

**BARRIERS AND FACILITATORS TO ACCESSING
ORTHOPAEDIC PHYSIOTHERAPY SERVICES AMONG
MARKET WOMEN WITH MUSCULOSKELETAL DISORDERS
IN OREDO LGA, BENIN CITY, EDO STATE, NIGERIA.**

BY

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CERTIFICATION

This dissertation by Ogu Ijeoma Lilian is accepted in its presented form as satisfying the dissertation requirement of the degree of Bachelor of Physiotherapy of the School of Basic Medical Sciences, College of Medical Sciences of the University of Benin.

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DEDICATION

This dissertation is first and foremost dedicated to God, whose underserved kindness, wisdom, and guidance have been my anchor throughout this journey. I also dedicate it to my father, Mr. Joseph Nnanna Ogu, whose love, support and prayers continue to inspire me, and to my late mother, Mrs. Mary Uchechi Ogu, whose genuine concern for my dreams and constant encouragement when she was alive remain forever in my heart.

ABSTRACT

Background: Musculoskeletal disorders (MSDs) are a leading cause of disability, particularly among individuals in physically demanding occupations like market trading. Market women in Oredo Local Government Area (LGA), Benin City, are exposed to risk factors such as prolonged standing and heavy lifting, yet many do not access orthopaedic physiotherapy services. This study aimed to investigate the barriers and facilitators influencing their access to these essential services.

Methods: A cross-sectional analytical study was conducted among 374 market women selected via convenience sampling from markets in Oredo LGA. Data were collected using a structured, self-administered questionnaire. Analysis involved descriptive statistics (frequencies, percentages) and inferential statistics (Pearson correlation), with the significance level set at $p < 0.05$.

Results: The study found a high prevalence of MSDs among respondents, with low back pain (80.5%), general body pain (80.7%), and joint pain (79.7%) being the most common. Key barriers to accessing physiotherapy included long waiting times (70.1%), distance to clinics (56.2%), and lack of awareness (53.4%). Major facilitators were affordability (81.3%), proximity of services (79.1%), and positive social testimonials (77.6%). Socio-demographic factors such as education and awareness significantly influenced service utilization, while income and marital status had less impact.

Conclusion: Market women in Oredo LGA experience a high burden of MSDs, but their access to physiotherapy is hampered primarily by systemic and informational barriers. To improve utilization, community-based awareness campaigns, mobile clinics, and strategies enhancing affordability and proximity are recommended.

Keywords: Musculoskeletal Disorders, Market Women, Physiotherapy, Barriers, Facilitators, Access to Healthcare, Nigeria.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Musculoskeletal disorders (MSDs) is a term used to describe a wide range of injuries to the tendons, ligaments, nerves and supporting structures (Nunes, 2020). It is known for being one of the most prevalent and most expensive occupational health problems in both developed and developing countries (Erick et al., 2011). Musculoskeletal disorders (MSDs) are the major cause of pain, impairment, reduced functional outcome, and heavy financial costs among individuals worldwide (Tabiti et al., 2024). Musculoskeletal conditions can impair people's ability to perform physical activity as they age (McPhail et al., 2014). MSDs exert dangerous effects on the life of individuals in all fields, especially those requiring manual labor (Njaka et al., 2021).

Studies have also shown that MSDs make up 39% of all work-related health burdens on the employees, which leads to loss of body parts and time, low productivity, change of career, and total or partial dependence on the society (Bao et al., 2020). The current prevalence and distribution of MSDs are widespread in many countries, generating substantial costs in terms of lost workdays, medical expenses, and impact on health-related quality of life (GBD 2019). Additionally, in low- and middle-income countries, they account for 19% of all disability adjusted life years lost due to disability (Vos et al., 2019)

Several conducted studies highlight that carrying heavy loads on a daily basis on the head can cause MSDs, which is harmful to the spinal health of the carrier. This is because it exerts pressure on the axial skeleton. Poor work posture was one of the major causes of work-related

pain and it is important to note that repeated actions that come with the execution of a task lead to a compiled workload that could be considered the cause of muscle pain and weakness (Lee et al., 2023)

Studies have identified numerous risk factors and patterns for developing MSDs. In a study by Hoy et al., (2014), aging, lower educational standards, and the presence of other diseases were reported to be strongly linked with an increased risk of developing MSDs. Other commonly reported factors associated with the rise in incidence and prevalence of MSDs among workers include awkward working postures, frequent use of body parts, prolonged standing, poor lifting techniques, and the absence of effective work injury prevention programs (Davis et al., 2015). Previous studies on MSDs have indicated that lower back, neck, shoulder, forearm, and hand are the most common body parts that are affected by MSDs (Tian et al., 2020) The observed pattern of MSDs among agricultural service workers constantly occurs in the low back; nevertheless, they are often more generalized in nature (Kowalska et al., 2019). Furthermore, the European Agency for Safety and Health at Work has reported that in the European Union, the relative prevalence rate of MSDs is highest among service workers, and shop and market sales employees (Eu- Osha et al., 2020). Additionally, working for a long time in a sitting position or maintaining a static posture for a prolonged period has been identified as one of the major causes of work-related diseases (Santos et al., 2021). Also, previous studies have indicated that constant sitting affects mostly the neck and lower back region (D' Angelo et al., 2020).

Risk factors often known for musculoskeletal disorders in the workplace include high hand exertions, continuous impact on the hand and wrist, bad postures, long standing and sitting hours, poor lifting or carrying techniques. Repetitive movements are especially harmful when they

involve the same joints and muscle groups over and over and when the same motion is done too often, too quickly and for too long.

The demand for musculoskeletal (MSK) care is increasing, and is a growing challenge for general practice. Direct access to physiotherapy and other healthcare services may provide appropriate care for MSK pain patients (Babatunde et al., 2020). Physical therapists are key professionals in the management of musculoskeletal conditions, which are common in rural and remote communities (Grona et al., 2018). Pain and difficulty with movement are two likely contributors to reduced participation in exercise (McPhail et al., 2014).

Non-specific low back pain is a common musculoskeletal condition that often requires the involvement of physiotherapists for effective management (Shah et al., 2023). Physiotherapists support people with LBP to improve strength and function, whereas the specialist physiotherapist's role was seen as more holistic (Boyle et al., 2024).

While patients with MSDs will likely benefit from physical activity appropriate for their condition, they are also likely to face additional barriers to becoming physically active compared to those without musculoskeletal dysfunction.

Multiple barriers to implementation have been suggested as for example insufficient time for health care professionals to address fall prevention in the context of competing demands and a focus on diagnosis and treatment of specific diseases (Frisendahl et al., 2025). Barriers to health are factors that prevent an individual, population, and community from acquiring access to health services and achieving best health and it include high cost of care, inadequate or no insurance coverage, lack of availability of services, and lack of culturally competent care.

1.2 Statement of the Problem

Musculoskeletal disorders (MSDs) are a leading cause of disability and reduced productivity worldwide, particularly among individuals engaged in physically demanding occupations. Market women in Oredo Local Government Area (LGA) of Edo State are frequently exposed to risk factors such as prolonged standing, heavy lifting, and poor ergonomics, making them vulnerable to various MSDs. Despite the proven effectiveness of orthopedic physiotherapy in managing and alleviating the symptoms of MSDs, many affected individuals in this population do not access these services. Observations and reports suggest that several barriers—such as financial constraints, lack of awareness, cultural beliefs, and limited availability of services—may hinder market women from utilizing orthopedic physiotherapy services. Certain facilitators, including community support and access to subsidized care, may improve utilization.

However, there is a limited amount of empirical data on the specific barriers and facilitators influencing access to orthopedic physiotherapy services among this population in Oredo LGA. This gap in knowledge limits the ability of policymakers and healthcare providers to design targeted interventions aimed at improving musculoskeletal health outcomes for market women. Therefore, this study seeks to identify and analyze the key barriers and facilitators affecting access to orthopedic physiotherapy services among market women with MSDs in Oredo LGA.

1.3 Research Questions

- I. What are the common musculoskeletal disorders experienced by market women in Oredo LGA, Benin City?

- II. What barriers hinder market women with musculoskeletal disorders from accessing orthopaedic physiotherapy services in Oredo LGA?
- III. What factors facilitate market women's access to orthopaedic physiotherapy services in Oredo LGA?
- IV. How do socio-demographic characteristics (such as age, education, income level, and marital status) influence the utilization of orthopaedic physiotherapy services among market women in Oredo LGA?
- V. What strategies can be employed to improve accessibility and utilization of orthopaedic physiotherapy services among market women with musculoskeletal disorders in Oredo LGA?

1.4 Aim of the Study

The aim of this study is to investigate the barriers and facilitators influencing access to orthopedic physiotherapy services among market women with MSDs in Oredo Local Government Area of Edo State. This research aims to know the extent to which socioeconomic, cultural, informational, and systemic factors affect the ability of these women to assess physiotherapy services. By identifying the specific challenges that hinder access and the enabling factors that promote service utilization, the study aims to generate evidence-based insights that can inform the development of targeted interventions and policies to improve healthcare accessibility and musculoskeletal health outcomes for market women in this region.

1.5 Specific Objectives

- I. To identify the common musculoskeletal disorders experienced by market women in Oredo LGA, Benin City.

- II. To examine the barriers hindering market women with musculoskeletal disorders from accessing orthopaedic physiotherapy services in Oredo LGA.
- III. To explore the factors that facilitate access to orthopaedic physiotherapy services among market women in Oredo LGA.
- IV. To determine the influence of socio-demographic characteristics (such as age, education, income level, and marital status) on the utilization of orthopaedic physiotherapy services among market women in Oredo LGA.
- V. To suggest strategies that can improve accessibility and utilization of orthopaedic physiotherapy services among market women with musculoskeletal disorders in Oredo LGA.

1.6 Hypothesis

There is a significant relationship between individual, socioeconomic, cultural, and systemic factors and the level of access to orthopedic physiotherapy services among market women with musculoskeletal disorders in Oredo Local Government Area of Edo State, Nigeria.

1.7 Significance/Justification of the Study

This study is significant as it addresses the critical public health burden of musculoskeletal disorders among market women in Oredo LGA, a population highly vulnerable due to their physically demanding occupation. By identifying the specific barriers and facilitators that influence their access to orthopaedic physiotherapy, the findings will provide essential evidence to inform healthcare providers in designing more responsive, inclusive services and guide policymakers and public health planners in developing targeted interventions, such as community outreach programs and financial support mechanisms. Ultimately, this research aims

to foster practical strategies that improve healthcare accessibility, enhance musculoskeletal health outcomes, and promote the occupational well-being and productivity of this essential workforce.

1.8 Scope and Delimitation

The scope of this study is limited to investigating the barriers and facilitators to accessing orthopaedic physiotherapy services among market women with musculoskeletal disorders in selected markets within Oredo LGA, Benin City. Its delimitations include a reliance on self-reported data from a female-only population, which may limit the generalizability of the findings to other regions or demographic groups.

1.9 Limitations

A key limitation of this study is that the data relied solely on self-reported responses from market women, which may have introduced recall bias or social desirability bias, as some participants might have underreported or overreported their experiences with musculoskeletal disorders and access to physiotherapy services. Additionally, the study was conducted within Oredo LGA alone, which may limit the generalizability of the findings to other local government areas or regions with different socio-economic or cultural contexts. The cross-sectional design also restricts the ability to establish causal relationships between socio-demographic factors, barriers, and the utilization of physiotherapy services. Furthermore, the absence of quality time for clinical assessments to validate the reported musculoskeletal disorders may reduce the accuracy of the prevalence estimates. Despite these limitations, the study provides valuable insights into the challenges and facilitators of accessing physiotherapy services among market women.

1.10 Definition of Terms/Operational definition of terms

Barriers: Things that hinder or interfere with the completion of a task or interaction

Facilitators: physical items or mechanisms that aid the progress or success of a task or interaction.

Musculoskeletal disorders: Health problems of the locomotor apparatus (muscles, tendons, skeleton, cartilage, and ligaments), they include conditions that arise suddenly and are short lived and also conditions associated with ongoing pain and disability” (WHO, 2019). It includes conditions such as scoliosis, lordosis, kyphosis, low back pain, shoulder pain and neck pain.

Low back pain: pain and discomfort below the 12th costal margin and above the inferior gluteal fold, with or without radiating symptoms to the lower limbs. (WHO 2013).

Scoliosis: abnormal lateral curvature of the spine

Lordosis: increased inward curving of the lumbar spine

Kyphosis: excessive outward curvature of the thoracic region of the spine

Shoulder pain: pain or discomfort felt in the region of the glenohumeral joint

Range of motion: the degree or amount of movement that is achievable at a joint.

1.1 List of Abbreviations

MSDs Musculoskeletal disorders

LBP Low back pain

VAS Visual Analogue Scale

ODI	Oswestry Disability Index
NDI	Neck Disability Index
MRI	Magnetic Resonance Imaging
CT	Computerized Tomography
SRS	Scoliosis Research Society

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Musculoskeletal Disorders are defined as health problems of the locomotor apparatus (tendons, muscles, ligaments, cartilage, and skeletons), they include conditions that arise suddenly and are short lived and also conditions associated with ongoing pain and disability” (World Health Organization, 2019). Musculoskeletal disorders include conditions such as low back pain, genu valgum, dropped shoulder, scoliosis, lordosis, kyphosis, pes planus and other regional pain syndromes (Olayinka et al, 2009). Musculoskeletal disorders involve inflammatory and degenerative conditions that affect various structures in the muscular and skeletal system: tendons, ligaments, joints and peripheral nerves, this results In a wide range of conditions that involve the upper limbs, lower limbs and also the back (Punnett & Wegman, 2004).

