

**PREVALENCE OF NECK, SHOULDER PAIN AND
ASSOCIATED RISK FACTORS AMONG SENIOR SECONDARY
SCHOOL TEACHERS IN EGOR LOCAL GOVERNMENT**

BY

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CERTIFICATION

This dissertation by Lamidi Solomon Oluwaloni is accepted in its present 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 dedicated to God Almighty and my late father Mr. Lamidi, to my mother Mrs. Lamidi, and to my superb siblings for their amazing support.

ABSTRACT

Background;

Neck pain and shoulder pain are common musculoskeletal conditions faced by senior secondary school teachers. There is however limited understanding of the prevalence of neck and shoulder pain and its associated risk factors among senior secondary school teachers therefore relationship between the prevalence of these musculoskeletal disorders and work characteristics, specifically the arm length, board height, and lesson duration needs to be investigated among senior secondary school teachers.

Aims;

The study aims to determine the prevalence of neck, and shoulder pain and associated risk factors among secondary school teachers in Egor local government of Edo state.

Methodology;

This cross-sectional survey was carried out in Egor local government. It involved 150 participants. Data was collected using a self-administered questionnaire. Neck and shoulder pain was assessed using the Standardized Nordic Musculoskeletal Questionnaire Descriptive and inferential statistics were used to analyze the data with a significance level set at $p < 0.05$. and Wilcoxon signed ranked test was done to find the significant difference between the prevalence of neck and shoulder pain at 12 months and 7 days duration

Result;

The findings of the study showed that the 12-month prevalence of neck pain among respondents was 96 (64%), while 60(40%) was observed for shoulder pain. The result also showed that there was a significant difference between 12-month prevalence of neck pain and shoulder pain ($Z = -4.500$, $P = 0.000$) and no significant difference between 7 days prevalence of neck pain and shoulder pain ($Z = -0.469$, $P = 0.639$) Similarly, a significant association was also observed between the prevalence of neck pain and shoulder pain at 12months ($P < 0.05$) and a significant association was also observed between the prevalence of neck pain and shoulder pain at 7 days ($P < 0.05$)

Conclusion;

There is a prevalence of neck and shoulder pain among senior secondary school teachers in Egor Local government, Edo state. The 12-month prevalence of neck pain and shoulder pain was the highest followed by the prevalence in 7 days among senior secondary school teachers in Egor Local government, Edo state. The risk factor associated with significant shoulder pain was prolonged teaching hours characterized by writing on the board.

Keywords;

Neck pain, Shoulder pain, Senior Secondary School Teachers.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Work-related musculoskeletal diseases (WMSDs) are defined as conditions or injuries affecting the muscles, nerves, tendons, joints, cartilage, and spinal discs that are associated with exposure to risk factors at work (Bureau of Labor Statistics, 2021). Globally in 2017, the age-standardized rate for point prevalence of neck pain per 100,000 population was 3551.1 (Safiri *et al.*,2017). The prevalence of WMSDs was found to be 26.4%, 17.7%, 14.9%, 40.1%, 20.8%, 7.0%, 18.1%, 35.4%, 7.0%, 13.0%, and 5% in the neck, upper back, mid back, lower back, shoulders, elbows, wrists/hands, thumb, hips/thighs, knees/legs, and ankles/feet, respectively. In Japan, the Nordic countries, and the US, WMSDs are the most prevalent kind of work-related illness, making up at least one-third of all officially recorded occupational illnesses. There is a 20–30% or even higher prevalence of upper extremity symptoms, according to numerous surveys conducted among working populations. Musculoskeletal disorders cause more people to be incapacitated or miss work than any other group of diseases in the US, Canada, Finland, Sweden, and England (Punnett *et al.*,2004).

Neck pain is one of the most common musculoskeletal conditions on a global scale. Four continents' neck and shoulder prevalences were nearly as high as the global prevalence (Gorce *et al.*, 2023). Pain in the neck and/or shoulder has been the common cause of absenteeism from work and the cause of specific illnesses or conditions that may lead to early retirement (Sadeghian *et al.*, 2013).

According to Ayanniyi *et al.* (2010), computer users had a considerably greater prevalence of WMSDs than non-users. Younger age, male gender, longer workdays, more years of computer

use, data entry duties, and computer designs/graphics were additional significant risk variables for computer users to report musculoskeletal problems.

Workers who bottle beverages also have a very high prevalence of WMSD, with the shoulder being the most affected body area. Within this particular occupational group, WMSDs were more prevalent among older and/or female workers (Abaraogu *et al.*, 2015).

School teachers majorly, relative to other occupational groups, have been reported to have high rates of neck and shoulder pain between 40% and 95%. The work of a teacher involves not only teaching students but also preparing lessons, assessing students' work and extracurricular activities, such as sports so on, frequent reading, and using a forward head-down posture (Erick & Smith 2015). Teachers' performance is negatively impacted by the stressful nature of their workload, which frequently necessitates a lot of neck flexion. Teachers are thought to have the greatest direct influence on children's daily educational experiences because, according to UNICEF/UNESCO (2007), "it is their task to translate national policies into practical action in each school".

A study in China reported that 12-month neck or shoulder pain prevalence among school teachers was 66.7% (Yue *et al.*, 2012). Upper back, shoulder, and neck MSD were common and reported at similar rates 52.6, 52.5, and 50.8% respectively in a cross-sectional study of Botswana school teachers (Erick *et al.*, 2014). There are some ergonomic issues also associated with the causation of musculoskeletal disorders which may include writing on the blackboard board and sitting position (Fazli *et al.*, 2016).

Risk factors of work-related Musculoskeletal disorders (MSDs) among school teachers include frequent adoption of 'head down' postures, poor application of kinetic handling principles, repetitive mechanical loading during holding and lifting tasks, faulty posture sequel to use of

inappropriate facilities and furniture, unsuitable backrest as well as prolonged standing and twisting postures (Liping *et al.*,2012). However, the association between these risk factors and the occurrence of neck and or shoulder pain among teachers remains controversial. In Nigeria, there seems to be a paucity of literature on the occupational and socio-demographic risk factors of work-related MSDs in school teachers,

A study performed in Enugu Nigeria showed that 70.2% of the instructors had work-related MSDs mostly at the shoulder (62.3%) and neck (57.9%) areas (Ojukwu *et al.*, 2021).

Thus, the purpose of this study is to determine the prevalence of neck and shoulder pain among secondary school teachers in Egor local government Benin City, Edo state, south-south Nigeria, as well as the risk factors that are associated with it. The teaching community will benefit from an increased understanding of the prevention and treatment of shoulder and neck pain.

1.2 Statement of the Problem

The risk factors associated with neck and shoulder pain have been a point of concern for physiotherapists and the whole society at large, several studies have shown the pattern of work-related musculoskeletal disorders among secondary school teachers (Yue *et al.*,2012; Liping *et al.*,2012; Erick *et al.*,2014; Ojukwu *et al.*, 2021; Omar,2022).

There is, however, a paucity of literature on the prevalence and risk factors for neck pain among teachers in the south-south geopolitical zone, particularly in Benin, and only one study has been conducted in the southeastern part of Nigeria (Ojukwu *et al.*, 2021). Furthermore, there have been many cases of neck and shoulder pain in the south-south that are under-treated in hospitals, hence the need for a study to investigate the prevalence and risk factors that are associated with neck and shoulder pain among teachers in secondary schools in Benin.

1.3 Research questions

This study was conducted to answer the following questions;

- i. What is the prevalence of neck and shoulder pain among secondary school teachers in Egor local government of Edo state?
- ii. What are the risk factors associated with neck and shoulder pain among secondary school teachers in Egor local government of Edo state?
- iii. What is the association between neck pain and shoulder pain among secondary school teachers in Egor local government of Edo state?
- iv. What is the association between arm length and neck/shoulder pain among secondary school teachers in Egor local government of Edo state?
- v. What is the association between teaching duration and neck/shoulder pain among secondary school teachers in Egor local government of Edo state?

1.4 Aims of Study

The study aims to determine the prevalence of neck, and shoulder pain and associated risk factors among secondary school teachers in Egor local government of Edo state.

1.5 Specific objectives

The specific objectives of this study are to:

- i. To determine the prevalence of neck pain and shoulder pain among secondary school teachers.
- ii. To investigate the association between neck pain and shoulder pain among secondary school teachers.
- iii. To determine if board height of secondary school teachers is associated with neck pain

- iv. To determine if teaching duration (excluding break time) is associated with neck and shoulder pain.

1.5.1 Hypothesis

- i. There would be no significant difference in the prevalence of neck and shoulder pain at 12 months among secondary school teachers in Egor Local Government.
- ii. There would be no significant difference in the prevalence of neck and shoulder pain at 7 days among secondary school teachers in Egor Local Government.

1.5.2 Main Hypothesis

- i. There would be no significant association between neck pain and shoulder among secondary school teachers in Egor Local Government.

1.5.3 Sub Hypotheses

- i. There would be no significant association between arm's length and neck pain at 12 months among secondary school teachers in Egor Local Government.
- ii. There would be no significant association between arm's length and neck pain at 7 days among secondary school teachers in Egor Local Government.
- iii. .There would be no significant association between arm's length and shoulder pain at 12 months among secondary school teachers in Egor Local Government.
- iv. There would be no significant association between arm's length and shoulder pain at 7 days among secondary school teachers in Egor Local Government.
- v. There would be no significant association between board height and neck pain at 12 months among secondary school teachers in Egor Local Government

- vi. There would be no significant association between board height and neck pain at 7 days among secondary school teachers in Egor Local Government
- vii. There would be no significant association between board height and shoulder pain at 12 months among secondary school teachers in Egor Local Government.
- viii. There would be no significant association between board height and shoulder pain at 7 days among secondary school teachers in Egor Local Government.
- ix. There would be no significant association between the duration of teaching and neck pain at 12 months among secondary school teachers in Egor Local Government.
- x. There would be no significant association between the duration of teaching and neck pain at 7 days among secondary school teachers in Egor Local Government.
- xi. There would be no significant association between the duration of teaching and shoulder pain at 12 months among secondary school teachers in Egor Local Government.
- xii. There would be no significant association between the duration of teaching and shoulder pain at 7 days among secondary school teachers in Egor Local Government.

1.6 Scope of Study

This is a cross-sectional study that was carried out on secondary school teachers in Egor local government Benin City, Edo State, Nigeria.

1.7 Limitation of Study

- i. This study was carried out using a self-reported questionnaire & there might be over-reporting of data & subjected to recall bias.

- ii. The time frame for the study was quite short.

