Benin City, Edo State. A total of 257 questionnaires distributed to the respondents were duly filled and returned, this is 100% response rate.

4.1 Data Analysis

This data analysis is presented in this section such that the demographic variables were presented first before the research objectives were looked into, followed by the hypothesis testing.

4.2 Demography of Respondents

The demographic variables that pertained to this study and which the questionnaires assessed were age, level of education, marital status and years of experience. Table 4.1 shows the demographic distribution of the respondents with respect to the afore-listed demographic variables.

Table 4.1: Demographic Information of Respondents

S/N	Variables	Attributes	Frequency	Percent (%)
1.	Age	21-25 years	27	10.5
		26-30 years	50	19.5
		31-35 years	58	22.5
		36 – 40 years	52	20.2
		41 – 45 years	30	11.7
		46 – 50 years	20	07.8
		51 years and above	20	07.8
2.	Academic Qualification	RN	27	10.5
		RN & RM	50	19.5
		BNsc	100	38.9
		M.Nsc	70	27.2
		Phd	10	3.9
3.	Marital Status	Single	77	30
		Married	150	58.4
		Divorced	20	7.8
		Widowed	10	3.9
4.	Years of practice	1 – 5 years	50	19.5
		6 – 10 years	100	38.9
		11-15 years	70	27.2
		16-20 years	27	10.5
		20 years and above	10	3.9

Table 4.1 showed that 27 (10.5%) are between 21 and 25 years old, 50 (19.5%) are between 26 and 30 years old, 58 (22.5%) are between 31 and 35 years old while 20 (7.8%) of the respondents are 51 years and above. In terms of academic qualification, 27 (10.5%) of the respondents had RN, 50 (19.5%) had RN & RM, 100 (38.9%) had BNsc, 70 (27.2%) had M.NSc while 10(3.9%) had Phd. The marital status of the respondents showed that 77 (30%) of the respondents are single, 150 (58.4%) are married while 20 (7.8%) are divorced and 10(3.9%) are widowed. The distribution of the respondents in terms of years of practice showed that 50 (19.5%) have practiced for 1-5 years, 100 (38.9%) have practiced for 6-10 years, 70(27.2%) have practiced for 11-15 years, 27(10.5%) have practiced for 16-20 years while 10 (3.9%) have practiced for 20 years and above.

4.3 Analysis of Study Objectives

Knowledge of Work Related Musculoskeletal Disorders among Nurses in UBTH

Tables 4.3 contain responses from respondents as regards their knowledge of Work Related Musculoskeletal Disorders among Nurses in UBTH.

Table 4.2: Respondents' level of knowledge

S/N	ITEMS	CORRECT RESPONSE	INCORRECT RESPONSE
		F (%)	F (%)
1	What is a Work-Related Musculoskeletal Disorder (WRMSD)?	206 (80.2%)	51 (19.8%)
2	What is the primary cause of WRMSDs?	156 (60.7%)	101 (39.3%)
3	Which of the following is a common WRMSD affecting the upper limb?	200 (77.8%)	57 (22.2%)
4	Which of the following is a symptom of WRMSDs?	210 (81.7%)	47 (18.3%)
5	What is the term for a condition causing pain and numbness in the hand and wrist?	198 (77%)	59 (23%)
6	Which of the following can help prevent WRMSDs?	180 (70%)	77 (30%)
	Mean	191 (74.3%)	66 (25.7%)

As can be seen in table 4.2 above, the majority 206 (80.2%) of the respondents gave the correct definition of WRMSD while 51 (19.8%) of the respondents gave the wrong definition of WRMSD. Response to item 2 showed that 156 (60.7%) of the respondents know the primary cause of WRMSD while 101 (39.3%) indicated otherwise. Majority of the respondents representing 200 (77.8%) reported that carpal tunnel syndrome and tendonitis as common WRMSD affecting the upper limb while 57 (22.2%) reported otherwise. In the same way, the majority of the respondents reported correct responses to items 4, 5 and 6 in table 4.2 while only a few had incorrect responses. The mean percentage of correctly answered items by the respondents as computed in table 4.2 was 191 (74.3%) and that of incorrectly answered questions was found to be 66 (25.7%). Comparing the mean percentages with the McDonald's standard of learning outcome measure criteria