Among the various musculoskeletal disorders, low back pain is a very common condition, affecting approximately 38.9% of the global population (Hoy et al, 2012). Low back pain is defined as pain below the 12th costal margin and above the inferior gluteal fold, with or without radiating symptoms to the lower limbs (World Health Organization, 2013).

Depending on the duration of the pain, low back pain can be classified into acute (pain lasting for less than 6 weeks), subacute (pain lasting between 7 and 12 weeks) and chronic low back pain, (more than 3 months), (Koes et al, 2010). Other common among musculoskeletal symptoms specific to the back, include scoliosis, kyphosis and lordosis.

Kyphosis (hyper kyphosis) is the excessive posterior curvature of the vertebrae of the thoracic region, and/or the flattening of the cervical and lumbar curvature, with a cobb angle of 50° or

more in a standing position (Koelé et al, 2020). Kyphosis on visual inspection presents with an abnormally rounded back. Like scoliosis, kyphosis can also be of two types, postural and structural. Postural kyphosis occurs secondary to a condition outside the vertebrae, such as flat feet and increased lumbosacral lordosis (Solomon et al, 2010). Structural kyphosis involves changes in the vertebral bodies, which can be congenital or as a result of disease conditions and infections (Solomon et al, 2010). Kyphosis can be as a result of trauma, degenerative disc disease, infectious diseases and can also be of congenital origin (Solomon et al, 2010).

Lordosis (hyper lordosis), is the excessive inward curvature of the vertebral column, commonly occurring at the lumbar region (Moore et al, 2013). The normal human spine possesses a lordotic curve in the lumbar region, developing from childhood through to puberty (Been & Kalichman, 2014). Hyper lordosis can occur as a result of weak abdominal and hip muscles, it can also occur as a secondary complication to hyper kyphosis in the thoracic vertebrae (Been & Kalichman, 2014). A study reported that the female lumbar spine has a greater degree of lordotic curve than that of the male, and associated this difference to be an effect of pregnancy on the lumbar spine (Hay et al 2015).

Scoliosis is defined as an abnormal lateral curvature of the spine (American Association of Neurological Surgeons). There are two classifications of scoliosis, structural and postural scoliosis (Solomon et al, 2010). Postural scoliosis occurs secondary to a disease or deformity outside of the spine, such as limb length discrepancy or joint contractures, especially along the lower extremity joints. Postural scoliosis is often corrected by a change in position (Goodman & Fuller, 2009). Structural scoliosis involves s affectation of the vertebral bodies and is associated with vertebral rotation and damages to the ligamentous structure that support the vertebrae. Structural scoliosis is often of idiopathic origin, but can also be of congenital origin or as a result

of musculoskeletal infections/diseases, such as tuberculosis of the spine and osteoporosis (Goodman & Fuller, 2009).

Neck Pain can either be non-specific neck pain or as a result of whiplash injury, common during road traffic accidents. Non-specific neck pain is described as neck pain that occurs as a result of postural or mechanical complications (Binder, 2008). Factors associated with neck pain include trauma to the cervical region (whiplash injury), cervical spondylosis, posture maintained while sitting or in the workplace, anxiety, depression, neck strain and sporting injuries (Binder, 2008).

Shoulder Pain is another common musculoskeletal disorder, it describes pain around the glenohumeral, acromioclavicular and sternoclavicular joints and also within the associated soft tissues (Murphy & Carr, 2010). Shoulder pain can occur as a result of pathologies such as frozen shoulder, instability of the glenohumeral and acromioclavicular joints, trauma to the associated soft tissues as well as poor posture and muscle imbalance (Murphy & Carr, 2010).

2.2 Epidemiology

Musculoskeletal disorders are a common worldwide problem as they affect individuals of all ages across various populations. The global burden of musculoskeletal disorders is estimated to be 21.3% (March et al, 2013). Studies in various countries have shown that there is a high prevalence of musculoskeletal disorders among the various populations. In a study by Delp and Wang p (2013), among clerical workers in Los Angeles, the 12-months prevalence of musculoskeletal disorder was 92%, with respondents reporting discomfort in more than one body region. (Delp and Wang p 2013). In Australia, between 2014 and 2015, 30% of the population were reported to have developed at least one musculoskeletal condition, with the back being the most affected body region with a prevalence of 16% among the population (Australian Institute

of Health and Welfare, 2019). Musculoskeletal disorders were most prevalent among members of the population aged 75 – 84 years (72%) and least prevalent among those aged 0 – 14 years (1.0%) (Australian Institute of Health and Welfare, 2019). Hongyun et al (2019) reported a high 12-months prevalence of musculoskeletal disorders (91.2%) among Chinese healthcare professionals, with the lower back (12-months prevalence of 72.8%) being the region most affected by musculoskeletal disorders. Data from the Health and Safety Executive, Great Britain (2019) showed that musculoskeletal disorders account for 37% of work-related diseases and 27% of working days missed due to work-related illnesses. In a study by Davis et al (2015), the prevalence of musculoskeletal pain among nurses in Africa was estimated to be 64% yearly (low back pain) and 41% for neck pain (Davis et al, 2015). Ayanniyi and Udofia (2016), in a study among Nigerian market women estimated the prevalence of musculoskeletal disorders to be 54.5%. In a similar study among Nigerian sonographers the estimated prevalence of work-related musculoskeletal disorders was 88% with back pain being most prevalent (45%) (Oke & Adeyekun, 2013).

Several studies have observed the prevalence of musculoskeletal disorders among the adolescent population. In one of such studies, the lifetime prevalence of low back pain among Nigerian market women was 58.0%, the 12-month prevalence was 43.8% and the point prevalence was 14.7%. Among the reported musculoskeletal disorders, the commonly reported symptoms were low back pain, shoulder pain, neck pain, ankle pain. Olayinka et al (2009) reported that the lower extremities musculoskeletal disorders were the most prevalent (93.1%).

2.3 Anatomy of the Back

The back is the posterior part of the trunk, it lies between the neck inferiorly and superiorly to the buttocks (Moore et al, 2013). The back includes the following structures;

- i. The skin and subcutaneous tissue
- ii. Muscles: these comprise of two layers;
 - A superficial layer, which is primarily concerned with positioning and movement of the upper limbs
 - Deeper layers, also called true muscles of the back, which are more concerned with maintaining the body posture.
- iii. The vertebral column: this comprises of the vertebral bodies, the intervertebral discs and the associated ligaments.
- iv. The ribs (located in the thoracic region).
- v. Spinal cord and the associated meninges.
- vi. And various segmental nerves and blood vessels. (Modes & Fahrioglu, 2020).

2.3.1 The Vertebral Column

The vertebral column (spine) is made up of the vertebrae and the intervertebral discs. It extends from the cranium to the apex of the coccyx. The vertebral column consists of 33 vertebrae, is approximately 71 to 75cm long in adults and the intervertebral discs form one quarter of its length. The vertebral column serves the following functions:

- i. It protects the spinal cord and the spinal nerves
- ii. It supports the weight and physical structures of the body (above the level of the pelvis)
- iii. It provides an axis for the movement of the body, and a base for the head.

- iv. It is important for the posture and locomotion of the body. (DeSai et al, 2020).

2.3.1 The Vertebrae

The vertebrae and the intervertebral discs make up the vertebral column. There are 33 vertebrae in the vertebral column of an adult. These vertebrae are arranged in five regions;

- i. The cervical region, made up of the first 7 vertebrae
- ii. The thoracic region made up of 12 vertebrae
- iii. The lumbar region, made up of 5 vertebrae
- iv. The sacral region made up of 5 vertebrae
- v. And the coccygeal region, which is made up of the inferior 4 vertebrae.

Significant motion occurs only between the first 25 vertebrae (cervical to lumbar region), the sacral region fuses to form a rigid sacrum and the coccygeal region fuses to form the coccyx. The junction between the lumbar vertebrae and the sacrum is described as the lumbosacral region. (Valovska, 2011). The vertebrae gradually increase in size down the vertebral column up to the sacral region, from where it gradually decreases towards the apex of the coccyx. The vertebrae are largest just immediate to the superior part of the sacrum, where weight is transferred to the pelvic girdle at the sacroiliac joints. The reason for the gradual variation in size of the vertebrae down the vertebral column is due to the fact the amount of body weight born by each vertebra gradually increases down the vertebral column. (Moore et al, 2013). Each vertebra is separated from the other superiorly and inferiorly by the intervertebral disc. The intervertebral discs are cartilaginous structures that consist of an outer avascular layer (annulus fibrosus) surrounding a soft nucleus pulposus (Desai et al, 2020). Zygapophyseal joints also exist between the cervical, thoracic, lumbar and first sacral vertebrae, these joints allow for more flexibility in these regions

of the vertebral column. (Moore et al, 2013). The size and characteristics of each vertebra vary from one vertebra to another and also from one region of the vertebral column to another. However, all the vertebrae still possess a similar basic structure. The structure of a typical vertebrae consists of:

- i. A vertebral body.
- ii. A vertebral arch and
- iii. 7 spinous processes.

The vertebral body is the anterior part of the vertebrae, it is the massive and roughly cylindrical part of the vertebrae. It serves to strengthen the vertebral column and support the weight of the body. It consists of two layers of bones, a thin external layer of compact bone, surrounding a vascular inner layer of cancellous bone. The trabeculae have spaces that are occupied by red marrow, this makes the vertebrae to be one of the major hematopoietic tissues in the adult individual. The superior and inferior ends of each vertebra are covered by hyaline cartilages, in the living organism, these cartilages are, however, dried up post-mortem (Moore et al, 2013).

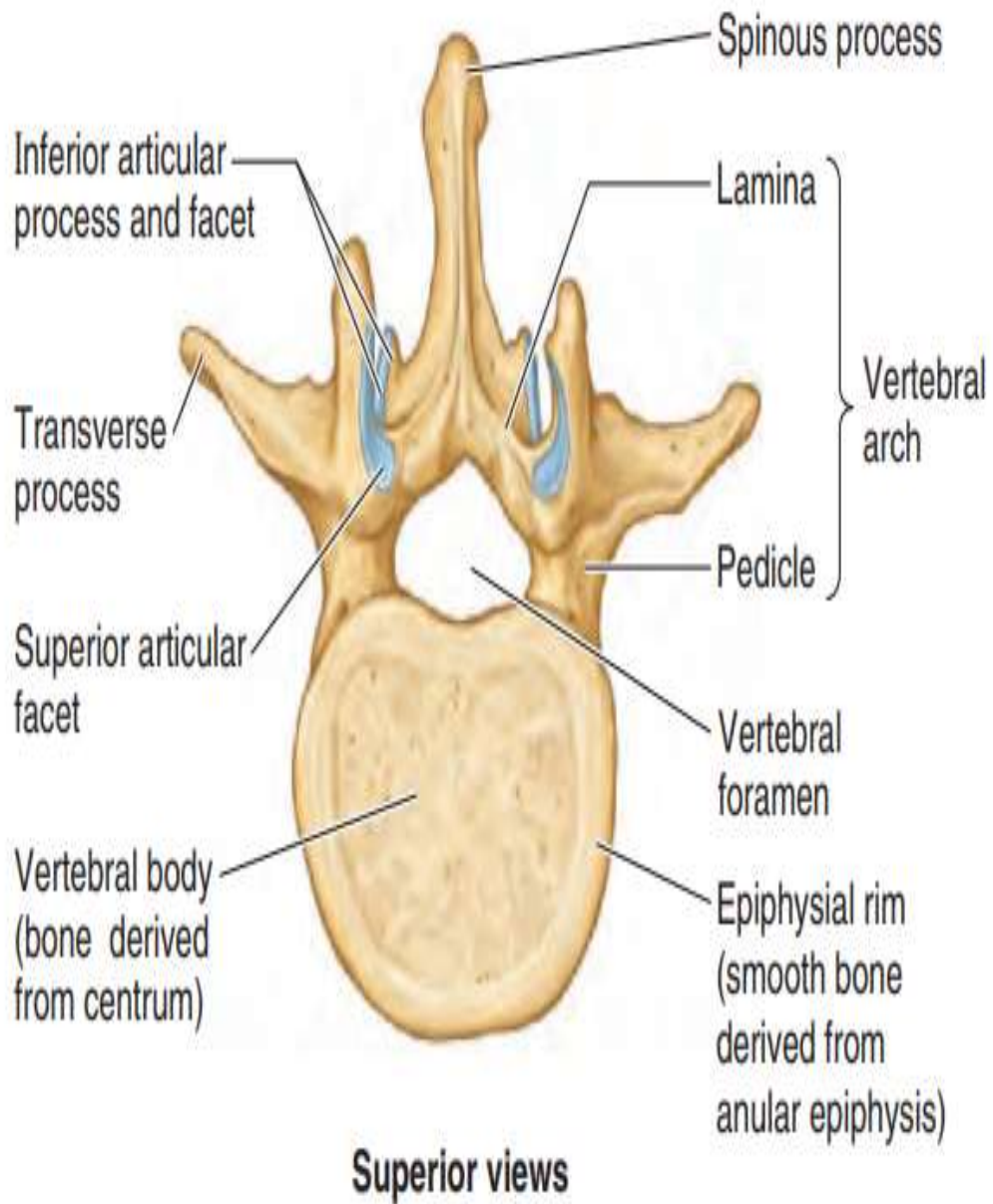


Figure 1: Superior view of the 2nd lumbar vertebrae, representing a typical vertebra. Image source: Moore, Clinically Oriented Anatomy. 7th Edition. Pg. 442.