1.8 Significance of the Study

- i. This study may contribute to the studies on the prevalence of neck and shoulder pain, among secondary school teachers, in Egor local government Benin City Nigeria.
- ii. This study may help educate secondary school teachers on work-related MSDs and teach normal ergonomic work posture.
- iii. The outcome of this study may help to educate secondary school teachers, on the risk factors how to avoid these risk factors, and effective ways to manage this pain.
- iv. This study may contribute to the studies on work-related musculoskeletal disorders among secondary school teachers, in Egor local government Benin City Nigeria.

1.9 Definition of Terms

- i. **Prevalence:** the percentage of a population that is affected by a particular medical condition (disease) at a particular point in time (Merriam-Webster Dictionary).
- ii. **Neck pain:** pain or discomfort felt in the neck area (the transitional area between the base of the skull and the inferior clavicles).
- iii. **Shoulder pain:** pain or discomfort felt in the region of the glenohumeral joint.
- iv. **Senior Secondary School teachers:** Teachers who teach Senior Secondary School 1 to Senior Secondary School 3 (SS1 – SS3) and fall within the age bracket of 22 and above.

1.9.1 List of Abbreviations

MSDs Musculoskeletal Disorders including only (neck pain and shoulder pain).

WRMSDs Work-Related Musculoskeletal Disorders including only (neck pain and shoulder pain).

NP Neck pain

SP Shoulder pain

NMQ Nordic Musculoskeletal Questionnaire (NMQ)

BMI Body mass index

TENS Transcutaneous electrical nerve stimulation

CHAPTER TWO

LITERATURE REVIEW

2.1 Definition of Neck pain

Cervicalgia, another name for neck pain, is a frequent discomfort felt in the neck area. It might be localized or extend to the shoulders, arms, and even the head. It can start as a dull ache and end as a strong, stabbing pain.(Suvarnato *et al.*, 2019).

In general, neck pain is described as pain, stiffness, and discomfort located in the posterior region of the cervical region between the occipital condyle and the C7 vertebral prominence. Pain in the upper thoracic region, occiput, and jaws is often present. (Kuo & Tadi, 2023).

The most frequent causes of neck pain, despite the wide range of potential causes, are prolonged sitting, improper workplace ergonomics, and holding one's neck in an abnormal position. Neck discomfort falls into one of three categories: acute (lasting less than six weeks), subacute (lasting three months or less), or chronic (lasting longer than six months). A longer duration of neck pain has been associated with a more favorable outlook for long-term effects.(Popescu & Lee, 2020).

The intricate anatomy of the neck is made up of blood vessels, ligaments, muscles, bones, and joints. Any of these structures might produce pain, thus it can be difficult to determine the precise cause without conducting a thorough assessment.(Suvarnato *et al.*, 2019)

Neck pain is linked to job absenteeism and can cause activity limits such as decreased neck range of motion, sitting tolerance, sleep disturbance, and decreased quality of life (QoL). Due to the high cost of healthcare, lost productivity or time away from work, and work insurance costs, it has a significant economic impact (Fandim *et al.*, 2021).

There are a few typical signs of neck pain:

Pain can manifest as a burning sensation, a sharp ache, a dull ache, or a shooting agony that spreads to other places, Stiffness that can impede the head's natural movement, and Reduced range of motion which can make it difficult to look up and down, tilt the head back, or turn head, Muscle spasms are sudden, intense pains caused by the involuntary tightening of neck muscles, Tension headaches, in particular, can occasionally be brought on by neck pain.

If a pinched nerve is the source of the discomfort, numbness or tingling may appear in the hands, fingers, or arms, and Weakness in the hands or arms (Kazeminasab *et al.*, 2022).

The presumed source of pain can be categorized as non-traumatic neck pain and traumatic neck pain. Non-traumatic neck pain consists of a neuropathic component (radiculopathy resulting from compression or irritation of the spinal nerve due to a disc herniation, foramina stenosis, or central spinal stenosis) or a mechanical component (cervical intervertebral disc, cervical zygapophyseal joints, facet joints, ligaments, and atlantoaxial joints), or a combination of the two (Popescu & Lee, 2020). Risk factors for non-specific neck pain include; Lifestyle and habits (Poor posture, Repetitive motions, Lack of physical activity), Age and physical factors (Age-related wear and tear, Previous injuries, Obesity, Genetics), Medical conditions (Autoimmune diseases, Tumors) (Jahre *et al.*, 2020).

2.1.1 Relevant anatomy of the cervical Spine

The cervical spine is composed of seven vertebrae: the lower cervical spine (C3–C7), the upper cervical spine (C1 and C2), and the cervical spine (C1–C7).

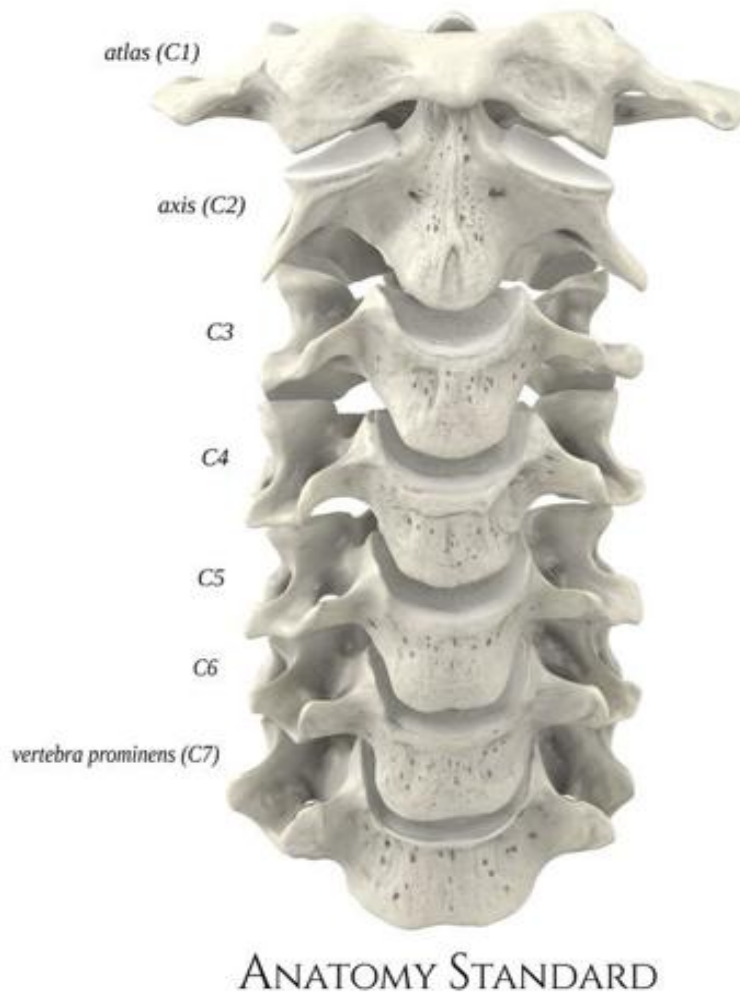


Figure 1 : Anatomy Of The Cervical Spine

2.1.2 Upper Cervical spine

There are two vertebrae in the upper cervical spine: The first atlas (C1) and the axis (C2).

The atlas (C1)

The first cervical vertebra in the human spine is called the atlas, or C1. It is a distinct bone that differs from the other cervical vertebrae in several ways, including:

Absence of a vertebral body: The atlas lacks a vertebral body, in contrast to the other cervical vertebrae. Rather, it possesses a ring-shaped structure made up of two anterior and posterior

arches joined by two lateral masses. The following are some of the most significant articulations in the atlas:

Atlanto-occipital joint: At the base of the skull, this synovial joint permits the head to flex, extend, and laterally flex.

A synovial junction called the medial atlantoaxial joint permits rotation of the head around the dens (odontoid process) of the axis (C2) vertebra.

Lateral atlantoaxial joints: The head can tilt slightly from side to side thanks to these synovial joints.

Large, noticeable transverse processes that extend laterally from the lateral masses are seen in the atlas. These mechanisms facilitate the attachment of muscles and aid in the head's weight support. The vertebral foramen is the name given to the sizable aperture located within the atlas' ring. The spinal cord can travel via this foramen to reach the remainder of the spinal cord from the brainstem(Moore *et al.*, 2013)

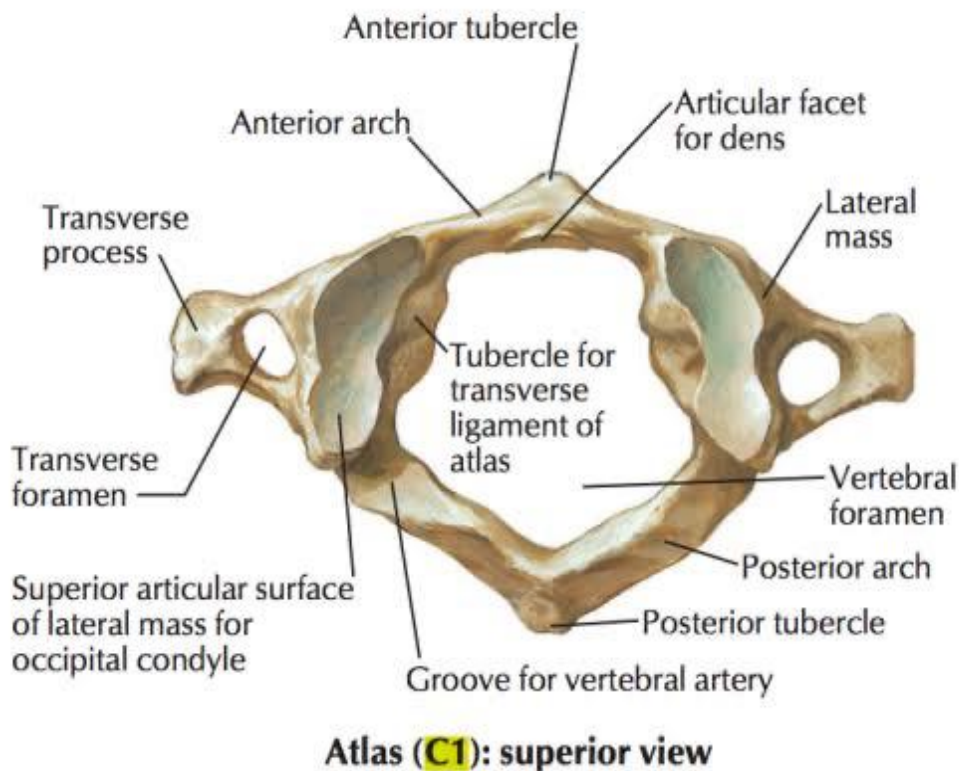


Figure 2: Anatomy of the Atlas (C1 Spine)

The axis(C2)

The second cervical vertebra in the human spine is called the axis, or C2. It gets its name from the key function it plays in enabling head rotation—it serves as a pivot joint around the dens, or odontoid process.