Level of Knowledge	composite of scores (%)
Very low	< 60%
Low	60 – 69.99%
Moderate	70 – 79.99%
High	80 – 89.99%
Very high	90 – 100%

Therefore, the result, 74.3% of the respondents exhibiting correct knowledge of WRMSD in comparison with the McDonald's scale indicates a moderate level of knowledge regarding WRMSD. Therefore, the respondents can be said to have a moderate level knowledge of WRMSD.

Identification of Work Related Musculoskeletal Disorders among Nurses in UBTH

Tables 4.3 contain responses from respondents as regards identification of Work Related Musculoskeletal Disorders among Nurses in UBTH.

Table 4.3: Identification of WRMSDs

Identification variables	Responses
In which areas do you most frequently experience discomfort?	
Neck	10(3.9%)
Shoulders	40(15.6%)
Upper back	68(26.5%)
Lower back	80(31.1%)
Wrists/Hands	19(7.4%)
Hips/Thigh	30(11.7%)
Ankles/Feet	10(3.9%)
Have you experienced any of the following musculoskeletal disorders in the past year?	
Back pain	100(38.9%)
Neck pain	10(3.9%)
Shoulder pain	20(7.8%)
Elbow pain	10(3.9%)
Wrist pain	10(3.9%)
Hand pain	10(3.9%)
Hip pain	50(19.5%)
Knee pain	27(10.5%)
Ankle pain	20(7.8%)
How often do you experience symptoms related to the musculoskeletal disorders listed below	
Daily	160(62.3%)
Weekly	50(19.5%)
Monthly	37(!4.4%)
Occasionally (less than once a month)	10(7.8%)

Table 4.3 showed the identification of WRMSD among nurses. Most 80(31.1%) of the respondents experienced lower back pain, 68(26.5%) experienced upper back pain, 40(15.6%) experienced shoulder pain, 30(11.7%) experienced hips/thigh pain, 10(3.9%) experienced neck pain while 10(3.9%) experienced ankles/feet pain. Generally, the most common WRMSD

experienced by nurses is back pain. On the WRMSD experienced by respondents in the past year, most 100(38.9%) experienced back pain, 50(19.5%) experienced hip pain, 27(10.5%) experienced knee pain, 20(7.8%) experienced ankle pain, 20(7.8%) experienced shoulder pain, 10(3.9%) experienced neck pain, 10(3.9%) experienced elbow pain, 10(3.9%) experienced wrist pain while 10(3.9%) experienced hand pain. Majority 160(62.3%) of the respondents experienced WRMSD daily, 50(19.5%) experienced it weekly, 37(14.4%) experienced monthly while 10(3.9%) experienced it occasionally

Table 4.4: Coping Strategies for WRMSD

S/N	ITEMS	SA	A	D	SD	Mean
1	I use ergonomic equipments (e.g chairs, keyboard)	15 5.8%	31 12.1%	196 76.3%	15 5.8%	2.43
2	I take regular breaks during work shifts.	200 77.8%	40 15.6%	10 3.9%	7 2.7%	2.67
3	I perform stretching exercises before/after shifts.	20 7.8%	30 11.7%	187 72.8%	20 7.8%	2.30
4	I seek medical treatment for musculoskeletal pain.	196 76.3%	31 12.1%	15 5.8%	15 5.8%	3.60
5	I use pain relief medications.	187 72.8%	30 11.7%	20 7.8%	20 7.8%	3.50
6	I modify work techniques to reduce physical strain.	200 77.8%	40 15.6%	10 3.9%	7 2.7%	2.67
7	I wear supportive footwear.	187 72.8%	20 7.8%	30 11.7%	20 7.8%	2.65
8	I utilize assistive devices (e.g patient lifting aids)	31 12.1%	15 5.8%	196 76.3%	15 5.8%	2.43