The vertebral arch lies posteriorly to the vertebral body. It consists of two pedicles and laminae (right and left). The vertebral arch along with the posterior portion of the vertebral body forms the vertebral foramen. The vertebral foramina of all the vertebrae form a central canal in the vertebral column, referred to as the vertebral canal. The vertebral canal contains the spinal cord, its meninges, the spinal nerve roots and the associated blood vessels. (Moore et al, 2013).

From a lateral view, lying superiorly and inferiorly to each pedicle of the vertebral arch, is the superior and inferior vertebral notches.

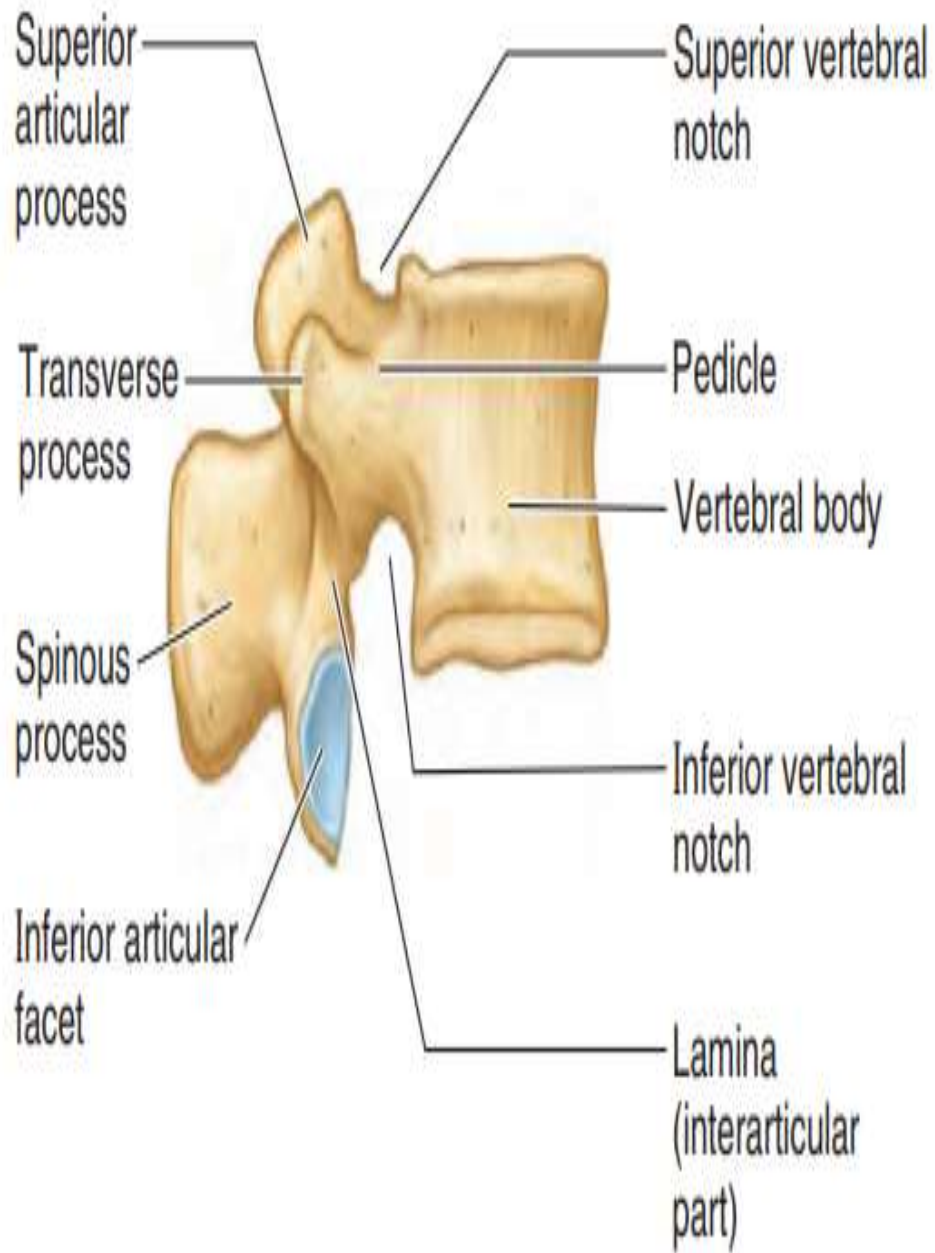


Figure 2 Lateral view of the 2nd lumbar vertebrae, showing the lateral features of a typical vertebraeImage source: Moore, Clinically Oriented Anatomy. 7th Edition. Pg. 442.

The superior and inferior vertebral notches of adjacent vertebrae, along with the connecting intervertebral disc form the intervertebral foramina, from which the spinal nerves emerge from the vertebral column. (Moore et al 2013).

In a typical vertebra, there are **seven spinal processes** arising from the vertebral arch:

- i. One median spinous process, which projects posteriorly from the junction of the laminae.
- ii. Two transverse processes, that project posterolaterally from the junction of the lamina and the pedicle, and
- iii. Four articular processes (2 superior and 2 inferior), arising from the junction of the lamina and the pedicle. These articular processes are also described as zygapophysies.

The transverse and spinous processes serve to provide attachment for the deep muscles of the back, while the articular process along with articular processes from adjacent vertebrae, form the zygapophysial joints, these joints determine the types of movements that are permitted between each vertebra. (Moore et al, 2013). The articular processes also bear weight during certain periods of transition, when one sit ups from a flexed position and also when the cervical vertebrae are flexed laterally to end range (Moore et al, 2013).

3.2.2 Joints of the Vertebral Column.

The vertebral column comprises of several joints which include;

- i. Joints of the vertebral bodies, formed by the intervertebral discs.
- ii. Joints of the vertebral arches, formed between the inferior and superior articular processes of adjacent vertebrae.
- iii. The craniovertebral joints, the atlanto-occipital and the atlanto-axial joints.

- iv. The uncovertebral joints (between each cervical vertebral body and the one immediately below it)
- v. The costovertebral joints (between the vertebral columns and the ribs)
- vi. The sacroiliac joints (Moore et al, 2013).

2.3.3 Movement of the Vertebral Column

Movement across the vertebral column occurs at the nuclei pulposi of each intervertebral disc and the zygapophyseal joints. The range of movement across the vertebral column is permitted by the elasticity and flexibility of the intervertebral discs between each vertebra. The movement of the vertebral column is produced mainly by the muscles of the back, assisted by gravity and also by the anterior abdominal muscles. The range of motion varies across the different regions of the vertebra, and is limited by;

- i. The adjoining ligaments of the vertebral column (the ligamentum flava, the posterior and anterior longitudinal ligaments.
- ii. The shape and orientation of the zygapophyseal joints
- iii. Resistance provided by the back muscles and surrounding tissues
- iv. The rib cage. (Moore et al, 2013).
- v. The range of movement of the vertebral column is wider at the lumbar and the cervical regions than the remaining three regions of the vertebral column. Possible movement that can occur along the vertebral column are;
 - i. Flexion (greatest in the cervical region)
 - ii. Extension (greatest in the lumbar region)
 - iii. Rotation (Moore et al, 2013).

2.3.4 Curvatures of the Vertebral Column

The vertebral column in an adult individual, when viewed laterally has four curvatures, in the cervical, thoracic, lumbar and sacral regions. Kyphosis, a curvature where the vertebral column is convex posteriorly and concave anteriorly, occurs in the thoracic and sacral region. Lordosis, a curvature in which the vertebral column is concave posteriorly and convex anteriorly, occurs in the cervical and lumbar region. The curvature of the vertebral column along with the flexibility and elasticity of the intervertebral discs, allows for greater degree of movement than would be allowed by the intervertebral disc alone. While the intervertebral disc provides a passive flexibility, due to the resistance of the zygapophyseal joints, the spinal curvatures provide a dynamic flexibility due to the resistance provided by the antagonist muscle groups to the movement of the curvature (thoracic kyphosis is restricted by the long extensors of the back and lumbar lordosis is restricted by the abdominal flexors). (Valovska,2011).

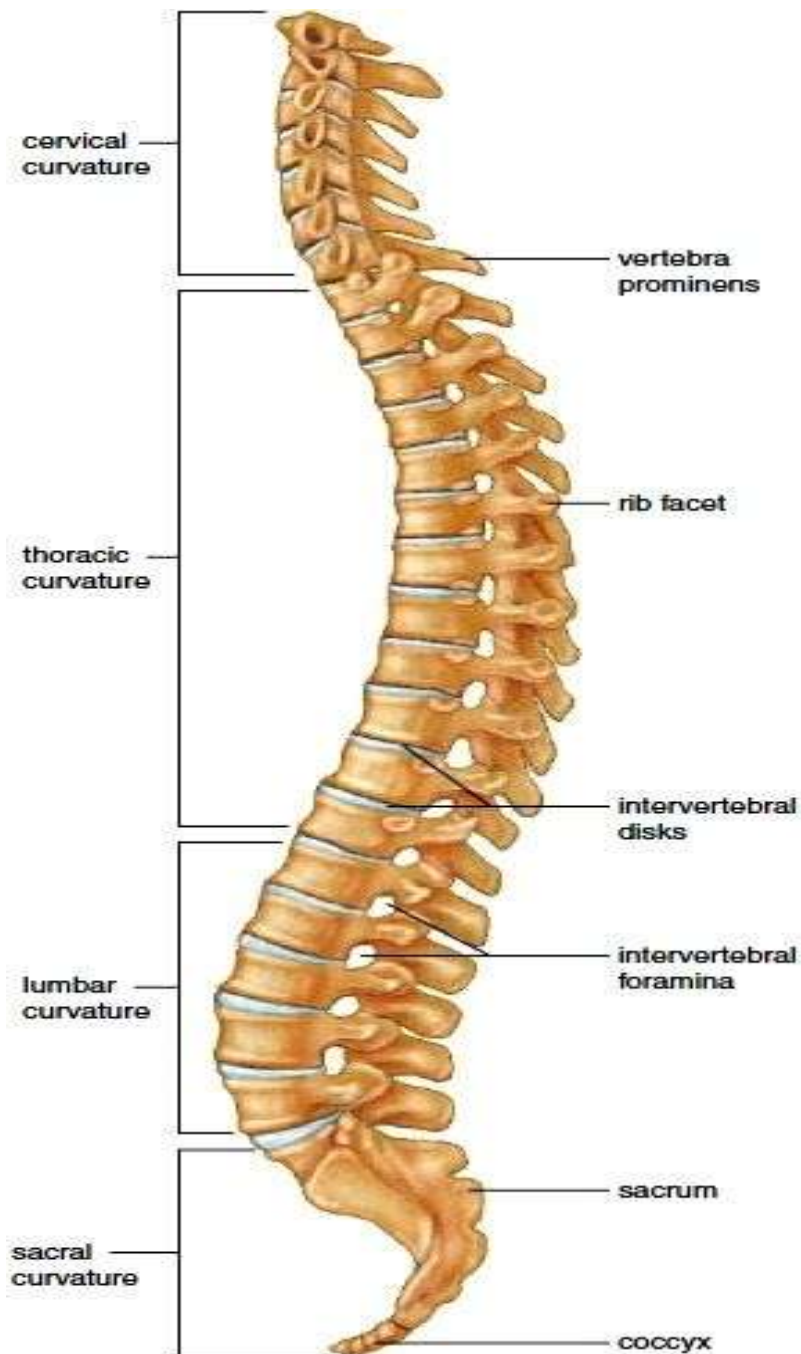


Figure 3 Lateral view of the vertebral column, showing the four spinal curvatures

Image source: www.pinterest.at

The spinal curvatures can be increased by carrying additional weights anterior to the normal gravitational axis of the body, when such weights are carried for a long duration, it often results in aching of the muscles that are antagonistic to the movement of the curvature. (Moore et al, 2013).

2.3.5 Vasculature of the Vertebral Column

The major arterial supply to the vertebral column is provided by the:

- i. vertebral and ascending vertebral arteries
- ii. the segmental arteries of the trunk. These include the posterior intercostal arteries (in the thoracic region), the subcostal & lumbar arteries and the iliocostal, lateral and medial sacral arteries.

The anterolateral surfaces of the vertebrae are supplied by the periosteal and equatorial branches of these arteries, while the spinal branches enter the intervertebral foramina and divide into larger branches (radicular medullary arteries) and smaller anterior and posterior vertebral canal branches. The anterior vertebral canal branches supply the vertebral bodies, while the posterior branches supply the vertebral arches. Nutrient arteries to the vertebral bodies arise as branches from the anterior vertebral canal arteries, these arteries supply the red marrow of the central vertebral body. The radicular medullary arteries supply the posterior and anterior roots of the spinal nerves along with their meninges (Moore et al, 2013).

The venous drainage of the vertebral column is provided by venous plexuses on the inside and outside of the vertebral canal. These plexuses, the internal and external vertebral venous plexuses are formed from the spinal veins, they communicate through the intervertebral foramina. The vertebral bodies are drained by the Basal vertebral veins, which drain into the anterior internal and

external vertebral plexuses. Blood from the vertebral venous plexuses and also from the spinal cord are drained by the intervertebral veins into the vertebral veins of the neck and the segmental veins of the trunk, the lumbar, sacral and intercostal veins (Moore et al, 2013).