Dens: The dens, a bony projection that rises from the vertebra's body, is the most characteristic aspect of the axis. The dens form the median atlantoaxial joint, which permits head rotation, by fitting into the anterior arch of the atlas (C1).

Anatomy of the vertebrae on axis (C2) with emphasis on dens. The axis's body supports the head's weight more than other cervical vertebrae since it is thicker and bigger, The axis features large, noticeable transverse processes, just like the atlas that extends laterally. On its lateral

masses, the axis possesses superior and inferior facet joints that engage with the corresponding facets on the atlas and C3, respectively. The vertebrae can glide somewhat thanks to these joints. Although it is smaller than the atlas', the axis' vertebral foramen nevertheless permits the spinal cord to pass through. (Moore *et al.*, 2013; Singh, 2019)

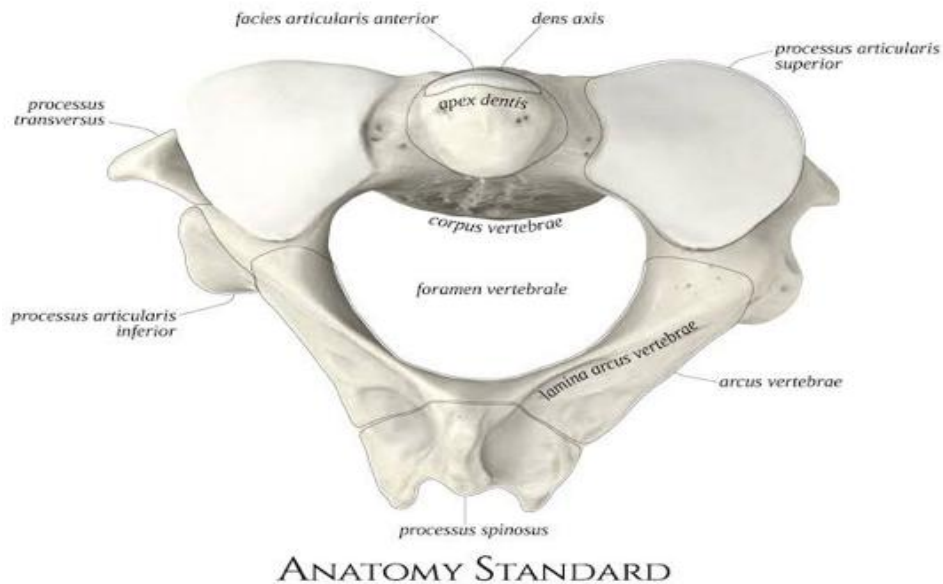


Figure 3: Axis

2.1.3 Lower Cervical Spine

Of the seven cervical vertebrae that comprise the neck, the lowest five (C3 through C7) are referred to as the lower cervical spine. These vertebrae have unique characteristics and are essential for the general movement and stability of the neck, even though they resemble the upper two (C1 and C2) in certain ways. The cylindrical bodies of each vertebra distribute weight and provide structural support. When the head is bent or tilted, the facet joints, which are tiny joints on the sides of the vertebrae, allow sliding motions. The cartilage pads between the vertebrae called intervertebral discs serve as shock absorbers and preserve room for the spinal cord and nerve roots. Each vertebra has small openings called transverse foramina that permit

blood vessels and nerves to pass through. The spinous processes, on the other hand, are bony projections located at the rear of each vertebra that act as attachment points for ligaments and muscles. (Moore *et al.*, 2013; Singh, 2019; Standring, 2021).

2.1.4 Intervertebral Disc

The intervertebral discs make up one-fourth of the spinal column's length. No discs are present between the Atlas (C1), and Axis (C2), (“Intervertebral Discs,” 2019). Intervertebral discs are fibrocartilaginous pads found between each vertebra in your spine. They cushion the bones and shield them from routine movements like walking, jumping, and lifting stress by acting as shock absorbers. These discs are essential to preserving the spine's flexibility and overall health. The

Intervertebral Disc's Structure includes:

Concentric layers of collagen fibers make up the robust outer ring, known medically as the annulus fibrosus. The disc is strengthened and stabilized by these fibers, which keeps it from bulging or herniating.

The nucleus pulpous, a gel-like center made of water and proteoglycans, is located inside the annulus fibrosus. The shock-absorbing qualities of the disc are derived from this jelly-like material, which also distributes pressure uniformly and keeps the vertebrae from grinding against one another (Moore *et al.*, 2013).

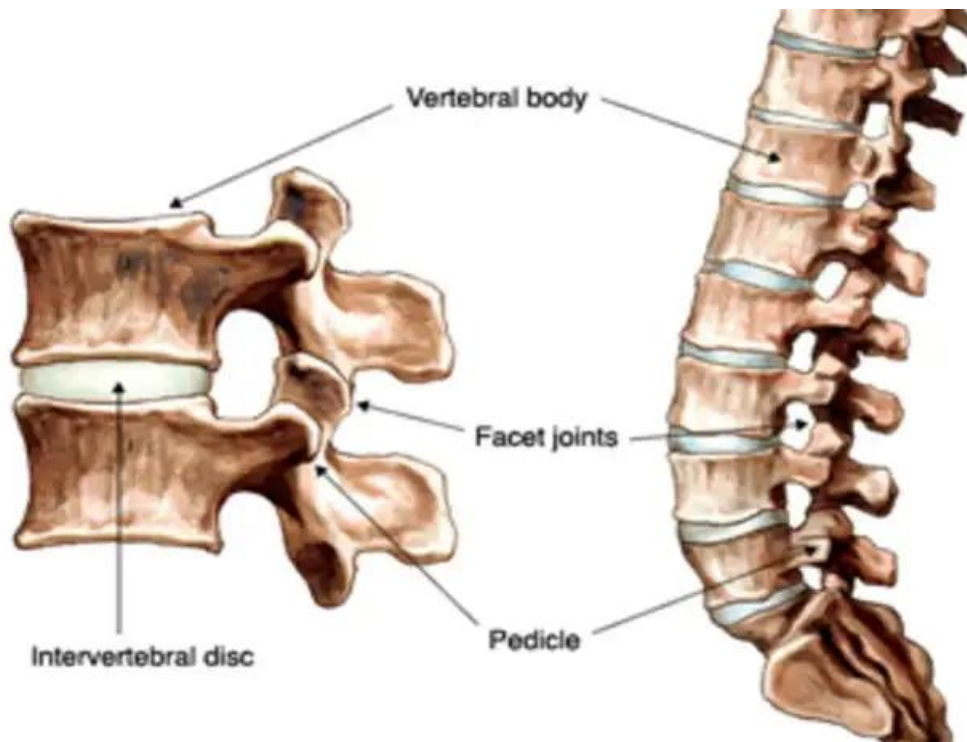


Figure 4: Intervertebral Disc

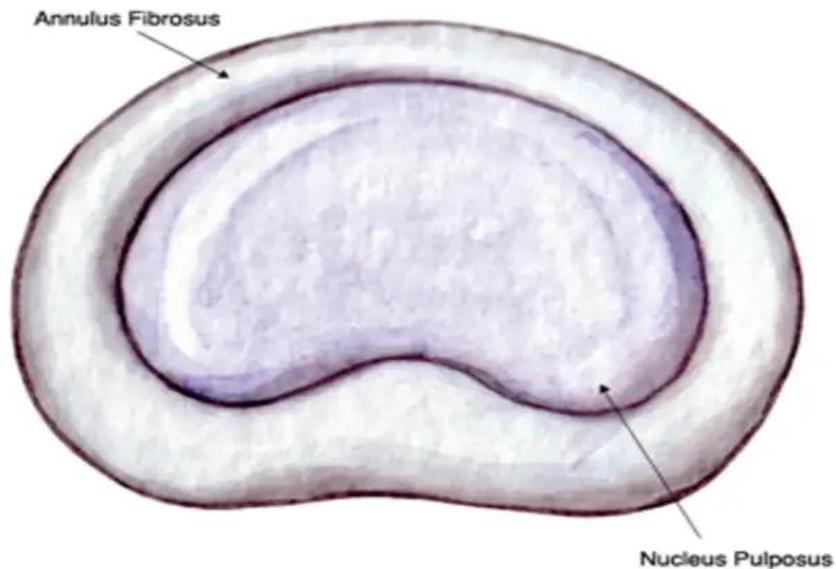


Figure 5: Annulus Fibrosis and Nucleus Propusus

2.1.5 Epidemiology of neck pain

A study by Safari *et al* , done in 195 countries between 1990 and 2017, found that the prevalence of neck pain patients worldwide was 288.7 million, with 65.3 million incident cases and 28.6 million years lived with disability.

According to a Chinese study, 66.7% of school teachers reported having neck or shoulder pain 12 months out of the year (Yue *et al.*, 2012). Sub-Saharan Southern Africa has a high prevalence rate of 4.7% for men and 7.6% for women. The only regions with higher incidence rates than sub-Saharan Southern Africa are the United States (5.3% for men and 7.6% for women), Western Europe (5.2% for men and 7.4% for women), and East Asia (4.8% for men and 7.0% for women). Hoy *et al.* (2014); and Vos *et al.* (2014) In a cross-sectional research of school teachers in Botswana, upper back, shoulder, and neck MSD were prevalent and reported at equal rates of

52.6, 52.5, and 50.8%, respectively. The study also found that female teachers had a greater incidence of MSD (Erick & Smith, 2014).

A study performed in Enugu Nigeria shows that 70.2% of the teachers had work-related MSDs predominantly at the shoulder (62.3%) and neck (57.9%) regions (Ojukwu *et al.*, 2021).

2.1.6 Etiology and Risk Factors of Neck Pain

Important risk factors for pain in the neck include psychological conditions including depression, anxiety, and long-term stress, they can also include a lack of social support. Regarding the biological dangers, neck pain might result from illnesses like autoimmune diseases or neuromusculoskeletal problems. Additionally, there is proof that age and sex are demographic factors that can affect the occurrence and progression of neck pain (Kazeminasab *et al.*, 2022).

Women's gender, computer use, carrying a backpack to school, and an excessively low seat backrest were risk factors for neck pain (Ben Ayed *et al.*, 2019).

Cervical radiculopathy is a subset of neck pain that is characterized by longer-lasting symptoms, lack of paresthesia, high baseline neck pain, disability, and altered range of motion. Low recovery of pain may be linked to this condition. (Sleijser-Koehorst *et al.* 2018).