Table 4.4 above contains respondents' coping strategies for WRMSD. From item 1 in table 4.4 above, 196 (76.3%) of the respondents strongly disagreed that they use ergonomic equipment, 15(5.8%) disagreed, 31(12.1%) agreed while 15(5.8%) strongly agreed. The mean response of the

respondents to item 1 is 2.43 which is less than the average of 2.50 for a 4-point Likert scale, hence indicating the respondents generally disagree with item 1 which states "I use ergonomic equipment". In the same way, the mean responses from the respondents as regards to items3 and 8 in table 4.4 were found to be less than 2.50, thus suggesting that the respondents generally disagreed with the items in the table. The mean responses to items 2,4.5,6 and 7 in table 4.4 were found to be more than 2.50, thus suggesting that the respondents generally agreed with the items. Thus, the coping strategies used by the respondents are regular breaks during work shifts, medical treatment for musculoskeletal pain, pain relief medications, modification of work techniques and the use of supportive footwears.

4.4 Test of Hypothesis

The researcher used analysis of Chi-square statistics to test the stated hypothesis at a significance level of 0.05. The decision rule was based on the p-value that is associated with the chi-square test. Thus, if the p-value is less than 0.05 (significance level), accept the null hypothesis (H_0) but if the p-value is greater than 0.05, reject H_0.

The following hypothesis was tested using Chi-square statistics:

H_0: There is no significant relationship between knowledge of WRMSDs among nurses and their years of practice.

H_1: There is a significant relationship between knowledge of WRMSDs among nurses and their years of practice

Table 4.5: Showing the relationship between the knowledge of WRMSDs among nurses and their years of practice.

		Knowledge of Nurses		**Chi-square value (χ^2)**	**p-value**
		Positive	Negative		
1	Years of practice			21.521	0.100
	Less than 10 years	196	71		
	10 years and above	200	57		

The result of the hypothesis testing revealed that the p-value associated with the test is more than 0.05 (significant level), hence the rejection of the null hypothesis. We therefore conclude that there is a significant relationship between the knowledge of WRMSD among nurses in UBTH, Benin city and their years of practice.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter provides the discussion of findings, implications for nursing, summary, conclusion, recommendation, and suggestion for further studies.

5.1 Discussion of findings

Level of knowledge of WRMSD among nurses in UBTH.

Study findings in respect to objective one revealed that the majority 74.3% of the respondents exhibited correct knowledge of WRMSD. Hence, the respondents have moderate knowledge of WRMSD. In line with the findings of this study, an earlier study done by Attia et al., (2023) revealed that nurses had fair knowledge of WRMSD. Abbas et al, (2019) in their study also revealed that nurses have adequate knowledge of WRMSD. This is in contrast with a study by Oletunde et al., (2021) which revealed that nurses had poor knowledge of WRMSD.

Identification of WRMSD among Nurses

Study findings in respect to objective two revealed that the respondents identified back pain as the WRMSD commonly experienced by nurses. In line with the findings of this study, Krishnan et al., (2021) in his study revealed that nurses reported back pain as the common WRMSD they experienced. This is also supported by Taraih et al, (2020) which revealed that nurses equally experience back pain. In line with the findings of this study, Bediako et al, (2021) reported that nurses experience back pain.

Coping Strategies of WRMSD among Nurses

Study findings in respect to objective three revealed that regular breaks during work shifts, medical treatment for musculoskeletal pain, pain relief medications, modification of work techniques and the use of supportive footwears are the coping strategies used by nurses in UBTH. This is in line

with a study by Manzoor et al., (2021) which revealed that modifying care practices are the coping strategies used by nurses. This is also in contrast with a study by Kashif et al., (2020) which revealed that getting assistance with heavy patients is the coping strategy used by nurses.