2.3.6 Nerve Supply of the Vertebral Column

The nerve supply to the vertebral column is provided by the recurrent meningeal branches of the spinal nerves. These nerves originate from the mixed spinal nerve, just before it bifurcates into the anterior and posterior rami, or in some variations they may originate from the anterior rami. Branches outside the vertebral canal supply the anterolateral aspect of the vertebral bodies and of the intervertebral discs and the anterior longitudinal ligament. Within the spinal canal, branches supply the periosteum of the posterior aspect of the vertebra, ligament flava, annuli fibrosis of the posterolateral aspect of the intervertebral disc, the posterior longitudinal ligament, spinal dura mater and the vasculature within the vertebral canal. The zygapophyseal joint is however supplied by the articular branches of the medial branches of the posterior rami. The nerve supply to the periosteum are mainly nociceptors, while the annuli fibrosis and the ligaments are supplied by both nociceptors and proprioceptors. (Moore et al, 2013).

2.3.2 Muscles of the Back

There are two major groups of muscles in the back:

- i. The extrinsic back muscles
- ii. The intrinsic back muscles

The extrinsic back muscles include superficial and intermediate muscle groups and they both of these muscle groups serve to initiate and control respiratory movement and also movement of the

limbs (Moore et al, 2013). However, Henson et al (2020), categorized muscles of the back into three groups with the superficial and intermediate muscle groups categorized separately along with the intrinsic muscle groups. The intrinsic muscle groups are attached to the vertebral column and are involved in controlling the movement of the vertebral column along with helping to maintain body posture (Henson et al, 2020)

2.3.2 Extrinsic Muscles of the Back

There are two groups of extrinsic muscles of the back, the superficial and intermediate muscles.

The superficial muscle groups include the trapezius, latissimus dorsi, rhomboids and levator scapulae. These muscles connect the vertebral column to the upper appendicular skeleton (the pectoral girdle and the humerus). They act to initiate and control movement of the upper limbs. Nerve supply to this group of muscles is from the anterior rami of the cervical nerves, except for the trapezius which receives its innervation from the spinal accessory nerve (cranial nerve XI). (Modes & Fahrioglu, 2020)

The intermediate extrinsic back muscles are the serratus posterior muscles (superior and inferior muscle), they are responsible for respiratory movement. The serratus posterior superior lies deep to the rhomboids, while the serratus posterior inferior lies deep to the latissimus dorsi. Both muscles are innervated by the intercostal nerves (Modes & Fahrioglu, 2020).

2.3.3 Intrinsic Muscles of the Back

The intrinsic muscles of the back are the muscles that control the movement of the vertebral column and act to maintain the posture of the body. These muscles extend from the pelvis to the

cranium, they are covered by the deep fascia and are innervated by the posterior rami of the spinal nerves. (Modes & Fahrioglu, 2020)

There are three layers of the intrinsic back muscles:

- i. The superficial layer (the splenius capitis and splenius cervicis).
- ii. The intermediate layer (the erector spinae muscles – the iliocostalis, longissimus and the spinalis muscles).
- iii. The deep layer (the transversospinalis muscles – the semispinalis, multifidus and rotatores muscles) (Henson et al, 2020).

The muscles of the superficial layer, the splenius capitis and splenius cervicis, act to cover the deep neck muscles and maintain the position of the neck. The intermediate layer, the erector spinae muscles act to extend the vertebral column. The muscles of the deep layer, the transversospinalis muscles occupy the depression between the transverse and spinous processes of the vertebrae (Moore et al, 2013)

The transversospinalis muscles serve to collectively extend the back, the semispinalis muscle extends the head, the cervical and the thoracic region of the vertebral column, it also acts unilaterally on one side to rotate the contralateral side of these regions. The multifidus muscle serves to stabilize the vertebrae while it moves, the rotatores also stabilizes the vertebrae and assists with extension and rotatory movement (Modes & Fahrioglu, 2020).

2.3.4 Blood Supply and Innervation of the Back Muscles

The arterial blood supply of all the muscle groups of the back is provided by the deep cervical, posterior intercostal, subcostal or lumbar vertebral arteries (Henson et al, 2020)

The nerve supply for muscles of the back originates from the ventral and dorsal rami of the spinal nerves;

- i. The anterior rami of the spinal nerves innervate the extrinsic muscles
- ii. The splenius capitis muscle is innervated by lateral branches of the C2 – C3 dorsal rami
- iii. The lateral branches of the lower cervical dorsal rami supply the splenius cervicis muscle
- iv. The erector spinae muscles are innervated dorsal rami of the spinal nerves. The lateral branches of the dorsal rami innervate the iliocostalis muscle and the longissimus muscle is innervated by the intermediate branches.
- v. The transversospinalis muscles supplied by the primary branches of the C1 – L5 dorsal rami. (Henson et al, 2020)

2.4 Pathophysiology of Musculoskeletal disorders

Musculoskeletal disorders occur when a tissue in the musculoskeletal system is made to perform a repetitive or forceful task, which results in multiple and repeated overstretching, compression, overexertion, ischemia and/or friction to the tissue involved (Barbie & Barr, 2006). These injuries to structures of the musculoskeletal system results in inflammation, which is initially meant to repair the injured tissue. However, when the injurious task is continued, this can result in a vicious cycle of injury to the affected tissue, chronic or systemic inflammation, fibrosis of the affected tissue and may even result in breaking down of the affected tissue, these will ultimately result in pain and loss of function in the region affected (Barbe & Barr, 2006). Musculoskeletal disorders occur when the body is exposed to heavy loads over a long period of time, they can also occur due to maintenance of an awkward body posture for an extended period of time (Oke & Adeyekun, 2013).

2.4 Aetiology of Musculoskeletal disorders

2.4.1 Posture

Postural scoliosis usually occurs as a compensatory deformity secondary to conditions that are not associated with the spine, such as limb length discrepancy or a pelvic tilt due to hip contractures. (Solomon et al, 2010). Postural low back pain can develop when the back is sustained in a poor position for a long period of time, this causes tension in the musculature and ligaments of the back, causing minor injuries which can present symptomatically as pain in the low back (Taguchi, 2003). Postural neck pain also occurs as a result of the loading of the cervical spine and the shoulder girdle due to sustained posture while working or during leisure (Edmondson et al, 2007), this pain is common among computer users, who exert strains on the musculature and ligaments of the neck due to awkward postures and forward bending of the neck adopted while working (Ming et al, 2004). Oke & Dada (2004), reported that the prevalence of neck pain is higher among computer users who spend at least 6 hours a day working on the computer.

2.4.2 Degenerative changes

Degenerative changes in the spine such as lumbar or cervical spondylosis can result in the development of musculoskeletal Disorders across the spine, resulting in conditions such as low back pain (Solomon et al, 2010). In spondylosis as the degeneration of the intervertebral disc progresses, there is bone growth along the edges of the vertebrae, this bony growths, termed osteophytes, along with the narrowing of the intervertebral space can impinge on the peripheral nerves that exit from the vertebral foramen resulting in radiculopathy associated with low back pain and neck pain (Solomon et al, 2010). The formation of bony growths can also narrow the

spinal canal resulting in spinal stenosis which can lead to presentation of symptoms of myelopathy.

Vertebral disc prolapse (herniation) which is the bulging out of the annulus portion of the intervertebral disc. Vertebral disc prolapse can result in the compression of the nerve structures on the side where the bulge occurs, this can result in back pain and also cause the patient to maintain a tilted posture (sciatic scoliosis) (Solomon et al, 2010).

2.4.3 Trauma

Traumas such as vehicle accidents, fractures, whiplash injury and micro traumas (such as occurs while lifting heavy loads) result in injuries to the musculoskeletal tissues and this can often present as musculoskeletal symptoms such as pain or complications like contractures or limb length discrepancies (Solomon et al, 2010).

2.4.4 Diseases and Infections

Systemic infections and diseases such as a pyogenic infection (staphylococcus) and tuberculosis and conditions such as rheumatoid arthritis. The infective pyogenic organism travels to the spine via the blood supply and infects the intervertebral disc (resulting in reduced disk space) and the vertebral bodies, abscess may form and spread into the spinal canal and the surrounding musculatures (Solomon et al, 2010). Presenting symptoms include muscle spasm and neck stiffness. Tuberculosis affecting the spine can also result in the formation of abscesses in the vertebral and the collapse of the vertebral curve. Tuberculosis of the cervical spine can result in the collapse of the cervical spine into a kyphosis and patients often present with neck pain. In the lumbar spine a severe tuberculosis infection can result in a collapse of the vertebral bodies and in the formation of a gibbus and kyphotic curve, the abscess formation can also lead to compression

of the spinal cord (Solomon et al, 2010). Rheumatoid arthritis, an autoimmune disease, can often affect the spine, eroding the facet leading to joint instability and possible compression of the spinal nerves (Solomon et al, 2010)

2.4.5 Risk Factors for Musculoskeletal disorders

There are several risk factors associated with the development of musculoskeletal symptoms and the occurrence of musculoskeletal symptoms is multifactorial, involving activities carried out at work and even recreational activities and activities of daily living, which result in overloading or stressing of the musculoskeletal system (Punnett & Wegman, 2004). Risk factors involve individual, physical and psychosocial factors. (Nunes & Bush, 2012)

Risk factors for the development of musculoskeletal symptoms include:

- i. **Gender:** studies report that there are gender differences in the prevalence of musculoskeletal disorders, with higher prevalence reported among women. These differences are associated with factors such as physiological differences, such as ergonomic factors. (Nunes & Bush, 2012). Cavallari et al (2016), reported higher prevalence of back, upper and lower extremities symptoms among females compared to males who are exposed to relatively the same kind of work, the largest discrepancy occurred in the prevalence of upper extremity symptoms. Ming et al (2004), reported that women are more predisposed to developing neck and shoulder pain because the work place is ergonomically designed to fit the male population more.
- ii. **Level of physical activity and muscle strength:** physical activity can predispose to the development of musculoskeletal disorders as increased level of activity results in increased risk of injuries to the musculoskeletal tissues, as there is increased loading of

the muscles and the frequency of repetitive movements. However, increased level of physical activity also results in the strengthening of the muscles and other tissues, improves blood flow to the musculoskeletal tissues and the oxygenation of these tissues, leading to a reduced rate of injury (as the tissues can withstand more force) and greater rate of repair from injury (Karen & Gisela, 2017).

- iii. Anthropometric factors:** this involves physical factors such as weight, height and body mass index. Studies have shown that there is an increased risk of developing musculoskeletal disorders among individuals who are obese or overweight compared to individuals who have normal body mass indices (Viester et al, 2013). Poussa et al. (2005), reported that abundant changes in anthropometric indices among male children and to a lesser extent among female children in a Finnish population, indicated a significant risk of developing low back pain. Hershkovich et al (2013) also reported similar results with low back pain being associated with higher body mass indices and greater height. Viester et al (2013) also reported that in individuals with high BMI (obesity), there is greater risk for developing musculoskeletal disorders, especially in the lower extremities.
- iv. Age:** The process of aging is associated with certain degenerative changes especially at the joints, as the body ages, the intervertebral discs begin to degenerate leading to a reduction in the space between the vertebral bodies. These degenerative changes result in pain and reduced range of motion at the back and can also result in radiculopathy if peripheral nerves are compressed. (Nunes & Bush, 2012).
- v. Posture:** maintaining a static posture while working or performing activities of daily living can result in the build of tension and overloading of the muscles associated with

maintaining that posture, especially the intrinsic back muscles, this overloading can result in injury to the muscles and development of musculoskeletal disorders. (Nunes & Bush, 2012). Studies have shown increased association between awkward body postures and a high prevalence of musculoskeletal disorders (Chen & Mu, 2018).

- vi. **Psychosocial factors:** such as financial/economic status, satisfaction with work and inter-relationships at the work place. Psychosocial factors are non-biomechanical risk factors that predispose to the development of musculoskeletal disorders. A negative perception of one's self, environment and work place can result in physiological and psychological stress which can result in physiological responses such as increase in muscle tension. Psychosocial factors on their own cannot result in injuries but in combination with the physical risk factors can result in occurrence of injuries and musculoskeletal disorders. (Nunes & Bush, 2012).

2.5 Clinical Presentations of Musculoskeletal disorders

- i. **Pain:** as defined by the International Association for the Study of Pain (IASP, 2020) pain is an unpleasant sensory and emotional experience associated with, or resembling that associated with actual or potential tissue damage. Pain may be experienced as aching, burning, stabbing, sharp or dull, and may vary in intensity from mild to severe. Sometimes the pain may be aggravated by motion or certain postures and may vary depending on the time of the day. (Beatrice, 2013).
- ii. **Reduced range of motion,** especially in conditions such as scoliosis and hyper-kyphosis. Reduction in range of motion of a joint can occur as a result muscles stiffness, inflammation around the joint, prolonged immobilisation and also joint pain. (Kaneguchi et al. 2016).