2.1.7 Grade of Neck Pain

Grade I: Pain that is not associated with any symptoms or indicators of a serious structural illness, such as a fracture, dislocation, etc., and that causes little to no trouble going about daily activities.

Grade II: Pain that is not indicative of structural pathology or nerve root compression, but it can nevertheless have a major impact on day-to-day activities.

Grade III: Neural symptoms accompanied by pain, such as diminished tendon reflexes, weakened muscles, or abnormalities of the senses (hypoesthesia or hyperesthesia).

Grade IV: Pain that appears to be associated with a major structural pathology. Serious structural pathologies such as spinal cord injuries, fractures, systemic illnesses, or vertebral dislocations (Guzman *et al.*, 2008).

2.1.8.1 Signs and Symptoms of Neck Pain

The most typical symptoms include alterations in sensory perception, numbness, and referred pain, along with pain intensity, location, and kind (dull, acute, persistent, or intermittent). Although they may begin suddenly and worsen, neck discomfort symptoms frequently build gradually. The person may not be able to move due to the neck pain, which can range in intensity from minor to severe. Sitting, sleeping, squeezing, coughing, and experiencing weakness in certain muscles can all exacerbate neck discomfort. Additional symptoms include discomfort, unusual sensations, weakness, and stiffness that worsens with time (Breivik, 2017).

2.2 SHOULDER PAIN

After spine and knee pathologies, shoulder pain is the third most prevalent musculoskeletal presentation, accounting for 1.3% of all general practice visits. Individuals who have chronic shoulder pain (lasting longer than six months) frequently have impaired psychosocial well-being and considerable functional limitations (Crookes *et al.*, 2023).

2.2.1 Relevant Anatomy Of The Shoulder

The scapula, or shoulder blade, the humerus, and the clavicle, or collarbone, are the three bones that make up the shoulder joint.

The rounded head of the humerus, the upper arm bone, fits into the shoulder socket. The primary support structure for the shoulder joint is the flat, triangular scapula. The thin S-shaped bone

called the clavicle separates the arm from the body by joining the shoulder to the breastbone. Together, these bones enable the shoulder joint to move in all planes, including up and down, forward and backward, and in circles. (Moore *et al.*, 2013; Singh, 2020)

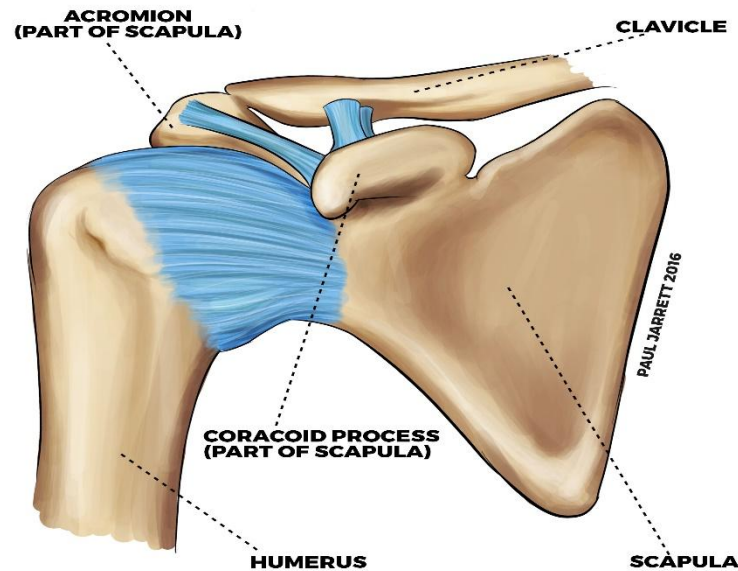


Figure 6: Anatomy of Shoulder Joint

2.2.1.1 Muscles of The Shoulder

A complex ball-and-socket joint with a broad range of motion is the shoulder. Many muscles, which can be roughly divided into two categories: intrinsic and extrinsic, enable this range of motion.

Intrinsic shoulder muscles

The scapula (shoulder blade) and clavicle (collarbone) are the origins of the intrinsic shoulder muscles, which insert into the humerus (upper arm bone). The arm's mobility at the shoulder joint is controlled by these muscles. The following are the primary intrinsic shoulder muscles:

Deltoid the primary muscle involved in raising the arm is this big, triangular muscle. The anterior, lateral, and posterior are its three sections. The arm is raised forward by the anterior deltoid, raised to the side by the lateral deltoid, and the posterior deltoid extends the arm back.

Rotator cuff muscles: The subscapularis, teres minor, supraspinatus, and infraspinatus muscles cooperate to support the shoulder joint and avoid dislocation. They also support the arm's rotation.

Extrinsic shoulder muscles

The shoulder's extrinsic muscles insert on the clavicle or scapula after coming from the neck, back, and chest. These muscles facilitate the mobility of the scapula and clavicle, which influences arm movement indirectly. The shoulder's primary extrinsic muscles consist of:

The large, triangular muscle known as the trapezius runs from the base of the neck to the middle of the back. It is useful to rotate, retract, and raise the scapula.

Rhomboids: The scapula may be raised and retracted with the assistance of these two fan-shaped muscles, which are located beneath the trapezius.

Serratus anterior: This broad, fan-shaped muscle on the side of the chest aids in scapular rotation and protraction.

The pectoralis major is a big muscle located on the front of the chest that aids in flexion and adduction, or drawing the arm inwards (Moore *et al.*, 2013; Singh, 2020; Standring, 2021).

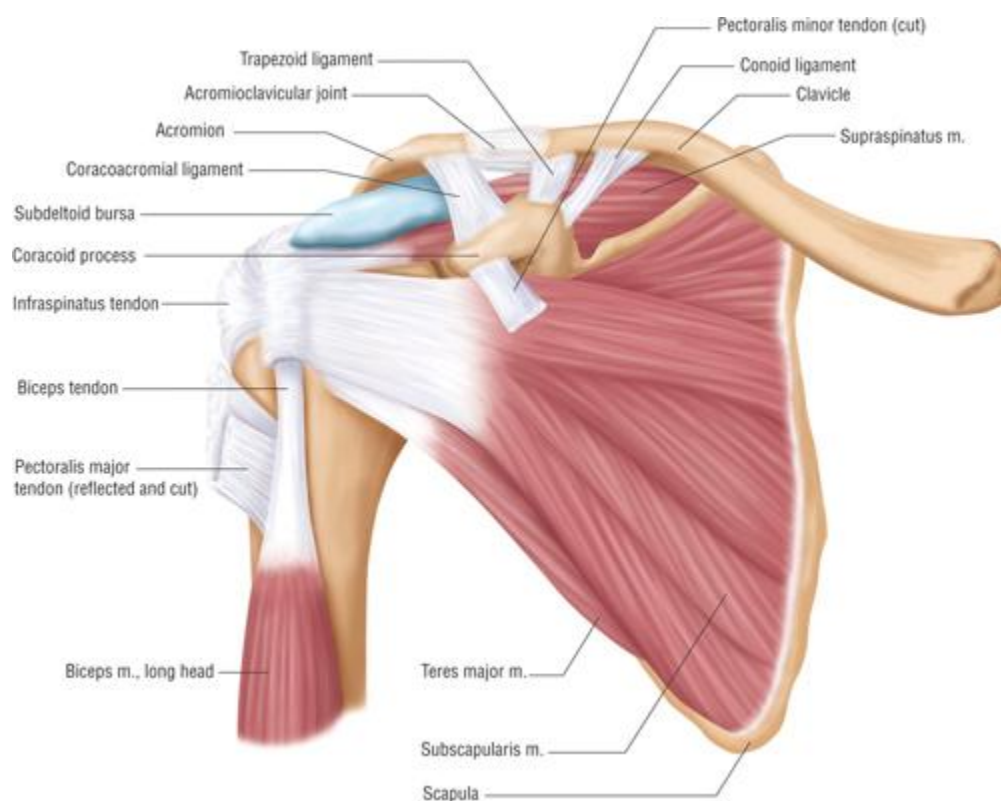


Figure 7: Muscles of the Shoulder joint

2.2.1.2 Joints Of The Shoulder

Atlanto-occipital joints (C1 articulations with the facial bones)

The head's flexion, extension, and lateral flexion at the base of the skull are made possible by these synovial joints. The superior facets of the atlas (C1) and the occipital condyles of the skull form ellipsoid joints.

Median atlantoaxial joint (C1 and C2 articulation)

Head rotation around the dens (odontoid process) of the axis (C2) is made possible by this synovial joint. a pivot joint that serves as a pivot point for rotation when the dens inserts into the atlas' anterior arch.

Lateral atlantoaxial joints (C1 and C2)

These synovial joints allow the head to tilt slightly from side to side. The superior articular facets of the axis and the lateral masses of the atlas produce plane joints.

Facet joints: (C2-C7 articulations)

Gliding motions are made possible by these synovial joints when the head and neck are extended, flexed, and rotated laterally. From C2 to C7, there are plane joints on the superior and inferior articular facets of each cervical vertebra.

Meningovertebral joints (articulations between the vertebrae and dura mater)

The dura mater, the spinal cord's outermost membrane, is joined to the vertebrae by these fibrous joints, which support and stabilize the spinal cord—connections via ligaments between the dura mater and facet capsules. (Moore *et al.*, 2013).

2.2.2 Joints of the Shoulder

The glenohumeral joint (GH)

The glenoid cavity, or socket, of the scapula and the head of the humerus, create the glenoid joint, the primary joint of the shoulder. There are several different movements possible with this joint, including flexion, extension, rotation, circumduction, abduction, and adduction. (Cucchi *et al.*, 2017; Moore *et al.*, 2013; Standring, 2021)

Acromioclavicular (AC) joint

The clavicle joins the acromion process (a bony projection on the scapula) at the articulation of the acromioclavicular (AC) joint, a small gliding joint. Though it doesn't move much, this joint aids with shoulder stability.

Sternoclavicular (SC) joint

This is a saddle-shaped joint that connects the clavicle to the sternum, or breastbone. The shoulder can move somewhat forward and backward because of this joint. (Cucchi *et al.*, 2017; Moore *et al.*, 2013; Standring, 2021).

Scapulothoracic(ST) joint

A "floating joint" in which the shoulder blades move in tandem with the back ribs. This joint permits the shoulder blade to move freely, which helps the overall movement of the shoulder (Cucchi *et al.*, 2017; Moore *et al.*, 2013; Standring, 2021).

2.2.3 Epidemiology of shoulder pain

Globally, the prevalence rates range from 10.8–55.2% for reference periods lasting 12 months or longer, 11.7–42.4% for reference periods lasting 2–6 weeks, 2.0–34.2% for reference periods lasting 7 days, and 20.9–26% for point-prevalence. Compared to males, women were more likely to report shoulder pain.(Lucas *et al.*, 2022).