There is no significant relationship between knowledge of WRMSDs among nurses and their years of practice.

The findings from this study revealed that there is a significant relationship between the knowledge of WRMSD among nurses in UBTH, Benin city and their years of practice. This is supported by Oletunde et al., (2021) which reported a significant relationship between knowledge of WRMSD among nurses in UBTH, Benin city and their years of practice. This means that as the years of practice increases, level of knowledge equally increases.

5.2 Limitations of the study

The limitations of the study include:

1. Unwillingness of respondents to give relevant information.
2. Inadequate finance for the researcher to carry out an extensive research on the problem of study.
3. Shortage of time for the researcher to carry out an extensive research on the problem of study.

5.3 Implications for Nursing

To Nursing Practice: This research will provide insights into the WRMSDs, enabling nurses to take proactive measures to prevent injuries and improve their overall well-being. It will inform the development of evidence-based guidelines for safe patient handling and movement, reducing the risk of WRMSDs.

To Nursing Education: This will highlight the need for inclusion of WRMSD prevention and management in nursing curricula, ensuring that future nurses are equipped with the knowledge and skills to prioritise their own safety and well-being.

To Nursing Research: It will contribute to the body of knowledge on WRMSDs in nursing, providing valuable insights for future research and informing the development of interventions to address this critical issue.

5.4 Summary

This study assessed work-related musculoskeletal disorders (WRMSDs) among nurses in a Tertiary Health Facility in Benin City, Edo-State. A descriptive survey design was adopted in this study and the study's population comprised of 257 nurses across selected wards in UBTH. Proportionate sampling technique was used. A self-structured questionnaire was used to get data from the respondents which was validated by the researcher's supervisor and yielded a reliability score of 0.81 during the pilot study. Descriptive statistics such as frequencies, percentage and means were used to analyze the data obtained while Chi-square statistics was used to test the stated hypotheses of the study. The major findings in this study are:

There is a moderate level of knowledge of WRMSD among nurses in UBTH.

Back pain is the most common WRMSD among nurses.

Regular breaks during work shifts, medical treatment for musculoskeletal pain, pain relief medications, modification of work techniques and the use of supportive footwears are the coping strategies used by nurses in UBTH.

5.5 Conclusion

This study sheds light on the assessed work-related musculoskeletal disorders (WRMSDs) among nurses in a Tertiary Health Facility in Benin City, Edo-State. Nursing care is one of the major health care services that contribute significantly to the patient healing process. This study found that nurses in UBTH have moderate knowledge of WRMSD. This study thus concluded that there is a fair knowledge, back pain is the most common WRMSD among nurses and regular breaks during work shifts, medical treatment for musculoskeletal pain, pain relief medications, modification of work techniques and the use of supportive footwears are the coping strategies used by nurses in UBTH.

5.6 Recommendations

Based on the findings and conclusion, the following recommendations are suggested:

Hospitals should perform periodic surveys on patients' needs, expectations and hospital so as to design the nursing care accordingly.

Nurses should be provided with in-service, in-house and on-the-job training in the fields of “WRMSD” and “coping strategies”, and those necessary arrangements be made accordingly.

5.7 Suggestion for Further Studies

It would be worthwhile to replicate this study using a larger sample including nurses from other hospitals in other states, particularly rural areas where there is limited availability of health institutions. This will broaden the overall understanding of the phenomena.

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APPENDIX
QUESTIONNAIRE

Department of Nursing Science,

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University of Benin, Benin City, Edo

State.

Dear Respondents,

This questionnaire will be used for a study on work related musculoskeletal disorders (WRMSDS) amongst nurses in University of Benin Teaching Hospital, being carried out by me an undergraduate student in the Department of Nursing Science, of the above named institution as part of the requirement for the completion of a Bachelor's Degree in Nursing Science. The participation in this study is voluntary, and all ethical considerations are strongly adhered to. Your assistance in completing this questionnaire would be greatly appreciated.