- iii. **Radiculopathy:** this describes a pain syndrome that is characterized by pain, weakness and numbing sensation along the course of a nerve. It is caused by compression or irritation of the nerve root (Alexander & Varacallo, 2020), which is common in degenerative conditions that affect the spine. Radicular symptoms experienced may differ depending on the level of the lumbar spine where the nerve compression occurs. In L2, L3 and L4 radiculopathy, radiating pain is felt at the anterior aspect of the thigh and may progress to the knee and the medial aspect of the lower leg (Khan and Das, 2021). In L5 radiculopathy radicular symptoms are felt at the lateral leg and into the foot, while S1 radiculopathy will result in radiating symptoms in the posterior leg, into the foot and the perineum (Khan and Das, 2021).
- iv. **Joint stiffness:** joint stiffness can occur as a result of various musculoskeletal conditions such as, spondylosis, arthritic conditions or adhesive capsulitis, among others. It results in the loss or reduction of the range of motion that occurs at a joint. All movement at the joint may be lost or limited while in some cases only some types of movements are limited, depending on the severity and cause of the joint stiffness (Solomon et al, 2010).

2.6 Diagnosis of Musculoskeletal disorders

2.6.1 Patient History

The first step in accurate diagnosis of a patient with musculoskeletal disorders is taking a proper and detailed history of the patient. History taken should include period of onset of the symptoms, history of trauma or diseases, location and description of the pain, family history, patient's occupation, severity and duration of the symptoms, aggravating and relieving factors (positional and time factors), medications used and treatments received, along with past medical and surgical treatments. (Porter & Tidy, 2013)

2.6.2 Physical Examination

Physical examination involves the general observation, local observation and assessment of movement and muscles strength. There are also specific physical tests for various musculoskeletal conditions which can be carried out to confirm or rule out a specific condition. General observation involves observing the patient gait and posture upon entry into the examination room, while walking, standing and sitting.

Local observation involves observation of the affected area for swelling, abnormal contours, muscle atrophy, asymmetry of muscles, joint malalignments and deformities.

The range of motion is assessed with the aid of a goniometer. The muscle strength is assessed and can be graded with outcome measures such as the Oxford muscle grading scale.

Certain orthopaedic tests can be performed to rule out or confirm certain pathologies, these tests include: Straight leg raise test, Faber's test, vertical oscillatory pressure (for low back pain), Empty can test (for shoulder pain), cervical distraction test (for neck pain) (Porter & Tidy, 2013). Scoliosis can be observed using the Adam's forward bend test (Reamy & Slakey, 2001). Adam's forward bend test is performed by asking the patient to expose his/her back and then bend forward at the waist, to the point where the spine becomes parallel to the horizontal plane, with the palms held together and the arms extended at the elbow. The examiner will then observe the spine along the horizontal plane to detect any asymmetry in the contour of the back (rib hump) which will be indicative of scoliosis (Reamy & Slakey, 2001).

2.6.3 Radiographic Examination

Radiographic examination involves the use of X-rays, Computerized tomography and Magnetic resonance imaging to examine internal tissues and detect the presence or absence of abnormalities.

2.6.3.1 X-rays

X-rays are the most commonly used imaging techniques for assessing skeletal deformities, as it is readily available and relatively cheap. X-rays can be used to assess fractures, bony deformities and degenerative changes. (Lateef & Patel, 2009). In the assessment of low back pain, if patient history indicates a non-mechanical cause of pain or if degenerative changes are suspected in the lumbar spine, an X-ray is usually recommended for further diagnosis (Lateef & Patel, 2009). The anteroposterior and lateral views are the common angles from which the X-ray is taken. For suspected spondylolysis, an oblique view may be requested which will show any fracture at the pars interarticularis. The film obtained is observed by the clinician for degenerative changes, reduced intervertebral disc, fracture of the vertebral body or any other obvious deformity (Lateef & Patel, 2009).

X-rays are also used in the assessment of scoliotic curves and kyphotic curves. In the frontal plane it is used to measure the cobb angle of all scoliotic curves along the spine, the thoracic curve, the thoracolumbar scoliotic curve and fractional curves in the lumbosacral junction. While the kyphotic and the lordotic curves can be obtained in the sagittal plane, these curves include the thoracic kyphosis (cobb angle between the superior endplate of the 4th thoracic vertebra and the inferior end plate of the 12th thoracic vertebra), the thoracolumbar kyphosis (cobb angle between the superior end plate of the 10th thoracic vertebra and the inferior end plate of the 2nd

sacral vertebra) and lumbar lordosis (cobb angle between the superior end plate of the 1st lumbar vertebra and the superior end plate of the 1st sacral vertebra) (Bess et al, 2016).

Cobb angle is measured by identifying the upper and lower end vertebrae on the anteroposterior x-ray film, a perpendicular line is drawn from both the upper and lower.

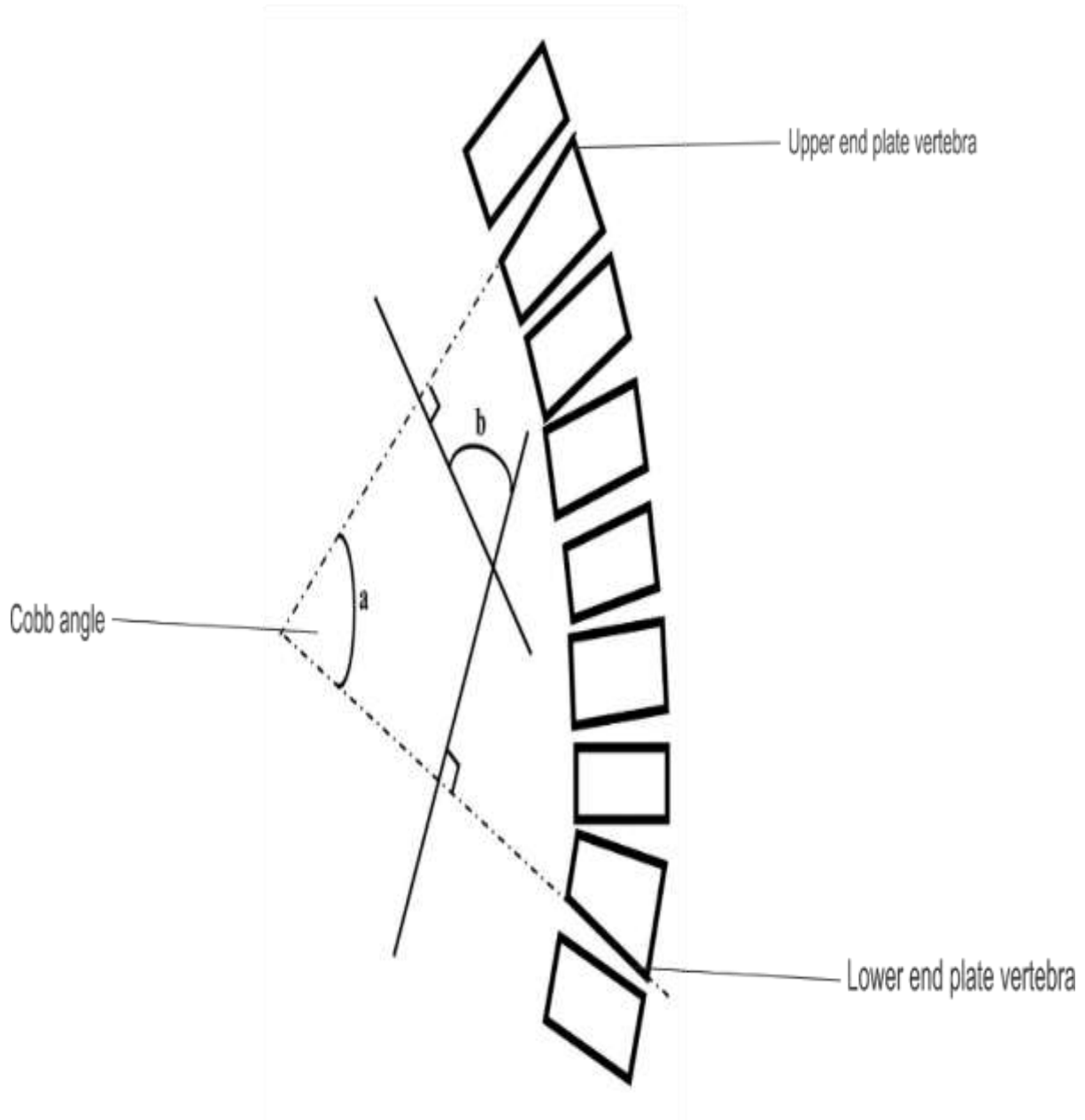


Figure 4: Measurement of Cobb angle. Image source: Adapted from <https://pubs.rsna.org>

Vertebral endplate lines, the angle between the two vertical lines, at their point of intersection is the Cobb angle of that curve. (Wang et al, 2018)

2.6.3.2. Computerized Tomography (CT) Scan

Computerized tomography is used mainly to assess the osseous structures of the spine, and the relation of the vertebrae to the neural canal in the axial plane. (Arya, 2014). In the assessment of musculoskeletal conditions, CT scan is useful in detecting the relationship of one bony structure to another, to show tumours, fractures and complete or partial dislocations (Arya 2014). In the diagnosis of low back pain, CT scan can be used to view the lumbar spine and detect abnormalities like spondylolisthesis (Arya, 2014). CT scan allows for the detection of complex bony abnormalities associated with the development of scoliosis (Kim et al, 2010)

2.6.3.3 Magnetic Resonance Imaging (MRI)

Magnetic resonance imaging involves the use of the natural magnetic properties of the body to generate detailed radiographic images (Berger, 2002). MRI is currently the standard diagnostic tool for detecting abnormalities in neurologic structures associated with low back pain (Arya, 2014). Magnetic resonance imaging provides multiaxial and multiplanar high resolution of tissues and has the advantage of having no known biohazard effects. Compared to computerized tomography, MRI is better suited at detecting the relationship between discs and nerves and locating soft tissue and non-bony structures as well as detecting conditions such as early osteomyelitis, discitis and hematomas (Arya, 2014). In the diagnosis of neck pain with symptoms including balance and gait problems (indicative of cervical myelopathy), MRI can be used to detect disk herniations or spinal stenosis that may be causative of the symptoms (Pompan, 2011). MRI is also indicated in young and middle-aged patients with shoulder pain, following traumatic

injury, reporting with persistent pain and weakness, as there may be a complete rotator cuff tear, detectable by the MRI (Pompan, 2011). MRI is used in the evaluation of patients with scoliosis presenting with unusual curve patterns or with alarming clinical and neuropathic symptoms (Kim et al, 2010).

2.7 Management of Musculoskeletal disorders

Musculoskeletal disorders result from variety of causes and risk factors, management of these disorders will involve approaching the causes of the disorder and correcting any associated deformity.

Management of musculoskeletal disorders include the following:

- i. Patient education and self-management
- ii. Exercise therapy
- iii. Manual therapy
- iv. Pharmacological treatment (mainly analgesics). (Babatunde et al, 2017)

Management of musculoskeletal disorders vary depending on the type of disorder and the region affected.

For the management of low back pain, early involvement of the patient in physical activity and exercise is recommended, while bed rest, as a means of management should be discouraged (Koes et al, 2010). Analgesics as a means of management is also recommended (Babatunde et al, 2017), manipulative therapy in the form of lumbar traction is also recommended in the treatment of low back pain (Koes et al 2010). Specific back exercises are recommended in the management of chronic low back pain, but patients suffering from acute low back pain are advised to maintain

a general state of physical activity, as opposed to performing exercises specifically for the back (Koes et al, 2010).

In the management of spinal deformities such as scoliosis and kyphosis, braces and therapeutic exercises are often recommended, surgical interventions may as well be required depending on the degree of affectation (Bettany-Saltikov et al, 2017). Surgical procedures involved spinal fusion, vertebroplasty, kyphoplasty, vertebral body stapling and vertebral body tethering (Bettany-Saltikov et al, 2017). Surgical management is indicated for patients with spinal curves greater than 45°.

For shoulder and neck pain, management involves postural changes, manual therapy, physical exercises, early mobilization, range of motion exercises to the neck and shoulder and the use of non-steroidal anti-inflammatory drugs (Ming et al, 2004). If symptoms are not relieved by conservative management, surgical intervention can become necessary especially in cases of nerve root compression. (Ming et al, 2004)

2.8 Prevention of Musculoskeletal symptoms

The prevention of musculoskeletal disorders involves avoiding the risk and causative factors that predispose to the disorders (European Agency for Safety and Health at Work, 2008). Preventive measures include:

- i. **Improving the ergonomics of the work or school environment:** studies have shown that improving the ergonomics of the work and home environment, such as the type of chairs used, the type and size of work tables used, sitting with back and arm support and general positioning while working and at home helps to reduce the occurrence of back pain and neck pain. (European Agency for Safety and Health at Work, 2008).

- ii. **Behavioural changes:** this involves proper positioning while sitting at a desk, performing activities of daily living, working or carrying loads. Adjustments can also be made to sleeping positions and work habits, such as taking short breaks in between work hours to promote relaxation of the muscles. (European Agency for Safety and Health at Work, 2008).
- iii. **Wearing of protective equipment:** protective equipment such as back braces, wrist splints and neck collars can help to minimize the development of musculoskeletal disorders. Back belts help to stabilize the trunk and increase intra-abdominal pressure and reduce the incidence of low back pain. (European Agency for Safety and Health at Work, 2008).
- iv. **Physical Exercises:** Strengthening of the neck and back muscles help to increase the physical capacity of these muscles. This helps to reduce the overloading of the muscles hence reducing the development of musculoskeletal disorders. (European Agency for Safety and Health at Work, 2008).