Shoulder pain was reported 14.3% of the time. The largest proportion of patients (38%) are those between the ages of 50 and 59. In 72% of cases, rotator cuff tendinopathy was the most common cause of shoulder pain syndrome. In 50% of individuals, diabetes was the most common comorbidity in a study performed in the Nigerian Tertiary Hospital.(Odunlami *et al.*, 2023). The most common WRMSD among school instructors (67.9%) is the shoulder (43.6%) (Ojukwu *et al.*, 2021).

2.2.4 Etiology and Risk Factors of Shoulder Pain

Inadequate training in injury prevention, repetitive tasks, little rest or break periods, heavy lifting, awkward postures, prolonged standing, job discontent, and a high student load are risk factors for shoulder pain in teachers.(Ojukwu *et al.*, 2021).It has been established that certain hormonal and

metabolic disorders, including diabetes, hyper-, and hypothyroidism, have a significant role in the onset of shoulder pain.(Cucchi *et al.*, 2017).

Common pathology of the shoulder include; Spinal discomfort, including radiculopathy or somatic transferred pain, instability after a traumatic or Atraumatic (inherited multidirectional or acquired overuse), Pathology of the labrum and long head bicep, Subacromial discomfort, and mild rotator cuff disorders (small-to-medium full-thickness tears, tendinopathy, and calcific tendonitis), Major rotator disease and rotator cuff arthropathy (big to enormous tears), ACJ arthritis, Syndrome of frozen shoulder contractures and Osteoarthritis of the glenoid (Crookes *et al.*, 2023).

2.2.5 Red Flag Causes of Shoulder Pain

Table 1:Red Flags

Orthopedics

- Unreduced dislocation (after electrocution, seizure, or prior trauma)
- Osteoporosis-related occult fracture
- Avascular necrosis of the humeral head (risk upped by sickle cell anemia, alcoholism, steroids, and prior fractures).

Infection

- Septic arthritis
- Osteomyelitis

Inflammatory disease

- Rheumatoid arthritis
- Polymyalgia rheumatica
- Spondyloarthropathy

Malignancy

- Primary
- Metastatic

Referred pain from extrinsic location

- Cardiac (angina, acute myocardial infarction)
- Upper gastrointestinal disorders (gastro-oesophageal reflux disease, pancreatitis, and cholecystitis)
- Myelopathy or cervical radiculopathy
- Thoracic outlet syndrome (complex, arterial, venous, or neural)

2.2.6 Test for Neck Pain and Shoulder Pain

Various tests for neck and shoulder pain include Neck flexion, Neck extension, Neck rotation, Shoulder abduction, Spurling's test, Neer impingement test, Crank test, X-rays, Magnetic resonance imaging (MRI) (Bertilson *et al.*, 2003).

2.3 Management of Musculoskeletal Symptoms

There are many different causes and risk factors for musculoskeletal problems. Treating these conditions will entail addressing the underlying causes and treating any related deformities.

To manage musculoskeletal complaints, the following are;

- i. Education and self-care for patients
- ii. Physical treatment
- iii. Physical Therapy (heat therapy, cold therapy, short wave diathermy, Massage, Exercise, Infrared, orthotic devices, and collars)

The use of pharmaceuticals, primarily analgesics, muscle relaxants, anti-inflammatory agents, and sedatives (Babatunde *et al.*, 2017, Thistle, 1969).

Medical management of MSDs

Disorders of the musculoskeletal system pose a significant threat to public health. One of the most widely prescribed drugs for musculoskeletal disorders is an NSAID. The safety of all NSAIDs has been a topic of continuous discussion and debate since the advent of selective cyclooxygenase-2 (COX-2) inhibitors, also known as coxibs. The evidence now available indicates that there is an increased risk of gastrointestinal and cardiovascular damage with both standard NSAIDs and coxibs; however, these risks can be minimized with appropriate risk assessment. Furthermore, the goal of recently developed NSAID formulations and administration methods is to increase their efficacy while lowering their toxicity. For the treatment of

musculoskeletal disorders and injuries, a wide range of oral and topical analgesic medications are available. There are several types of analgesics available, both over-the-counter (OTC) and through prescription; nonopioid analgesics include acetaminophen, salicylates, and NSAIDs (Atchison *et al.*, 2013).

Physical Management of MSDs

The two categories of these measures are physical and psychological modalities. The physical interventions consist of spinal manipulation, massage, mobilization techniques, exercise, local heat or cold therapy, bed rest, and stimulation techniques like acupuncture, transcutaneous electrical nerve stimulation (TENS), and percutaneous electrical nerve stimulation. Psychosocial therapies include patient education, relaxation techniques, biofeedback, guided imagery, support groups, family counseling, and psychotherapy (Atchison *et al.*, 2013)

Specific Management for Neck and Shoulder Pain

Postural adjustments, manual therapy, physical activity, early mobilization, range-of-motion exercises for the neck and shoulder, and the use of nonsteroidal anti-inflammatory medicines are all part of the management of shoulder and neck pain (Ming *et al.*, 2004). Surgery may be required if conservative treatment is unable to alleviate symptoms, particularly in situations where nerve root compression is present. (Ming *et al.*, 2004).

Conditions that are acute or subacute: it is advised that those who have these conditions engage in frequent exercise. Exercises focusing on range of motion (ROM) are beneficial. Although the exact level of exercise is unknown, it should be consistent and occur multiple times a week. Exercise-related information should be provided on an individual basis. A complement for short-term symptom reduction is to employ transcutaneous electric nerve stimulation (TENS) or low-level laser treatment (LLLT).

It is advised to employ pulse electromagnetic therapy (PEMS) and intravenous glucocorticoids exclusively for acute whiplash-associated disease (WAD). For sub-acute WAD, multimodal treatments involving non-excessive range-of-motion exercise and cognitive behavioral therapy are also advised.

Chronic conditions: exercise and multimodal treatments are beneficial for overall treatment outcomes. Exercise-related information should be provided on an individual basis. Exercise is not the only effective way to reduce pain; TENS, LLLT, PEMS, or radiofrequency denervation are recommended treatments for individuals with this condition (Jensen & Harms-Ringdahl, 2007).

Pain relief, inflammation reduction, relaxation, healing, muscle power restoration, and the restoration of normal ranges of motion and function are the goals of treatment of neck and shoulder pain (Thistle, 1969).

2.4 Empirical Review

Table 2: Empirical review

S/N	Name/Year/Country	Title	Aim	Design/Sample Size	Result	Conclusion
1	(Ojukwu <i>et al.</i> , 2021)/Nigeria	Prevalence, pattern, and correlates of work-related musculoske	This study aimed to investigate the prevalence of work-	Socio-demographic and occupational characteristics	The results showed that 70.2% of the teachers had work-related MSDs	A high prevalence of work-related MSDs existed

		letal disorders among school teachers in Enugu, Nigeria	related MSDs and their associations with occupational and sociodemographic factors of Nigerian-based school teachers.	tics, prevalence, and pattern of work-related MSDs of 352 school teachers (24-60 years) were investigated using a standard Nordic questionnaire	predominantly at the shoulder (62.3%) and neck (57.9%) regions. Most of the studied sociodemographic features, and anthropometric and occupational characteristics are significantly associated ($p < 0.05$) with MSDs in at least one body region.	among the teachers. Advanced educational qualification, elevated teaching boards, teaching experience beyond 10 years, and an age range of 35-50 years were the major predictors of MSDs.
2	(Chiu & Lam, 2007a)/Hong kong	The prevalence of and risk	To take a look at the risk factors	Among 3,100 secondary	prevalence of neck pain and upper limb	Neck pain and upper limb pain

		factors for neck pain and upper limb pain among secondary school teachers in Hong Kong	and frequency of neck and upper limb problems in secondary school teachers' line of work.	school teachers.	pain was 69.3% (2091/3018) and 35.8% (1088/3042) respectively	were highly prevalent in secondary school teachers in Hong Kong. Gender, age, head-down posture, and some psychological factors were found to be significant risk factors.
3	(AlMaghlouth <i>et al.</i> , 2022)/Saudi Arabia	Prevalence, Patterns, and Risk Factors of WorkRelated Musculosk	This study aimed to determine the prevalence, patterns, implications,	404 random school teachers located in the Eastern province	Among the participants, back pain, shoulder pain, and knee pain were the most reported	Hong Kong secondary school teachers were highly likely to report

		<p>keletal Diseases Among Teachers in the Eastern Province, Saudi Arabia: A Community-Based Retrospective Cross-Sectional Survey</p>	<p>and risk factors of WMSDs among teachers in the Eastern Province of Saudi Arabia.</p>	<p>of Saudi Arabia.</p>	<p>symptoms of WMSDs in the past 12 months, while elbow pain was the least experienced; 41.1% had pain, discomfort, or numbness that prevented them from performing regular daily activities.</p>	<p>having neck and upper limb pain. It was discovered that several psychological variables, head down posture, gender, and age were important risk factors.</p>
4	<p>(Erick & Smith, 2014)/Botswana</p>	<p>The Prevalence and Risk Factors for Musculoskeletal Disorders</p>	<p>The aim of this study was to look into the effects, risk factors, and prevalence</p>	<p>Among school teachers in seven randomly selected education</p>	<p>The prevalence of MSD at any site in the previous 12 months was 83.3%. Upper back, shoulder,</p>	<p>this study suggests that MSD is reasonably common among school</p>

		among School Teachers in Botswana	of MSD among Botswana's school teachers.	regions in Botswana.	and neck MSD were common and reported at similar rates, (52.6%, 52.5%, and 50.8%, respectively),	teachers in Botswana, particularly at body sites such as the shoulder, upper back and neck.
5	(Odole <i>et al.</i> , 2022)/Nigeria	Prevalence, Pattern and Correlates of Work-Related musculoskeletal Pain among Selected Primary School Teachers in Ibadan Nigeria	The study aim to identify the prevalence of MSDs among primary school teachers.	Six hundred and seventy-nine teachers recruited consecutively from S4 public and private primary schools in Ibadan North	The 12-month prevalence of WRMSP was 78.8% in females and 21.2% in males. Majority (78.9%) of the participants reported WRMSP in at least one body part. Neck pain (36.1 %)	The Ibadan North Local Government Area of Oyo State has a significant prevalence of work-related musculoskeletal discomfort, particularly in the neck, among

				Local Government Area participated in this study	was the mostcommonly reported WRMSP followed by low back (34.9%), knee (34.8%) and shoulder(32.8%). There was no significant association between reported WRMSP and eachof the socio-demographic and occupational factors.	elementary school teachers. Compared to their male counterparts, it is higher in female teachers. Among primary school teachers, sociodemographic and occupational characteristics did not significantly correlate with WRMSP.
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CHAPTER THREE

MATERIALS AND METHOD

3.1 Participants

3.1.1 Study Area

Egor is a Local Government Area (LGA) in Edo State, Nigeria's South-South geopolitical zone. The administrative center is located at Uselu. Egor spans an area of about 93 square kilometers. While the 2006 census reported a population of 339,899, current estimates suggest it is closer to 258,442. Egor is one of the LGAs that contribute to the greater Benin City area. Egor LGA includes several towns and villages, including Okhoro, Use, Uwelu, Iguikpe, Ugbighoko, Iguediaye, Evbougide, and Oghedaivbiobaa. Esan, Bini, and Owan are among the various ethnicities that live in the area. Egor has a multi-faith community that includes Christians, Muslims, and followers of traditional religions. The Bini, Owan, and Esan languages are spoken, while English is most likely used for official purposes (Bello *et al.*, 2022).

