PREVALANCE OF NECK PAIN AND ITS ASSOCIATION WITH SLEEP QUALITY IN RELATION TO PROLONGED SITTING AMONG COMPUTER DESK WORKERS IN UNIBEN

BY

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(BMS1906375)

A PROJECT SUBMITTED TO THE DEPARTMENT OF PHYSIOTHERAPY, SCHOOL OF BASIC MEDICAL SCIENCES, COLLEGE OF MEDICAL SCIENCES, UNIVERSITY OF BENIN
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF PHYSIOTHERAPY (B.PT) DEGREE

OCTOBER, 2025.

CERTIFICATION

This dissertation by Ogbebor Osama Frances 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 dedicated to God, to my parents, Engr. Osayande P. Ogbebor and , Mrs. Imeutinyan E. Ogbebor ,and my every supportive family members who made this work a reality through their constant support.

ABSTRACT

Background/Purpose: Neck pain is a prevalent musculoskeletal disorder among computer-based desk workers; however, its interaction with sedentary behaviour and sleep quality in the Nigerian context remains underexplored. This study investigated the prevalence of neck pain and its associations with sleep quality and prolonged sitting among computer-based staff of the University of Benin, Nigeria. The overarching aim was to elucidate occupational and behavioural determinants of neck musculoskeletal disorders and inform integrated ergonomic interventions.

Methods: A cross-sectional analytical design was employed involving non-academic desk workers engaged in prolonged computer use. Standardized self-administered instruments were utilized, including the Nordic Musculoskeletal Questionnaire (NMQ), Oswestry Neck Disability Index (ONDI), Pittsburgh Sleep Quality Index (PSQI), Sedentary Behaviour Questionnaire (SBQ), and an ergonomic self-assessment checklist. Data were analysed using SPSS version 27, with descriptive statistics summarising prevalence and exposure variables. Pearson's correlation tested associations between continuous variables, while Chi-square analyses examined categorical relationships. Statistical significance was set at $p < 0.05$.

Results: A total of 281 participants were analysed. The 12-month prevalence of neck pain was 51.2%, and the 7-day prevalence was 41.3%. Mean PSQI scores (≈15.5) indicated very poor sleep quality, while average sedentary time was ≈345 minutes per day (≈5.75 hours). Neck pain severity correlated strongly with poor sleep quality ($r = 0.799$, $p < 0.001$) and modestly with sedentary time ($r = 0.170$, $p = 0.004$). Poor sleep was associated with short-term neck pain prevalence ($p = 0.002$). Despite access to ergonomic equipment, only 34.5% practiced proper posture and 23.1% took regular breaks.

Conclusion: Neck pain, poor sleep quality, and prolonged sitting constitute a multifactorial occupational triad among Nigerian desk workers. Interventions should prioritise ergonomic behaviour modification, structured movement breaks, and sleep-hygiene education to mitigate neck pain and enhance workplace wellbeing.

ACKNOWLEDGEMENTS

I am grateful to God for the successful completion of this work and for His protection and Guidance throughout my stay in this University .

Special thanks to my supervisor Mr E. Okhuahesuyi (Papa Suyi) for his assistance, support and guidance during the course of the research study. Despite the busy schedule he devoted his time to listen to me, answer questions, read through my work and also make corrections. May the good Lord continue to bless and reward you in hundred fold.

My sincere appreciation goes to my Head of Department, Dr.(Mrs) C. O. Obaseki, all the lecturers of the Department of Physiotherapy, University of Benin, Prof. K. I. Oke ,Rev. Sr. (Dr.) H. O. Fawole, Dr.(Mrs) Kubeyinje, Dr. Adebisi Hammed, Prof. Joseph Umunnah, Dr. Nelson Ekechukwu, Dr. Bolarinde , Prof. A. Aiyegbusi, Prof. Obinna Ezeukwu, Dr. Nicholas Oghumu, Prof Mohamed Jubril. A special thanks to the Head of Department, Dr. Taiwo Oyewumi, the directors ,deputy directors, and also to the chiefs, senior physiotherapist, interns and other clinicians in the Department of Physiotherapy, University of Benin Teaching Hospital, I appreciate the knowledge and skills imparted on me during my studentship in the University of Benin Teaching Hospital. I also appreciate the non-academic staffs, especially Mr Nosa, of the Department of Physiotherapy, University of Benin.