2.9 Outcome Measures

2.9.1 Neck Disability Index (NDI)

The neck disability index was designed to assess neck-specific disability in patients. The test-retest reliability of the NDI is estimated to be high with an intra-class correlation value of 0.93, 95% confidence limits of 0.86 – 0.97 and an Internal consistency of 0.864 (McCarthy et al, 2007). A study by Odole and colleagues, assessed the test-retest reliability of the NDI among a Nigerian population and ascertained that the NDI is a valid instrument (content validity) for

assessing neck pain among a Nigerian population and with a test-retest reliability coefficient of 0.96 (Odole et al, 2011).

2.9.2 The Oswestry Disability Index (ODI)

The Oswestry disability index is one of the commonly used outcome measures to assess patients with low back pain. The questionnaire is self-administered, divided into ten sections, and it assesses the pain intensity along with various activities of daily living (personal care, lifting, walking, sitting, standing, sleeping, sex life, social life and travelling). Each section contains 6 statements which describe scenarios in the patient's life in correlation to the pain. The first statement is scored 0 and the last statement is scored six, patients are to pick one statement from each section. The total score is calculated by dividing the sum of the scores gotten by the patient, by the total possible score (50) and then multiplying by 100 to get a percentage (Mehra et al, 2008). The total score in percentage is used to estimate the degree of disability perceived by the patient, a higher percentage correlates to a higher perception of disability (Fairbank & Pynsent, 2000) The test-retest reliability of the ODI ranges from $r = 0.83$ to 0.99 (Vianin, 2008), Fairbank reported a test-retest reliability of 0.99 (Fairbank and Pynsent, 2000). In a study assessing the psychometric evaluation of the cross-cultural adaptation of the Oswestry disability index among a Yoruba population, the one-week test-retest reliability of the ODI was found to be 0.80 (95% CI $0.74 - 0.84$) and the convergent validity of the ODI with the Yoruba version of the visual analogue scale (VAS) was $r = 0.30$, $p = 0.001$ (Mbada et al, 2020).

2.9.3 Scoliosis Research Society Questionnaire (SRS-22)

The SRS question was originally designed to provide a patient-based assessment tool for assessing surgical outcomes of patients with idiopathic scoliosis (Berven et al, 2003), several

modifications have been made to the original question resulting in the SRS-22 which has been validated for use in the assessment of the quality of life in the patient with idiopathic scoliosis (Vavken, 2015) and also for use in the assessment of adult spinal deformities in general (Berven et al, 2003). The SRS-22 assesses the patient's level of pain at various durations, their perception of their appearance, their levels of activity, the impact of their medications and how the condition affects their psychological state and social relationships. (Scoliosis Research Society, 2003). The current modification of the SRS questionnaire is the SRS-30, which encompasses the SRS-22 and also serve as an outcome measure for assessing post-surgical intervention for spinal deformities. Scoring the SRS question involves grading each answer that the patient chooses under each question. There are 22 questions with 5 answers each describing, with the answer describing the best possible outcome scored 5 and the answer describing the worst outcome scored 1. The questionnaire is divided into domains (function, pain, satisfaction with management, self-image and mental health) and the total score for the domains is calculated, the total score for the questionnaire is also calculated (with scores ranging from 22 to 110), the mean score for the questionnaire is also calculated (values ranging from 1 to 5), lower values represent greater degrees of pain and disability (Scoliosis Research Society, 2006). Studies have examined the validity and reliability of the SRS questionnaire an instrument of clinical measurement.

2.10 Barriers to Accessing Orthopaedic Physiotherapy Services

Market women in Oredo LGA frequently encounter awareness and knowledge barriers, as a large proportion of Nigerians, especially in rural communities, have little to no understanding of physiotherapy. In a study from Kano State, nearly 98% of individuals with musculoskeletal disorders had never heard of physiotherapy, leading them to depend largely on traditional treatments without seeking professional care (Okafor et al, 2015). Rural physiotherapy

accessibility is hampered by misconceptions and limited visibility of physiotherapy roles within the healthcare system.

Financial constraints are another significant barrier to access to physiotherapy services. With approximately 75% of private health spending in Nigeria being out-of-pocket, many low-income families including market women face difficulty affording physiotherapy services. This high cost, compounded by long waiting times and travel expenses, discourages continued attendance; a Nigerian outpatient physiotherapy study found that 86.7% of non-attendance was due to cost, and 93.3% was related to travel burden (Meredith et al, 2015)

A further barrier is the geographical maldistribution of physiotherapy services. Most facilities are concentrated in urban centres like Benin City, leaving suburban and market areas underserved (Chidozie et al, 2019) This is exacerbated by Nigeria's systemic under-funding of healthcare, a dearth of trained physiotherapists, and ongoing brain drain. Cultural attitudes and social norms including the stigmatization of disability and preference for traditional healing discourages individuals from accessing modern rehabilitation services (Nischal et al, 2024)

2.11 Facilitators to Accessing Orthopaedic Physiotherapy Services

Facilitators enhance access to orthopaedic physiotherapy for market women. Educational attainment is strongly correlated with service utilization; those with higher education levels are significantly more likely to access physiotherapy, as demonstrated in community-based research (Chidozie et al, 2019). Effective community health campaigns and mass media outreach have been shown to improve awareness and clarify that physiotherapy is not limited to massage or therapists' duties (Samuel et al, 2020)

Social support systems including encouragement from family and endorsement by healthcare workers play a crucial role in influencing health-seeking behaviour. Organizational-level facilitators, such as mobile clinics, subsidized services, and inclusive health insurance plans that cover physiotherapy, help to reduce financial and geographic constraints. International examples demonstrate that integrating physiotherapy into community health centres improves access; the establishment of community-based musculoskeletal physiotherapy services has led to significant increases in service attendance (Stanley et al, 2022).

Policy and structural facilitators, such as enabling self-referral policies and support for tele-rehabilitation services, could greatly improve service uptake among working women who have limited flexibility and time (Stanley et al, 2022).

/N	AUTHOR/ YEAR	TITLE	AIM OF STUDY	STUDY TYPE	OUTCOME/MEASURE	RESULTS AND CONCLUSION
1	Babatunde et al, (2017).	Effective treatment options for musculoskeletal pain in primary care.	To summarise current best evidence on currently available treatment options for the five most common musculoskeletal pain presentations (back, neck, shoulder, knee and multi-site pain) in primary care.	Systematic literature review.	Quality of systematic reviews was assessed using AMSTAR, and strength of evidence rated using a modified GRADE approach.	Moderate to strong evidence suggests that exercise therapy and psychosocial interventions are effective for relieving pain and improving function for musculoskeletal pain.
2	Cavallari et al, (2016).	Differences in the Prevalence of musculoskeletal symptoms among female and male custodian.	To compare musculoskeletal symptoms between female and male custodians and to explore how task might affect this relationship.	Cross-sectional study.	Chi-square tests and logistic regression analyses were used to test for associations between gender, cleaning tasks, and musculoskeletal symptoms.	Gender was significantly ($P < 0.05$) associated with musculoskeletal symptoms in χ^2 tests and multivariate analyses. The prevalence ratio of symptoms among women was roughly 50% higher than men, regardless of the tasks that workers performed.
3	Hansen et	Sociodemographic	The study examines	Cross-	Barriers to Physical	Our results

	al, (2021).	characteristics associated with physical activity barrier perception among manual wheelchair users.	whether the perception of physical activity barriers is associated with wheelchair user sociodemographic characteristics.	sectional study.	Activity Questionnaire for People with Mobility Impairments' (BPAQ-MI).	provide new evidence that MWCUs with BMI ≥ 30 ; who are not employed; or who only have completed high school, may need special consideration and resources to overcome distinct physical activity barriers. Behavioural strategies and interventions focusing on reducing physical activity barriers should be tailored to the individuals above.
4	Nischal et al, (2024).	Barriers and facilitators for strengthening physiotherapy services in Nepal: perspectives from physiotherapists and health providers.	The study aims to identify barriers and facilitators at different system levels for strengthening physiotherapy services in Nepal.	Qualitative study.	A semi-structured individual interviews were performed with different health providers. Transcribed interviews were assessed with thematic analysis. A five-level socioecological framework conceptualised multilevel determinants of	The results provide information for the development of physiotherapy by pointing out key elements that need attention.

					barriers and facilitators.	
5	Okafor et al, (2015).	Assessment of functional and musculoskeletal problems, and barriers to obtaining physiotherapy services among the elderly in a rural community in Kano State, Nigeria.	The study evaluates the pattern of musculoskeletal disorders, functional status and barriers to obtaining physiotherapy services among the elderly in a rural community in Kano, Nigeria.	Cross-sectional study.	Hausa translated version of the modified Older American Resource and Services (OARS) multidimensional functional assessment questionnaire and other instruments to assess the pattern of functional and musculoskeletal problems and barriers to obtaining physiotherapy services.	The results from this study revealed that the majority of the participants were females (59.9%). The prevalence of musculoskeletal problems was significant (47%), mostly affecting the lower extremity joints and the spine.

2.13 Summary of Literature Review

Musculoskeletal disorders are health conditions that affect the musculoskeletal system of the body, involving the muscles, tendons, skeletal structures, the ligaments and the nerve and vessels that supply these structures. Symptoms of musculoskeletal disorders may be short lived or may be chronic and associated with an ongoing disability. Musculoskeletal disorders are common problem globally and can be found in both the young and adult population. Common causes of musculoskeletal disorders include trauma, awkward and static body postures, non-ergonomic nature of the school, home or work environment. Musculoskeletal disorders are known to affect different parts of the body such as the neck, the back, the shoulder and regions of the upper and lower limbs, symptoms vary depending on the nature of one's activities of daily living and the kind of work one is exposed to. The symptoms of musculoskeletal disorders mainly involve pain and affectation of the range of motion. In the management of musculoskeletal disorders early diagnosis is an important factor and involves a detailed history of the patient, physical examination (including orthopaedic tests such as straight leg raise test, empty can test), and radiographic examination (x-ray of the spine is particularly used to diagnose degenerative processes in the spine, detect fractures in the spine and especially in the diagnosis of scoliosis in measuring the cobb angle which is used to measure the progression of the scoliotic curve). Musculoskeletal disorders can be prevented by improving the ergonomics of the home and work environment, postural and behavioural changes, wearing protective equipment and physical exercises. Management of musculoskeletal disorders involve pharmaceutical, therapeutic and surgical interventions. Outcome measures can be used in the assessment of the pain and disability caused by the musculoskeletal disorders to the patient and also to assess the patients' perception of their condition. These outcome measures include the Oswestry disability index

(ODI), used to assess the degree of pain and disability in patients with low back pain, the neck disability index (NDI) and the Scoliosis Research Society -22 questionnaire (SRS-22) which can be used to assess the level of pain and disability of patients with scoliosis and other spinal deformities and also to assess their perception of their appearance and how it influences their psychology and social life.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Materials

3.1.1 Population

This study was conducted among Market women, aged between 30 to 70 years in Oredo L.G.A Benin city, Edo state, Nigeria.

3.1.2 Selection Criteria

3.1.2.1 Inclusion Criteria

- i. Participants must be market women in Oredo L.G.A Benin city, Edo state, Nigeria.
- ii. Participants must be between the ages of 30 and 70 years

3.1.2.2 Exclusion Criteria

- i. Presence of rheumatic, neurological diseases or other underlying health conditions, affecting active or unsupported ambulation.
- ii. Participants with fractures, dislocations and other such musculoskeletal injuries to the spine, neck or shoulder region.

3.1.3 List of Instruments

- i. A weighing scales.
- ii. A stadiometer.
- iii. A self-administered questionnaire: such as the Evaluation of the perception of physical activity (EPPA) questionnaire and the Barriers to physical activity questionnaire for People with Mobility Impairments (BPAQ-MI).

3.1.4 Description of Instruments

A weighing scale: this was used to measure the weight of the participant.

A stadiometer: this was used to measure the height of the participants.

The Evaluation of the Perception of Physical Activity (EPPA) Questionnaire: The Evaluation of the Perception of Physical Activity (EPPA) Questionnaire is a standardized tool designed to assess individuals' beliefs, perceived barriers, facilitators and benefits related to engaging in physical activity (Costa et al 2020). It is organized into four subscales. The EPPA is a self-report questionnaire. It is commonly used in community health, physiotherapy, public health research, and physical rehabilitation programs to gain insight into factors that influence participation in physical activity (Coste et al 2020). The questionnaire can be used with diverse groups, such as adults, patients in rehabilitation, or specific occupational groups (e.g., market women, students).

Reliability: The EPPA Questionnaire demonstrate good internal consistency, and measured with Cronbach's alpha values ranging between 0.70 and 0.85 across different subscales (Coste et al 2020). Test-Retest Reliability has been reported as satisfactory, with correlation coefficients often above 0.75, indicating that individuals' responses remain stable over time if their perceptions haven't changed. (Husu et al 2024)

Validity: The EPPA Questionnaire has a strong construct Validity that supports the subscales (Coste et al 2020). Content Validity is Developed based on established behavioural theories, which captures core components of how people perceive physical activity (Coste et al 2020). Concurrent Validity scores often correlate with actual physical activity levels measured through

self-report or objective tools confirming that the tool reflects real-world behaviour. (Coste et al 2020)

Scoring: The EPPA Questionnaire comprises 10–30 items, grouped under subscales such as: Perceived be physically active and each rated on a 5-point Likert scale (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree). Total Scores is calculated by summing the total perception score of all items with higher score on the “benefit” subscale indicating a positive perception of physical activity and a high score on the “barriers” subscale suggests a negative perception or greater barrier to participation. Subscale scores can also be calculated by summing the scores of items under each subscale scores can be compared across different groups such as age groups, health conditions.

b. The Barriers to Physical Activity Questionnaire for People with Mobility Impairments

(BPAQ-MI): is a validated self-report tool designed to identify perceived environmental and personal barriers that limit participation in physical activity among individuals with mobility impairments (Vasudevan et al 2015). It helps researchers and clinicians assess factors that restrict or discourage physical activity in this population. (Vasudevan et al 2015). It assesses seven barrier domains: Health and Fitness, Family and friends, Facility, Policy, Knowledge, Motivation, Transportation. (Vasudevan et al 2015).it is Self-administered, making it practical for use in clinical and research settings.