3.1.1 Participant Selection

This study was conducted among secondary school teachers, aged between 22 and 60 years in Egor local government Benin City, Edo State, Nigeria.

3.1.2 Inclusion Criteria

- i. Participants were adult males and females who teach, live, and work in Benin City.
- ii. Participants were within 22 years of age and above.
- iii. Participants have been in active professional teaching career for at least a year.
- iv. Participants' consent was obtained

3.1.3 Exclusion Criteria

- i. Presence of a congenital musculoskeletal deformity.
- ii. Participants with fractures, dislocations, and other such musculoskeletal injuries to the spine, neck, or shoulder region.
- iii. Participants with less than one year of teaching experience.

3.2 Materials

3.2.1 Apparatus/Instruments

- i. **A weighing scale:** this was used to measure the weight of the secondary school teachers
- ii. **A tape measure:** this was used to measure the teacher's arm length.
- iii. **A stadiometer:** this was used to measure the height of the participants

Nordic Musculoskeletal Questionnaire (NMQ): This questionnaire was used to assess the senior secondary school teacher's musculoskeletal symptoms. It was designed to assess and

compare musculoskeletal symptoms during 12 months. It evaluates nine different parts of the body (Kuorinka *et al.*, 1987). The nine different parts include neck, shoulders, upper back, elbows, lower back, wrist, hip, knees, and ankles. For this study, only the neck and shoulder aspect of the NMQ will be considered. It gives data collection on the frequency, severity, and length of symptoms as well as how they affect day-to-day activities and employment in an organized method. When the validity of the questionnaire was compared to the clinical history, the findings showed that there was a range of answers that differed from 0% to 20% (Kuorinka *et al.*, 1987). The Nordic Musculoskeletal Questionnaire showed 66% to 92% sensitivity and 71% to 88% specificity when used to evaluate pain within the previous 7 days (Ohlsson *et al.*, 1994). It was discovered that specificity was highest for elbows and lowest for shoulders and that sensitivity was highest for shoulders and lowest for the neck (Ohlsson *et al.*, 1994). Reliability testing using the test-retest method showed that the percentage of different answers varied from 0% to 23% (Kuorinka *et al.*, 1987). The Nordic Musculoskeletal Questionnaire exhibited good reliability in assessing musculoskeletal symptoms, with kappa coefficients ranging from 0.64 to 0.71 for pain in the past week, 0.73 to 0.82 for pain in the past year, and 0.59 to 0.78 for pain in the past year that interfered with work or leisure (Palmer *et al.*, 1999).

3.3 Methods

3.3.1 Sampling Technique

Senior Secondary schools in Egor local government Benin city Edo state both private and public schools have a statistic of 274 teachers (Ahika, 2023) in 12 public schools and not specific in 150 private secondary schools (Soluap, 2023).

The public secondary schools were arranged in no specific order and the 1st, 4th, 7th, and 10th schools were chosen; the first has 27, the fourth has 14, the 7th has 32, and the 10th has 31 making a total of 104 teachers.

The sample sizes for this study was calculated using Slovin's sample size formula

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

Where n = the sample size

N = the population of the study

e = the margin error in the calculation.

For the public secondary school teachers,

$$N = 104, e = 0.06$$

$$n = 104 / (1 + 104(0.06)^2)$$

$$n = 75$$

For private secondary school teachers,

$$N = 104, e = 0.06$$

$$n = 104 / (1 + 104(0.06)^2)$$

$$n = 75$$

$$n_{total} = 150$$

3.3.2 Research Design

This study is a cross-sectional analytical study.

3.3.3 Procedure for Data Collection

The height, weight, and arm length was taken using a stadiometer, weighing scale, and tape rule respectively. The first part of the questionnaire was enquiring about the respondents' socio-

demographic characteristics, including, age, gender, height, weight, body mass index (BMI), marital status, educational level, salary, alcohol consumption, and smoking and exercise habits. The second part focused on occupational and work characteristics which include the type of school, academic level, years of teaching experience, weekly working hours(minus break-time), lessons per week, weekly working hours with a computer, type of teaching board, number of teachers per class and height of teaching board. The third aspect is the data for the musculoskeletal disorder which was collected using the Nordic musculoskeletal questionnaire.

3.3.4 Procedure for Assessment and Measurements

The weight, height, and arm length were then taken and then participants were given the questionnaire for self-administration.

3.3.5 Ethical Consideration

Ethical approval for this study was obtained from the Ministry Of Health, Benin City Edo state under the Protocol code: HA/737/24/D/04003226.

3.3.6 Data Analysis

Data was analyzed using Statistical Package for Social Sciences (IBM SPSS) version 24. All data was analyzed using descriptive statistics of mean, frequency, and standard deviation. Chi-Square was used to determine the association between the prevalence and selected predictors and Wilcoxon signed ranked test was used to determine the significant difference between variables. The level of significance was set at $p < 0.05$.

CHAPTER FOUR

RESULT

4.1 PREAMBLE

This research investigated the prevalence of neck and shoulder pain and its associated risk factors among secondary school teachers in Egor local government Benin Edo state. The study included a sample of 150 participants selected from 5 different public secondary schools and 7 different private secondary schools in Egor local government.

4.1.1 Socio-Demographics Characteristics Of The Respondents

In the table below (table 1), the result shows that 150 secondary school teachers in Egor local government Benin Edo state participated in this study. The age of the respondents ranges from 21 to 60 years under the following distribution: 21-30 years (24.7%), 31-40 years (38.0%), 41-50 years (23.3%), 51-60 years (14.0%). There are slightly more females 79(52.7%) than males 71 (47.3%). There are more married participants 90(60.0%) than single people 60(40.0%). The BMI of the respondents is distributed as follows: Underweight 1(0.7%), Normal weight 60(40.0%), Overweight 25 (16.7%), Obese 64 (42.7%), Most secondary school teachers 144 (96.0%) do not smoke, with only a small minority 6(4.0%) reporting that they smoke. A small proportion of 25 (16.7%) of respondents reported consuming alcohol, with the majority 125(83.3%) reporting that they do not drink alcohol. (Table 1)

Table 1: Sociodemographic Characteristics of Respondents (N= 150)

Variables	n	%
Age		
21-30	37	24.7
31-40	57	38.0
41-50	35	23.3
51-60	21	14.0
Gender		
Male	71	47.3
Female	79	52.7

Marital status		
Single	60	40.0
Married	90	60.0
BMI		
Underweight	1	0.7
Normal	60	40.0
Obesity	64	42.7
Oveweight	25	16.7
Smoking		
Yes	6	4.0
No	144	96.0
Alcohol		
Yes	25	16.7
No	125	83.3

4.1.2 WORKPLACE CHARACTERISTICS OF RESPONDENTS

In the table below (table 2), The academic level of the respondents are SSCE 11(7.3%), NCE 2(1.3%), ND 1(0.7%), HND 9(6.0%), BSc 67(44.7%), BEd 44(29.3%), MSC 16(10.7%). All the respondents are 6 Years and above 150(100%). Private secondary school teachers that participated were 74(49.3%), Public secondary school teachers participated 76 (50.7%), and the Type of Board used were White 133(88.7%), Black 17(11.3%).

Table 2: Work Place characteristics of respondents

Variables	n	%
Academic Level		

SSCE	11	7.3
NCE	2	1.3
ND	1	0.7
HND	9	6.0
BSc	67	44.7
BEd	44	29.3
MSc	16	10.7
Years of Experience		
>6 Years	150	100
School		
Private	74	49.3
Public	76	50.7
Type of Board		
White	133	88.7
Black	17	11.3

4.1.3 PREVALENCE OF NECK PAIN AND SHOULDER AMONG THE RESPONDENTS

As shown in Table 3, Out of 150 respondents, 96 (64%) reported experiencing neck pain in the last 12 months. Of those who reported neck pain, 45 (30%) said it prevented them from working in the last year. Additionally, 39 (26%) of those with neck pain saw a physician for it in the last year. In the last 7 days, 48 (32%) of all respondents reported experiencing neck pain among secondary school teachers in Egor local government. Regarding shoulder pain, 60 (40%) of respondents reported experiencing shoulder pain in the last 12 months. Of those who reported shoulder pain, 52 (34.7%) said it prevented them from working in the last year. Additionally, 24 (16%) of those with shoulder pain saw a physician for it in the last year. In the last 7 days, 45 (30%) of all respondents reported experiencing shoulder pain.

Table 3: Prevalence scores of Neck and Shoulder Pain at 12 months and 7 days duration of the respondents

Variable	n	%
Neck Pain		
Presence of pain in the last 12 months	Yes 96	64.0
	No 54	36.0
Prevented from work due to pain in the last 12 months	Yes 45	30.0
	No 105	70.0
Seen Physician due to pain in the last 12 months	Yes 39	26.0
	No 111	74.0
Experience pain in the last 7 days	Yes 48	32.0
	No 102	68.0
Shoulder Pain		

Presence of pain in the last 12 months	Yes	60	40.0
	No	90	60.0
Prevented from work due to pain in the last 12 months	Yes	52	34.7
	No	98	65.3
Seen Physician due to pain in the last 12 months	Yes	24	16.0
	No	126	84.0
Experience pain in the last 7 days	Yes	45	30.0
	No	105	70.0

4.1.4 WILCOXON SIGN RANKED TEST FOR SIGNIFICANT DIFFERENCE IN THE PREVALENCE OF NECK AND SHOULDER PAIN AT 12 MONTHS AND 7 DAYS DURATION

Table 4, below shows the results of Wilcoxon signed rank test for the significant difference in the prevalence of neck and shoulder pain at 12 months and 7 days. There is a significant difference in neck Pain at 12 Months and Shoulder pain at 12 Months ($Z=-4.500$, $p=0.000$) and no significant difference in neck Pain at 7 days and shoulder pain at 7 days.