Kindly and sincerely provide answers to the questions in the spaces provided. Every information provided is highly confidential and strictly for academic purposes. No names are required. You may decide to answer questions that best suit your understanding and for accuracy in statistics please be as independent and truthful as possible.

Yours

Sincerely,

SECTION A: Socio-demographic & Work history

Instructions: Please fill out the following sections, tick ✔ in the boxes as it applies to you.

1. Age: [ ] 21-25 years [ ] 26-30 years [ ] 31-35 years [ ] 36-40 years [ ] 41-45 years [ ]46-50 years [ ] 51 years and above
2. Gender: [ ] Male [ ] Female [ ] Other
3. Marital Status: [ ] Single [ ] Married [ ] Divorced [ ] Widowed
4. Educational Qualification: [ ] Diploma in Nursing [ ] Bachelor's Degree in Nursing [ ] Master's Degree in Nursing [ ] Doctorate in Nursing [ ] Other (Please specify): _____
5. Years of Experience as a Nurse: [ ] 1-5 years [ ] 6-10 years [ ] 11-15 years [ ] 16-20 years [ ] Over 20 years

SECTION B: KNOWLEDGE OF WORK-RELATED MUSCULOSKELETAL DISORDERS

Instructions: Answer the following questions by choosing the right options

1. What is a Work-Related Musculoskeletal Disorder (WRMSD)? a) An injury caused by exposure to hazardous chemicals b) A condition resulting from repetitive strain or ergonomic issues in the workplace c) A mental health disorder triggered by workplace stress d) An infection acquired from workplace environments
2. What is the primary cause of WRMSDs? a) Poor posture b) Repetitive movements c) Heavy lifting d) All of the above
3. Which of the following is a common WRMSD affecting the upper limb? a) Carpal tunnel syndrome b) Tendinitis c) Bursitis d) All of the above

4. Which of the following is a symptom of WRMSDs? a) Pain b) Fatigue c) Numbness d) All of the above
5. What is the term for a condition causing pain and numbness in the hand and wrist? a) Carpal tunnel syndrome b) Tendinitis c) Bursitis d) Ganglion cyst
6. Which of the following can help prevent WRMSDs? a) Regular exercise b) Proper lifting techniques c) Taking regular breaks d) All of the above

SECTION C: IDENTIFICATION OF WRMSDS

Instructions: Please indicate if you have experienced any of the following symptoms or conditions related to WRMSDs in the past 12 months.

1. In which areas do you most frequently experience discomfort? (Select all that apply) [ ] Neck [ ] Shoulders [ ] Upper Back [ ] Lower Back [ ] Wrists/Hands [ ] Hips/Thighs [ ] Knees [ ] Ankles/Feet [ ] Other (Please specify): _____
2. Have you experienced any of the following musculoskeletal disorders in the past year? (Select all that apply) [ ]Back pain [ ]Neck pain [ ]Shoulder pain [ ]Elbow pain [ ]Wrist pain [ ]Hand pain [ ]Hip pain [ ]Knee pain [ ]Ankle pain [ ]Other (please specify): _____
3. How often do you experience symptoms related to the musculoskeletal disorders listed above? [ ] Daily [ ] Weekly [ ]Monthly [ ]Occasionally (less than once a month) [ ]Rarely

SECTION D: COPING STRATEGIES FOR WRMSDS

Instructions: Please indicate h you use the following coping strategies to manage WRMSDs

Coping Strategies	Never	Rarely	Occasionally	Frequently	Always
Using ergonomic equipment (e.g., chairs, keyboards)					
Taking regular breaks during work shifts					
Performing stretching exercises before/after shifts					
Seeking medical treatment for musculoskeletal pain					
Using pain relief medications					
Attending workplace health and safety training programs					
Modifying work techniques to reduce physical strain					
Wearing supportive footwear					
Utilizing assistive devices (e.g., patient lifting aids)					