Reliability: The BPAQ-MI has demonstrated good to excellent internal consistency with Cronbach’s alpha subscales values ranging from 0.70 to 0.90, indicating reliable measurement across different domains. (Vasudevan et al 2015). Test-retest reliability is also rated very good with stability confirmed overtime. (Hansen et al 2021).

Validity: The BPAQ-MI has a strong construct validity, correlating factors that support the 7-factor structure to confirm that the questionnaire measures distinct but related domains of barriers. (Vasudevan et al 2015). It correlates appropriately with related constructs, such as physical activity levels and perceived disability. Content validity was developed through literature reviews, expert panel reviews, and focus groups with individuals with mobility impairments to ensure relevance and completeness of barrier items (Vasudevan et al 2015).

Scoring: The BPAQ-MI comprises 34 items, each rated on a 5-point Likert scale. Each item is scored from 1 (strongly disagree) to 5 (strongly agree). (Hansen et al 2021). Higher scores indicate greater perceived barriers. Subscale scores can be calculated by averaging the responses within each domain. A total barrier score can also be calculated by averaging all 34 items. (Hansen et al 2021)

Information collected from the market women included;

- i. Demographic data of the respondents, including their age, gender, type of business, weight and height.
- ii. Area of the body at which the participant had perceived discomfort within 7 days and 12 months prior to the administration of the questionnaire
- iii. The total duration of time during which they felt pain or discomfort on the various parts of their body
- iv. How the pain or discomfort has affected the performance of the basic and functional activities of daily living.
- v. What treatment or medical visits have they underwent to address the pain or discomfort.

3.2 Methods

3.2.1 Research Design

This research is a cross-sectional analytical study.

3.2.2 Sampling Technique

Markets in Oredo L.G.A were selected around Benin city and women from each market were selected via convenience sampling.

3.2.2 Sample Size

The minimum sample size for this study was calculated using the formula $n = Z^2 p (1 - p) / d^2$.

Where n = minimum sample size

Z = z-value set at 95% confidence interval, this correlates with a normal standard deviate set at 1.96.

p = expected prevalence, in the absence of a reasonable estimate, an estimate of 58% (Adegoke et al, 2015) will be used.

d = degree of precision required, set at 0.05.

The calculated minimum sample size for this study will be:

$$n = [(1.96)^2 * (0.58) * (0.42)] / (0.05)^2$$

$$n = 374.33$$

Therefore, the minimum sample size required for this study was approximately 374 participants

3.2.4 Procedure for Data Collection

The data for this study was collected using the self-administered questionnaire. 400 Market women were recruited from Three (3) selected markets completed the questionnaire, while the researcher was to clarify any questions.

The questionnaire was administered to women at their various markets on agreed days within the week and the completed questionnaires was then retrieved on the same day by the researcher.

3.2.5 Data Analysis

All data were analysed using descriptive statistics of mean, frequency and standard deviation. Chi Square was used to determine the association of musculoskeletal disorders. Data was analysed using Statistical Package for Social Sciences (IBM SPSS) version 25. The level of significance was set at $p < 0.05$.

CHAPTER FOUR

RESULTS

4.1 preamble

This chapter deals with data presentation and analysis. The data were primarily sourced from the administered questionnaires. A total of three hundred and seventy-four (374) questionnaires were administered to among market women in Oredo L.G.A Benin city, Edo state, Nigeria. The three hundred and seventy-four (374) questionnaires were returned completely filled. Hence, the analysis of data was based on three hundred and seventy-four (374) questionnaires recovered.

4.2 Analysis of Socio-Demographic Data

The socio-demographic data show that most respondents were aged between 40–49 years (41.7%), and the majority were married (56.1%). In terms of education, 38.0% had no formal education, while only 13.4% attained tertiary education. Regarding income, 29.9% earned ₦80,000 and above, indicating a moderate economic status. The majority had 5–10 years of trading experience (39.0%), reflecting a stable and experienced workforce. Finally, most respondents were engaged in foodstuff trading (41.2%), followed by household items (25.7%), highlighting food trade as the predominant commercial activity among market women.

Table 1: Socio-Demographic Characteristics of Respondents

Socio-Demographic Variables	Frequency (n)	Percentage (%)
Age Range (Years)		
30–39 years	82	21.9
40–49 years	156	41.7
50–59 years	92	24.6
60 years and above	44	11.8
Marital Status		
Single	74	19.8
Married	210	56.1
Divorced	42	11.2
Widowed	48	12.8
Level of Education		
No formal education	142	38.0
Primary education	64	17.1
Secondary education	118	31.6
Tertiary education	50	13.4
Monthly Income Level (₦)		
Less than ₦20,000	52	13.9
₦20,000 – ₦39,999	60	16.0
₦40,000 – ₦59,999	58	15.5
₦60,000 – ₦79,999	92	24.6
₦80,000 and above	112	29.9
Years of Trading Experience		
Less than 5 years	64	17.1
5–10 years	146	39.0
11–15 years	88	23.5
16 years and above	76	20.3
Type of Goods Sold		
Foodstuffs	154	41.2
Clothing/Fabrics	72	19.3
Household items	96	25.7
Agricultural implements	52	13.9

4.2 Common Musculoskeletal Disorders Experienced by Market Women

The findings reveal that musculoskeletal disorders are highly prevalent among market women in Oredo LGA. The most frequently reported condition was pain from prolonged standing or lifting goods (81.8%), followed by general body pain (80.7%) and low back pain (80.5%). Similarly, musculoskeletal pain affecting work performance (80.8%) and joint pains (79.7%) were also common complaints. These results indicate that market-related physical strain, repetitive lifting, and prolonged standing are major contributors to musculoskeletal discomfort and reduced occupational functionality among the respondents.

Table 2: Common Musculoskeletal Disorders Experienced by Market Women

Common Musculoskeletal Disorder	Frequency (n)	Percentage (%)
Pain from prolonged standing or lifting goods	306	81.8
General body pain due to market activities	302	80.7
Low back pain during daily activities	301	80.5
Musculoskeletal pain affecting work performance	302	80.8
Joint pains (e.g., knee or shoulder pain) after market activities	298	79.7

4.3 Barriers Hindering Market Women with Musculoskeletal Disorders from Accessing Orthopaedic Physiotherapy Services

The results show that the major barriers preventing market women with musculoskeletal disorders from accessing orthopaedic physiotherapy services are distance to physiotherapy clinics (56.2%) and long waiting times or difficulty in booking appointments (55.1%). Other key constraints include lack of awareness about physiotherapy (53.4%), high cost of services (38.0%), and cultural or personal beliefs (37.5%) that discourage physiotherapy utilization. These findings suggest that geographical inaccessibility, service delivery delays, and limited knowledge are the most significant structural and informational barriers limiting physiotherapy service uptake among the respondents.

Table 3: Barriers Hindering Market Women with Musculoskeletal Disorders from Accessing Orthopedic Physiotherapy Services in Oredo LGA

Identified Barriers	Frequency (n)	Percentage (%)
Distance to physiotherapy clinics	210	56.2
Long waiting times or difficulty in booking appointments	206	55.1
Lack of awareness about physiotherapy services	200	53.4
High cost of physiotherapy services	142	38.0
Cultural or personal beliefs discouraging physiotherapy visits	140	37.5

4.4 factors facilitate market women’s access to orthopaedic physiotherapy services

The findings indicate that the most influential factor facilitating market women’s access to orthopedic physiotherapy services in Oredo LGA is the availability of affordable physiotherapy services (81.3%). This is closely followed by easy access to nearby physiotherapy centers (79.1%) and positive testimonies from other women (77.6%), showing that both cost and proximity play key roles in service utilization. Additionally, flexible clinic hours (77.0%) and recommendations from healthcare workers (74.9%) also contribute substantially to improving accessibility. Collectively, these results emphasize that reducing financial and logistical barriers, along with community-based encouragement and professional referrals, are critical to enhancing physiotherapy service uptake among market women in the study area.

Table 4: Factors Facilitating Market Women’s Access to Orthopedic Physiotherapy Services in Oredo LGA (N = 374)

Facilitating Factors	Frequency (n)	Percentage (%)
Availability of affordable physiotherapy services	304	81.3
Easy access to nearby physiotherapy centers	296	79.1
Positive testimonies from other women who have received physiotherapy	290	77.6
Flexible clinic hours for market women	288	77.0
Recommendations from healthcare workers	280	74.9

4.5: Influence of Socio-Demographic Characteristics on the Utilization of Orthopedic Physiotherapy Services

The findings show that education and socioeconomic awareness are the most significant socio-demographic factors influencing the utilization of orthopedic physiotherapy services among market women. Specifically, 77.0% agreed that their level of education determines how much they know about physiotherapy, while 74.9% linked their health service awareness to social and economic status. Conversely, income level (37.4%), age (34.2%), and marital status (33.7%) were perceived as less influential, indicating that financial and family-related constraints may play a moderate rather than dominant role.

Table 5: Influence of Socio-Demographic Characteristics on the Utilization of Orthopedic Physiotherapy Services

Socio-Demographic Factors	Frequency (n)	Percentage (%)
Level of education influences awareness and knowledge of physiotherapy services	288	77.0
Level of awareness about health services is related to social and economic status	280	74.9
Income level affects ability to pay for physiotherapy treatment	140	37.4
Younger market women are more likely to access physiotherapy than older ones	128	34.2
Married women prioritize family needs over seeking physiotherapy services	126	33.7

4.6: Strategies to Improve Accessibility and Utilization of Orthopedic Physiotherapy Services Among Market Women with Musculoskeletal

The results show that most respondents agreed that creating awareness campaigns (78.1%) and collaboration between physiotherapists and community leaders (77.6%) would greatly enhance access to physiotherapy services. Similarly, health education in local languages (76.0%) was seen as an important strategy to promote utilization. However, fewer women agreed that government subsidy (39.6%) and locating physiotherapy units near markets (36.4%) would significantly improve access. This implies that information and community engagement are viewed as stronger drivers of utilization than structural or financial interventions.

Table 6: Strategies to Improve Accessibility and Utilization of Orthopedic Physiotherapy Services Among Market Women with Musculoskeletal

Proposed Strategies	Frequency (n)	Percentage (%)
Collaboration between physiotherapists and community leaders to promote access	290	77.6
Creating awareness campaigns in markets to improve knowledge about physiotherapy	292	78.1
Health education programs in local languages to encourage physiotherapy utilization	284	75.9
Government support in subsidizing physiotherapy costs to increase accessibility	148	39.6
Establishing physiotherapy units closer to market areas for easier access	136	36.4

Table 7: Chi-square Test Showing the Relationship Between Individual, Socioeconomic, Cultural, and Systemic Factors and Access to Orthopaedic Physiotherapy Services Among Market Women

Variables	χ^2 (Chi-square)	df	p-value	Decision
Individual factors (e.g., awareness, attitude)	18.462	3	0.001	Significant
Socioeconomic factors (e.g., income, education)	22.731	4	0.000	Significant
Cultural factors (e.g., beliefs, norms)	10.892	3	0.012	Significant
Systemic factors (e.g., distance, cost, clinic availability)	25.643	4	0.000	Significant

The Chi-square analysis revealed a statistically significant relationship between individual, socioeconomic, cultural, and systemic factors and the level of access to orthopedic physiotherapy services among market women with musculoskeletal disorders in Oredo LGA ($p < 0.05$). This implies that women’s awareness, educational level, income, cultural beliefs, and the availability or affordability of physiotherapy services all play crucial roles in determining their level of utilization. Therefore, improving socioeconomic conditions, health education, and service accessibility could enhance the uptake of orthopedic physiotherapy services in the area.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This chapter contained the summary of the study, the conclusions drawn and recommendations offered.

5.1 Discussion

Common musculoskeletal disorders experienced by market women

The findings clearly show that musculoskeletal disorders are highly prevalent among market women in Oredo LGA, as the majority of respondents strongly agreed or agreed to all items assessing common symptoms and causes. Specifically, 80.7% of the women acknowledged frequent body pain as a direct result of their trading activities, suggesting that the physical demands of the market environment contribute significantly to their discomfort. Similarly, 80.5% reported low back pain as one of their most persistent challenges, highlighting the strain that repetitive bending, lifting, and prolonged sitting or standing can impose on the spine. Joint pains such as knee and shoulder pain were also confirmed by 79.7% of respondents, indicating that the constant carrying of heavy loads and awkward postures place substantial stress on the joints. The most widely recognized cause was prolonged standing or lifting goods, with 81.8% in agreement, which reflects the routine tasks involved in trading that often lack ergonomic support. Importantly, 80.8% of the respondents admitted that musculoskeletal pains interfere with their ability to perform market tasks effectively, underscoring how these disorders not only compromise their health but also reduce their productivity and earning capacity. Taken together, these findings emphasize that musculoskeletal disorders are not isolated complaints but rather

widespread occupational hazards inherent to market trading, pointing to the urgent need for interventions such as ergonomic education, workplace health programs, and preventive strategies to safeguard the wellbeing of market women and sustain their livelihoods. This is in line with the findings of Adegoke et al. (2018), who reported that informal sector workers in Nigeria, particularly traders, experience high rates of musculoskeletal pain due to prolonged standing and heavy lifting. However, this contrasts with the findings of Okoye and Uche (2019), who observed lower prevalence rates of musculoskeletal disorders among urban shop attendants, attributing the difference to less physically demanding trading environments.