Table 4: Test of significant difference in prevalence between Neck and Shoulder Pain at 12 months and 7 days duration

Paired Variables	Mean Rank	Sum of Ranks	Z Value	P value
Neck Pain at 12 Months	32.50	455.00	-4.500	0.000**
Shoulder pain at 12 Months	32.50	1625.00		

Neck Pain at 7 days	21.00	399.00		
Shoulder pain at 7 days	21.00	462.00	-0.469	0.639 ⁺⁺

4.1.5 CHI-SQUARE ASSOCIATION BETWEEN NECK PAIN AND SHOULDER PAIN AT 12 MONTH AND 7 DAYS DURATION

The result shown in Table 5, displays a Chi-square test for the association between neck pain and shoulder pain at 12 months and 7 days duration. The result shows a statistically significant association between neck pain at 12 months and shoulder pain at 12 months ($\chi^2=6.078$, p-value = 0.014). There is also a statistically significant association between neck pain at 7 days and shoulder pain at 12 months ($\chi^2=5.067$, p-value = 0.024). There is also a statistically significant association between neck pain at 7 days and shoulder pain at 12 months ($\chi^2=17.975$, p-value = 0.000).

Table 5: Association between Neck pain and Shoulder Pain at 12 months and 7 days Duration

Neck Pain at 12 month Duration	Variables	N (%)	X ²	P Value
	Shoulder at 12 Month			
	Pain present	60 (40.0)	6.078	0.014**
	Pain Absent	90 (60.0)		

	Shoulder at 7 days			
	Pain present	45 (30.0)	3.044	0.081 ⁺⁺
	Pain Absent	105 (70.0)		
Neck Pain at 7 Days Duration	Shoulder at 12 Month			
	Pain present	60 (40.0)	5.067	0.024 ^{**}
	Pain Absent	90 (60.0)		
	Shoulder at 7 days			
	Pain present	45 (30.0)	17.975	0.000 ^{**}
	Pain Absent	105 (70.0)		

^{**} Indicate Significant Association

⁺⁺ Indicate no Significant Association

4.1.6 CHI-SQUARE ASSOCIATION BETWEEN ARM'S LENGTH, BOARD HEIGHT, LESSON HOUR, AND NECK PAIN AT 12 MONTHS

Table 6, below shows the results of a chi-square test analysis of the prevalence of neck pain at 12 months among secondary school teachers who were categorized based on three ergonomic factors: arm length, board height, and lesson hours. The Short Arm's length category, is 59(39.3%), Long Arm's length category, is 91 (60.7). The short Board height category, which is 52 (34.7%), Long Board height category, which is 98 (65.3%). The lesson hour category, which is 80(53.3%), Long lesson hour category, which is 70 (46.7%). In this table, all the p-values are greater than 0.05.

Table 6: Association between Arm’s length, Board height, Lesson hour, and Neck pain at 12 months

Neck Pain at 12months Duration	Variables	N (%)	X ²	P Value
	Arm’s Length			
	Short Arm’s length	59 (39.3)	1.696	0.140++
	Long Arm’s length	91 (60.7)		
	Board height			
	Short Board Height	52 (34.7)	0.190	0.663++
	Long Board height	98 (65.3)		
	Lesson Hours			
	Short lesson hour	80 (53.3)	2.090	0.352++
	Long Lesson hour	70 (46.7)		

4.1.7 CHI-SQUARE ASSOCIATION BETWEEN ARM’S LENGTH, BOARD HEIGHT, LESSON HOUR, AND NECK PAIN AT 7 DAYS

Table 7, below shows the results of a chi-square test analysis of the prevalence of neck pain at 7 days among secondary school teachers who were categorized based on three ergonomic factors: arm length, board height, and lesson hours. There is no significant association as the p-value is greater than 0.05.

Table 7: Association between Arm’s length, Board height, Lesson hour and Neck pain at 7 Days

Neck Pain at 7 Days Duration	Variables	N (%)	X ²	P Value
	Arm's Length			
	Short Arm's length	59 (39.3)	2.740	0.067++
	Long Arm's length	91 (60.7)		
	Board height			
	Short Board Height	52 (34.7)	1.106	0.293+=
	Long Board height	98 (65.3)		
	Lesson Hours			
	Short lesson hour	80 (53.3)	2.917	0.23++
	Long lesson hour	70 (46.7)		

4.1.8 CHI-SQUARE ASSOCIATION BETWEEN ARM'S LENGTH, BOARD HEIGHT, LESSON HOUR, AND SHOULDER PAIN AT 12 MONTHS

Table 8, below shows a significant association between arm's length, board height, lesson hour, and shoulder pain at 12 months. The p-value for arm length and board height is greater than 0.05. A significant relationship was observed between the prevalence of shoulder pain at 12 months and lesson hours ($\chi^2=7.921$, $p=0.019$).

Table 8: Association between Arm's length, Board height, Lesson hour and Shoulder pain at 12 month

Shoulder Pain at 12 Months Duration	Variables	N (%)	X2	P Value
	Arm's Length			
	Short Arm's length	59 (39.3)	0.513	0.474++
	Long Arm's length	91 (60.7)		
	Board height			
	Short Board Height	52 (34.7)	0.354	0.552++
	Long Board height	98 (65.3)		
	Lesson Hours			
	Short lesson hour	80 (53.3)	7.921	0.019**
	Long lesson hour	70 (46.7)		

4.1.9 CHI-SQUARE ASSOCIATION BETWEEN ARM'S LENGTH, BOARD HEIGHT, LESSON HOUR, AND SHOULDER PAIN AT 7 DAYS

Table 9, below shows a significant association between arm's length, board height, lesson hour, and shoulder pain at 7 days. The p-value for arm length, board height and lesson hour is greater

than 0.05.

Table 9: Association between Arm’s length, Board height, Lesson hour, and Shoulder pain at 7 Days

Shoulder Pain at 7 days Duration	Variables	N (%)	X ²	P Value
	Arm’s Length			
	Short Arm’s length	59 (39.3)	1.043	0.307++
	Long Arm’s length	91 (60.7)		
	Board height			
	Short Board Height	52 (34.7)	0.500	0.477++
	Long Board height	98 (65.3)		
	Lesson Hours			
	Short lesson hour	80 (53.3)	1.151	0.563++
	Long lesson hour	70 (46.7)		

P < 0.05

++ Indicate no significant association

4.2 HYPOTHESIS TESTING

Hypothesis 1: There would be no significant difference in the prevalence level of Neck and Shoulder Pain at 12 months.

Test: Wilcoxon signed Rank test

Observed p-value: <0.05

JUDGEMENT: The observed p-value is less than 0.05. The Null Hypothesis was therefore REJECTED.

Hypothesis 2: There would be no significant difference in the prevalence level of Neck and Shoulder Pain at 7 days.

Test: Wilcoxon signed Rank test

Observed p-value: >0.05

JUDGEMENT: The observed p-value is greater than 0.05. The Null Hypothesis was therefore NOT REJECTED.

Hypothesis 3: There would be no significant relationship between the prevalence of neck pain and shoulder pain at 12 months duration.

Test: Chi-Square test

Observed p-value: <0.05

JUDGEMENT: The observed p-value is less than 0.05, The Null Hypothesis was therefore REJECTED.

Hypothesis 4: There would be no significant relationship between the prevalence of neck pain at 12 months duration and shoulder pain at 7 days duration

Test: Chi-Square test

Observed p-value: >0.05

JUDGEMENT: The observed p-value is greater than 0.05. The Null Hypothesis was therefore NOT REJECTED.

Hypothesis 5: There would be no significant relationship between neck pain at 7 days and shoulder pain at 12 months duration

Test: Chi-Square test

Observed p-value: <0.05

JUDGEMENT: The observed p-value is less than 0.05. The Null Hypothesis was therefore REJECTED.

Hypothesis 6: There would be no significant relationship between neck pain at 7 days and shoulder pain at 7 days duration

Test: Chi-Square test

Observed p-value: <0.05

JUDGEMENT: The observed p-value is less than 0.05. The Null Hypothesis was therefore REJECTED.

Hypothesis 7: There would be no significant relationship between neck pain at 12-month duration and arm's length

Test: Chi-Square test

Observed p-value: >0.05

JUDGEMENT: The observed p-value is greater than 0.05. The Null Hypothesis was therefore

NOT REJECTED.

Hypothesis 8: There would be no significant relationship between neck pain at 12-month duration and board height

Test: Chi-Square test

Observed p-value: >0.05

JUDGEMENT: The observed p-value is greater than 0.05. The Null Hypothesis was therefore NOT REJECTED.

Hypothesis 9: There would be no significant relationship between neck pain at 12 months duration and lesson hours.

Test: Chi-Square test

Observed p-value: >0.05

JUDGEMENT: The observed p-value is greater than 0.05. The Null Hypothesis was therefore NOT REJECTED.

Hypothesis 10: There would be no significant relationship between neck pain at 7 days duration and arm's length.

Test: Chi-Square test

Observed p-value: >0.05

JUDGEMENT: The observed p-value is greater than 0.05. The Null Hypothesis was therefore NOT REJECTED.

Hypothesis 11: There would be no significant relationship between neck pain at 7 days duration and board height.

Test: Chi-Square test

Observed p-value: >0.05

JUDGEMENT: The observed p-value is greater than 0.05. The Null Hypothesis was therefore NOT REJECTED.

Hypothesis 12: There would be no significant relationship between neck pain at 7 days duration and lesson hours.

Test: Chi-Square test

Observed p-value: >0.05

JUDGEMENT: The observed p-value is greater than 0.05. The Null Hypothesis was therefore NOT REJECTED.

Hypothesis 13: There would be no significant relationship between shoulder pain at 12-month duration and arm's length

Test: Chi-Square test

Observed p-value: >0.05

JUDGEMENT: The observed p-value is greater than 0.05. The Null Hypothesis was therefore, NOT REJECTED.

Hypothesis 14: There would be no significant relationship between shoulder pain at 12-month duration and board height

Test: Chi-Square test

Observed p-value: >0.05

JUDGEMENT: The observed p-value is greater than 0.05. The Null Hypothesis was therefore NOT REJECTED.

Hypothesis 15: There would be no significant relationship between shoulder pain at 12-month duration and lesson hour

Test: Chi-Square test

Observed p-value: <0.05

JUDGEMENT: The observed p-value is less than 0.05. The Null Hypothesis was therefore REJECTED.

Hypothesis 16: There would be no significant relationship between neck pain at 7 days duration and arm's length.

Test: Chi-Square test

Observed p-value: >0.05

JUDGEMENT: The observed p-value is greater than 0.05. The Null Hypothesis was therefore NOT REJECTED.

Hypothesis 17: There would be no significant relationship between neck pain at 7 days duration and board height.

Test: Chi-Square test

Observed p-value: >0.05

JUDGEMENT: The observed p-value is greater than 0.05. The Null Hypothesis was therefore NOT REJECTED.

Hypothesis 18: There would be no significant relationship between neck pain at 7 days duration and lesson hours

Test: Chi-Square test

Observed p-value: >0.05

JUDGEMENT: The observed p-value is greater than 0.05. The Null Hypothesis was therefore NOT REJECTED.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

This study examines the prevalence and risk factors for neck and shoulder pain among senior secondary school teachers in Egor Local Government, Edo state. Similar investigations have been conducted globally, such as those by Erick *et al.* (2014), Liping *et al.* (2012), Ojukwu *et al.* (2021), Omar (2022), and Yue *et al.* (2012). However, this study focuses specifically on secondary school teachers in Egor Local Government.

This present study found a higher proportion of female participants, this is consistent with previous research which shows that women dominate the teaching profession (Odole *et al.*, 2022; Korkmaz. 2011; Ojukwu *et al.*, 2021). In Nigeria, teaching is perceived as a suitable profession for women due to its emphasis on "guidance" and nurturing skills. Additionally, the high prevalence of married teachers in this study may reinforce this perception.

The majority of teachers were neither smokers nor drinkers, possibly due to their understanding of health risks and the prominence of women in the teaching profession.

The observation that most participants (44.7%) possessed a Bachelor of Science (BSc) qualification aligns with the trend of graduates entering the teaching profession, particularly in private schools (Darwish & Al-Zuhair, 2013). This present study also noted a higher percentage of obese participants (42.7%), which could be attributable to prolonged sitting at work and the higher proportion of female teachers.

The preponderance of married participants (60%) may be explained by the marriageable age of most participants, the predominance of females, and the age distribution, with 38% aged between

31 and 40 years. The absence of participants over 60 years of age aligns with the mandatory retirement age of 60 years set by the government (Darwish & al-Zuhair, 2013).

In this present study, the 12-month prevalence of neck pain and shoulder pain was 64% and 40%, respectively, while the 7-day prevalence was 32% and 30%, respectively. In a study among school teachers in Hong Kong by Chiu & Lam (2007), the 12-month prevalence of neck and shoulder pain was 66.7% and 33.3%, respectively. A study conducted in Turkey by Korkmaz (2011) among secondary school teachers reported a high prevalence of neck pain (42.5%) and shoulder pain (28.7%). The finding in this present study is consistent with the findings of research conducted in Saudi Arabia by Darwish & Al-Zuhair (2013) where the primary sites of pain reported were the shoulder pain (45.4%) followed by the neck (42.1%).

In comparison, a study among primary school teachers in Ibadan North local government area by Odole *et al.* (2022) found a lower 12-month prevalence of neck pain (36.1%) and shoulder pain (32.8%). These differences may be due to variations in geographical locations. Moreover, a study among school teachers in Enugu by Ojukwu *et al.* (2021) reported a higher prevalence of shoulder pain (62.3%), which may be attributed to teachers often working with outstretched arms while writing on boards or pointing at images.

This present study found no significant association between musculoskeletal pain and sociodemographic characteristics such as marital status or education level, this finding is also consistent with the findings of research conducted in Saudi Arabia by Darwish & Al-Zuhair (2013) where significant relationships were observed for school type (p value 0.038), age (p value 0.002), weight (p value 0.007), number of children (p value 0.006), shoe type (p value 0.000), teaching years (p value 0.003), and daily working hours (p value 0.027).

While this study found a significant association between teaching hours and the 12-month prevalence of shoulder pain, a study conducted among primary school teachers in Ibadan by Odole *et al.* (2022) reported otherwise. These contrasting results may be attributed to differences in the population studied.

The study found no association between board heights, and shoulder and neck pain, the result therefore supports the findings of Ojukwu *et al.* (2021) who observed that the study showed no significant association between shoulder MSDs and teaching board heights.

5.2 Conclusion

Senior secondary teachers in Egor Local Government, Edo State, experience a high prevalence of neck and shoulder pain. Among teachers in this area, 12-month pain prevalence was the highest, followed by 7-day prevalence. The risk factor associated with significant shoulder pain was prolonged teaching hours characterized by writing on the board.

5.3 Recommendations

Based on these findings, we suggest:

Educating teachers about proper posture, movement, and musculoskeletal positions

Evaluating school infrastructure (furniture, equipment, classrooms) for ergonomic impact on educators and learners

Establishing frequent breaks for upper limb and neck exercises to reduce pain

5.4 Implications for Further Study

Additional research in other local governments could provide a broader understanding of pain prevalence among teachers. Investigations into risk factors for shoulder pain in various levels of education could be valuable due to teaching variations among grade levels.

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APPENDIX 1

INFORMED CONSENT FORM

**Title: PREVALENCE OF NECK AND SHOULDER PAIN AND ITS ASSOCIATED
RISK FACTORS AMONG SENIOR SECONDARY SCHOOL TEACHERS IN EGOR
LOCAL GOVERNMENT**

My name is LAMIDI SOLOMON OLUWALONI I am a final year student of the department of Physiotherapy, School of Basic Medical Sciences, University of Benin. I am conducting a study on “PREVALENCE OF NECK

AND SHOULDER PAIN AND ITS ASSOCIATED RISK FACTORS AMONG SENIOR SECONDARY SCHOOL TEACHERS IN EGOR LOCAL GOVERNMENT”. This research is being carried out to know the prevalence and risk factors of neck and shoulder pain in senior secondary school teachers. For the purpose of this study the weight, height and arm length of the participants will be checked. Your participation and responses will be appreciated and kept confidential. Your sincere response to this questionnaire will be most helpful.

My email is lonilawal9942@gmail.com and my phone number is 08111993389.

Please note that your participation in this study is voluntary and the participants has the right to withdraw from this study at any time.

Consent: Now that this study has been explained to me in details and I understand the nature purpose and benefits of the study, I consent to participate in this study.

Signature/Date

Signature of Researcher/Date

APPENDIX 2

QUESTIONNAIRE

Please fill in the required information correctly

Sociodemographic and anthropometric Data

- i. Age; 22-31 { } 32-41 { } 42-51 { } 52-61 { }
- ii. Sex: Male { } Female { }
- iii. Weight (kg) _____

- iv. Height (m) _____
- v. Body mass index (kg/m²) _____
- vi. Level of education _____
- vii. Arm length (m) _____
- viii. Smoking _____
- ix. Alcohol _____
- x. Marital status _____

Occupational and work characteristics

- i. Type of school _____
- ii. Academic level _____
- iii. Years of teaching experience _____
- iv. Weekly working hours(minus break-time) _____
- v. Lessons per week _____
- vi. Weekly working hours with computer _____
- vii. Type of teaching board _____
- viii. Number of teachers per class _____
- ix. Height of teaching board _____

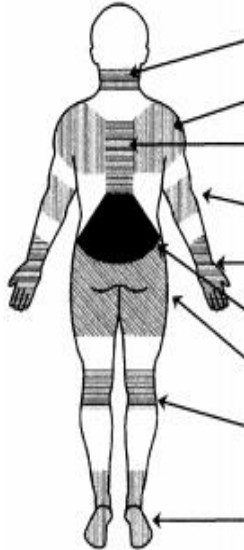
NORDIC MUSCULOSKELETAL QUESTIONNAIRE

Please answer by putting a cross in the appropriate box – one cross for each question. You may be in doubt about how to answer but please do your best anyway. Please answer every question, even if you have never had trouble in any part of your body. In this picture, you can see the appropriate position of the parts of the body referred to in the questionnaire. Limits are not

sharply defined and certain parts overlap. You should decide for yourself which part you have or have had your trouble (if any).

MUSCULOSKELETAL DISORDERS

Please answer by putting a cross in the appropriate box_ one cross for each question. Please answer every question even if you have never had trouble in any parts of your body. This picture shows how the body has been divided. You should decide for yourself which part (if any) is or has been affected.

	Have you at any time during the last 12 months had trouble (such as ache, pain, discomfort, numbness) in:	During the last 12 months have you been prevented from carrying out normal activities (e.g. job, housework, hobbies) because of this trouble in:	During the last 12 months have you seen a physician for this condition:	During the last 7 days have you had trouble in:
 NECK	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
SHOULDERS	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
UPPER BACK	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
ELBOWS	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
WRISTS/ HANDS	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
LOWER BACK	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
HIPS/ THIGHS	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
KNEES	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
ANKLES/ FEET	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes

**APPENDIX 3
ETHICAL APPROVAL LETTER**



**EDO STATE
MINISTRY OF HEALTH**

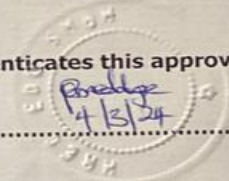
PROTOCOL NUMBER	HA/737/24/D/04003226 (PLEASE QUOTE IN ALL ENQUIRIES)
TITLE OF RESEARCH PROPOSAL	PREVALENCE OF NECK, SHOULDER PAIN AND ITS ASSOCIATED RISK FACTORS AMONG SENIOR SECONDARY SCHOOL TEACHERS IN EGOR LOCAL GOVERNMENT, BENIN CITY, EDO STATE, NIGERIA.
PRINCIPAL INVESTIGATOR (S)	LAMIDI SOLOMON OLUWALONI
DATE CONSIDERED	4th MARCH, 2024
DECISION OF THE COMMITTEE	APPROVED

THIS APPROVAL DATES 04/03/2024 TO 04/03/2025. IF THERE IS A DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC EDO SMoH SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY

REMARK: Please kindly note that the HREC Edo SMoH seal authenticates this approval

**DR (MRS) Omonyemen B. BELLO
(MBBS, MPH, FPHCM) (CHAIRMAN)**

SIGNATURE & DATE.....



SUPERVISOR(S)

ATTESTATION BY INVESTIGATOR(S)

No participant accrual or activity related to this research may be conducted outside of the approval dates. All informed consent forms used in this study must carry the Edo SMoH HREC-assigned number and duration of your research. No changes are permitted in the research without prior approval of the Edo SMoH HREC except in circumstances outlined in the Code. The Edo SMoH HREC reserves the right to conduct compliance visits to your research site without previous notification.

Signature & Date.....

[Signature] 10/04/24