Barriers that hinder market women with musculoskeletal disorders from accessing orthopedic physiotherapy services

The analysis shows that barriers to accessing orthopedic physiotherapy services among market women with musculoskeletal disorders in Oredo LGA vary across different factors. A majority of respondents strongly agreed (32.1%) or agreed (24.1%) that the distance to physiotherapy clinics hinders access, giving a combined 56.2%. Similarly, more than half (53.4%) strongly agreed (28.6%) or agreed (24.8%) that lack of awareness about physiotherapy limits their ability to seek care. Long waiting times or difficulties in booking appointments were also highlighted, with 38.0% strongly agreeing and 32.1% agreeing, making a total of 70.1%. In contrast, most respondents disagreed (33.4%) or strongly disagreed (28.6%) that the cost of physiotherapy services prevents them from seeking treatment, totaling 62.0%. Likewise, 62.5% either disagreed (31.0%) or strongly disagreed (31.5%) that cultural or personal beliefs discourage market women from visiting physiotherapists. These findings suggest that while affordability (62.0%) and cultural beliefs (62.5%) are not considered major obstacles, the key barriers are distance (56.2%), lack of awareness (53.4%), and long waiting times (70.1%). This aligns with the

findings of Onyeso and Umunnah (2017), who reported that limited awareness and long travel distances significantly reduced physiotherapy utilization in southeastern Nigeria. Conversely, it contrasts with the study by Mbada et al. (2015), which emphasized cost as the major limiting factor to physiotherapy access among patients in southwestern Nigeria.

The factors facilitate market women's access to orthopedic physiotherapy services

The responses show that the majority of market women strongly emphasized affordability and accessibility as key facilitators of physiotherapy use. For instance, 48.4% strongly agreed and 32.9% agreed (a total of 81.3%) that having affordable physiotherapy services would encourage them to seek treatment. Similarly, 42.5% strongly agreed and 36.6% agreed (79.1%) that easy access to nearby physiotherapy centers motivates women to utilize services. Healthcare workers' recommendations were also influential, with 40.4% strongly agreeing and 34.5% agreeing (74.9%), while 45.2% strongly agreed and 32.4% agreed (77.6%) that positive testimonies from other women encouraged them to seek care. Flexible clinic hours were another major factor, as 40.9% strongly agreed and 36.1% agreed (77%). These results indicate that most respondents view affordability (81.3%), proximity (79.1%), and social influence through testimonies and recommendations (77.6% and 74.9% respectively), along with flexible service hours (77%), as the strongest facilitators of access to orthopedic physiotherapy services in Oredo LGA. However, these findings contrast with Odetola and Ojo (2021), who reported that in some rural Nigerian settings, even when services were affordable and accessible, cultural beliefs and preference for traditional healing limited physiotherapy utilization. This suggests that while affordability, accessibility, and social influence are decisive facilitators in Oredo LGA, cultural context may alter these patterns in other regions.

How socio-demographic characteristics influence the utilization of orthopedic physiotherapy services among market women

The analysis shows that education and awareness are the most influential socio-demographic factors affecting the utilization of orthopedic physiotherapy services among market women. A significant majority (77.1%) agreed or strongly agreed that their level of education influences their knowledge of physiotherapy services, while 74.9% indicated that their level of awareness about health services is closely tied to their social and economic status. In contrast, income was less consistently seen as a limiting factor, as 62.6% disagreed or strongly disagreed that their financial status significantly hinders their ability to pay for physiotherapy treatment. Similarly, most respondents (65.7%) disagreed or strongly disagreed that younger women are more likely to access physiotherapy than older ones, and 66.3% also disagreed or strongly disagreed that marital status leads women to prioritize family needs over physiotherapy. These findings highlight that while education and awareness strongly shape physiotherapy utilization, income, age, and marital status play comparatively weaker roles in influencing access. This aligns with the findings of Ajayi et al. (2020), who reported that educational attainment and health awareness were the strongest predictors of physiotherapy uptake among women in Southwest Nigeria. However, it contrasts with the study of Eze and Okeke (2019), who found that financial barriers remained the most critical determinant of physiotherapy utilization in rural populations.

Strategies that can be employed to improve accessibility and utilization of orthopedic physiotherapy services among market women with musculoskeletal disorders

The results revealed that market women strongly favor strategies related to awareness, health education, and community collaboration to enhance access to orthopedic physiotherapy services. A large proportion agreed or strongly agreed that creating awareness campaigns in markets (78.1%), providing health education programs in local languages (76.0%), and fostering collaboration between physiotherapists and community leaders (77.6%) would significantly improve service utilization. In contrast, strategies focused on government cost subsidies and establishing physiotherapy units near markets were not viewed as strongly effective, as 60.4% and 63.6% of respondents, respectively, disagreed or strongly disagreed with these options. This pattern suggests that women prioritize interventions that directly engage their communities and improve their understanding of physiotherapy services, rather than structural or policy-related measures. Overall, the findings indicate that grassroots approaches such as awareness creation, culturally sensitive health education, and community partnerships are seen as the most effective strategies for enhancing physiotherapy accessibility among market women in Oredo LGA. This is in line with the study of Akinola and Adeyemi (2021), who found that community-driven awareness programs significantly improved women's uptake of rehabilitative health services in Lagos markets. However, it contrasts with the findings of Musa et al. (2020), who emphasized that government subsidies and infrastructural expansion were the most effective strategies for increasing physiotherapy access in underserved rural communities.

5.2 Conclusion

In conclusion, this study revealed that musculoskeletal disorders are a widespread occupational health issue among market women, with body pain, low back pain, and strain from prolonged standing or lifting goods being the most dominant problems affecting their productivity and wellbeing, that distance, lack of awareness, and long waiting times are the major barriers to

physiotherapy access, while cost and cultural beliefs are less significant, that affordability, proximity of services, positive testimonies, flexible clinic hours, and healthcare worker recommendations are the most important factors that facilitate market women's access to orthopedic physiotherapy services, and that education and awareness are the most important socio-demographic factors influencing the utilization of orthopedic physiotherapy services, while income, age, and marital status have less impact. It also revealed that market women value awareness, culturally tailored education, and community collaboration more than financial subsidies or proximity of services as strategies to improve access to orthopedic physiotherapy.

5.3 Recommendations

Community-Based Awareness Campaigns: Physiotherapists, in collaboration with local health authorities, should organize regular awareness and education programs in markets to improve knowledge of musculoskeletal disorders and the benefits of physiotherapy services.

Mobile and Outreach Physiotherapy Clinics: Establishing mobile physiotherapy units or outreach programs within market environments would help overcome distance barriers and make services more accessible to market women.

Culturally Appropriate Health Education: Health education materials and programs should be developed in local languages and tailored to cultural contexts to increase understanding and acceptance of physiotherapy interventions.

Policy and Government Support: Government and stakeholders should provide financial subsidies or support for physiotherapy services to reduce cost barriers and make care affordable for low-income women traders.

Collaborative Engagement with Community Leaders: Physiotherapists should work closely with community leaders, market associations, and women's groups to build trust, promote utilization of services, and implement sustainable community-driven interventions.

5.4 Implication for Further Studies

Future studies should employ a longitudinal or mixed-methods design to establish causal relationships between the identified barriers and actual physiotherapy utilization and to gain deeper, qualitative insights into the lived experiences of market women. Research should also be expanded to include comparative studies across different local government areas and demographic groups, such as male traders, to enhance the generalizability of the findings. Furthermore, investigating the effectiveness and feasibility of specific intervention strategies, such as the impact of community-based mobile physiotherapy clinics or targeted awareness campaigns on service uptake, would provide an evidence base for practical implementation and policy development.

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APPENDICES
INFORMED CONSENT FORM

Title of study: Barriers and facilitators to accessing orthopaedic physiotherapy services among market women with musculoskeletal disorders in Oredo LGA, Benin city, Edo state.

Researcher: Ogu Ijeoma Lilian

I am a final-year student of the Department of Physiotherapy, University of Benin, conducting a research study as part of the requirements for the completion of my undergraduate project.

Purpose: This study aims to evaluate the Barriers and facilitators to accessing orthopaedic physiotherapy services among market women with musculoskeletal disorders in Oredo LGA, Benin city, Edo state.

Participation: Your participation in this study is entirely voluntary. You may choose to withdraw at any time without penalty.

Confidentiality: All information provided will be kept strictly confidential and used solely for research purposes.

Risks/Benefits: There are no known risks associated with participation. The findings may help in recommending better sleeping surfaces to reduce pain and improve comfort.

Consent: By signing below, you agree to participate in the study and affirm that you have understood the purpose and nature of the study.

Participant's Name: _____

Signature: _____ Date: _____

QUESTIONNAIRE

SECTION A: BIODATA AND DEMOGRAPHIC INFORMATION.

(Instruction: Please tick the most appropriate option or fill in the blank where applicable.)

Age:

- 18–29 years
- 30–39 years
- 40–49 years
- 50–59 years
- 60 years and above

Marital Status:

- Single
- Married
- Widowed
- Divorced/Separated

Level of Education:

- No formal education
- Primary education
- Secondary education
- Tertiary education

Monthly Income Level (₦):

- Less than ₦20,000
- ₦20,000 – ₦39,999
- ₦40,000 – ₦59,999
- ₦60,000 – ₦79,999
- ₦80,000 and above

Years of Trading Experience in the Market:

- Less than 5 years
- 5–10 years
- 11–15 years
- 16 years and above

Type of Goods Sold:

- Foodstuffs
- Clothing/Fabrics

- Household items
- Agricultural Implements

Section B: Common musculoskeletal disorders experienced by market women

Indicate the extent to which you agree or disagree with the following statements.

Key: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD)

S/N	ITEMS	SA	A	D	SD
	Common musculoskeletal disorders experienced by market women				
1.	I frequently experience body pain due to the nature of my work in the market.				
2.	Low back pain is one of the common problems I face while carrying out daily activities.				
3.	I often suffer from joint pains (such as knee or shoulder pain) after market activities.				
4.	Prolonged standing or lifting goods contributes to my musculoskeletal problems.				
5.	Musculoskeletal pains affect my ability to perform market tasks effectively.				

Section C: Barriers hindering market women with musculoskeletal disorders from accessing orthopedic physiotherapy

Indicate the extent to which you agree or disagree with the following statements.

Key: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD)

S/N	ITEMS	SA	A	D	SD
	Barriers hindering market women with musculoskeletal disorders from accessing orthopedic physiotherapy				
6.	The cost of physiotherapy services prevents me from seeking treatment.				
7.	The distance to physiotherapy clinics makes it difficult for me to access services.				
8.	Lack of awareness about physiotherapy limits my ability to seek care.				
9.	I believe that cultural or personal beliefs discourage market women from visiting physiotherapists.				
10.	Long waiting times or difficulty in booking appointments discourage me from using physiotherapy services.				

Section D: Factors that facilitate access to orthopedic physiotherapy services

Indicate the extent to which you agree or disagree with the following statements.

Key: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD)

S/N	ITEMS	SA	A	D	SD
	Factors that facilitate access to orthopedic physiotherapy services				
11.	Having affordable physiotherapy services would encourage me to seek treatment.				
12.	Easy access to nearby physiotherapy centers motivates women to use the services.				
13.	Recommendations from healthcare workers influence me to seek physiotherapy services.				
14.	Positive testimonies from other women who have received physiotherapy encourage me to access care.				
15.	Flexible clinic hours would make it easier for market women to attend physiotherapy sessions.				

Section E: Influence of socio-demographic characteristics on the utilization of orthopedic physiotherapy services

Indicate the extent to which you agree or disagree with the following statements.

Key: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD)

S/N	ITEMS	SA	A	D	SD
	Influence of socio-demographic characteristics on the utilization of orthopedic physiotherapy services				
16.	My level of education influences how much I know about physiotherapy services.				
17.	My income level affects my ability to pay for physiotherapy treatment.				
18.	Younger market women are more likely to access physiotherapy than older ones.				
19.	Married women are more likely to prioritize family needs over seeking physiotherapy services.				
20.	My level of awareness about health services is related to my social and economic status.				

Section F: Strategies that can improve accessibility and utilization of orthopedic physiotherapy services among market women

Indicate the extent to which you agree or disagree with the following statements.

Key: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD)

S/N	ITEMS	SA	A	D	SD
	Strategies that can improve accessibility and utilization of orthopedic physiotherapy services among market women				
21.	Creating awareness campaigns in markets will improve knowledge about physiotherapy.				
22.	Government support in subsidizing physiotherapy costs will increase women's access to services.				
23.	Establishing physiotherapy units closer to market areas will improve utilization.				
24.	Health education programs in local languages will make women more likely to seek physiotherapy.				
25.	Collaboration between physiotherapists and community leaders will promote better access to services.				