I also want to express my sincere gratitude to my parents, Engr. and Mrs O.P. Ogbebor , my siblings;Eloghosa Ogbebor, Isoken Ogbebor, Eseosa Ogbebor, Efosa Ogbebor especially Rita Ogbebor for her love, support and care, my uncles;Mr.Osasere Ogbebor, Mr.Kingsley Ogbebor, Mr.Eghosa Ogbebor, Mr.Oghogho Ogbebor and Mr. Nosakhare Ogbebor for their constant support and encouragement,

my aunts; Mrs.Itohan Ogbebor, Nr. (Mrs) Ramotu Isah-Habeeb Omone Ogbebor, Mrs.Oyemwen Aleme, Mrs Ivie Obaseki, Priests; Rev. Fr Charles Omogiate, Fr. Lawrence Obasi, Fr. Francis Abuobokhkle, Fr.Christopher Okankan , my God mothers; Nr. (Mrs) Cynthia Agbonrofo , Mrs. Jacinta O. Aigbona and relatives for their encouragement, prayers and financial support throughout my undergraduate program.

I will also like to appreciate my wonderful friends, Chukwuamaka Aliaga for her constant support, encouragement and love , Rufus Aviomoh for his constant support , Frances Nwokedi,Emmanuel Igbobie, Okaka Fidelis, Ikede Perfect, Omorogbe Rose,Pharm. Dr Rufus Obasogie,Shalom Adewole, Idogho Joshua,Ngozi Edeh, Pharm. Dr. Angela, Chibuike Enekwe, Aminat Ifeoluwa ,Pharm.Dr. Cyprain Ikolah , Frank, Oloye Daniel,Tuoyo, Bukola, Amaka, Great Destiny, Pharm. Dr Ese Esomitoje, Pharm.Dr. Aisosa Ehonwa, PT. Kayode, PT. Angela Edegbi,PT. Ruth Obubu, Dr. Kelly Elimian,PT. Delphine, Louie Martins, Francis , for their support ,help and guidance. My special thanks and gratitude to FECAMDS, all my classmates, and all the computer desk workers that volunteered to participate in my study and to others which the confines of this page will not permit me to state.

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CHAPTER ONE
INTRODUCTION

1.1 Background of Study

Neck pain is a common musculoskeletal issue that affects millions of people around the world, especially those who spend long hours working at desks or computers (Côté et al., 2008). In fact, it ranks as the fourth leading cause of disability globally, with about 30% to 50% of adults experiencing it each year (Vos et al., 2020). Prolonged computer use, poor ergonomic practices, and prolonged static postures all contribute to increased musculoskeletal strain, which results in chronic neck pain (Biruk Demissie et al., 2024). On top of that, many people dealing with neck pain also struggle with sleep, as studies have shown a strong link between musculoskeletal pain and disrupted sleep patterns (Alsaadi et al., 2014).

Neck pain and sleep disturbances often go hand in hand, creating a cycle where each issue worsens the other. This ongoing interaction not only increases physical discomfort but also impacts a person's ability to stay focused and productive at work, making it a significant concern for public health (Kelly et al., 2011). In West Africa, more office workers are experiencing neck pain as computer-based jobs become more common (Omokhodion et al., 2018).

For instance, a study in Ghana found that around 42% of office employees reported having neck pain, often linked to poor ergonomic setups at their workstations (Tettey et al., 2020). Likewise, in Nigeria, musculoskeletal issues like neck pain are frequently seen among university staff who spend long hours on computers (Akinpelu

et al., 2011). Although this is an emerging concern, there hasn't been much research exploring how neck pain and sleep quality are connected in the region. Sleep problems among desk workers could be making musculoskeletal pain worse, but this link hasn't been thoroughly investigated in West Africa (Moreno CR et al., 2016).

In Nigeria, as universities increasingly shift "to digital work environments, more academic and non-academic staff are reporting neck pain (Oyewole et al., 2020). Research among university employees in Southwestern Nigeria revealed that 38.5% suffer from work-related neck pain, with long hours of sitting and infrequent breaks identified as major contributors (Balogun et al., 2018). Despite this, there's still limited research exploring how this kind of neck pain might be affecting sleep quality among desk-based workers. Poor sleep doesn't just harm overall well-being—it also hampers concentration and job performance, which are especially important in academic roles (Omole et al., 2021). Understanding this association is essential for developing workplace interventions that improve both musculoskeletal health and sleep quality among Nigerian university workers.

Neck Pain can be seen as a pain in the neck and shoulder, it may defer or change in intensity and it is often felt like an aching pain or like a tingling sensation or it may even be like an electric shock from the neck and radiating to the arm. The neck is a part of body that connects the skull and the clavicle. The neck is the bridge between the head and the rest of the body. It is located in between the mandible and the clavicle, connecting the head directly to the torso, and contains numerous vital structures. It contains some of the most complex and intricate anatomy in the body and is comprised of numerous organs and tissues with essential structure and function

for normal physiology. Structures contained within the neck are in charge of breathing, speaking, swallowing, metabolism regulation, brain and cervical spine support and connectivity, and circulatory and lymphatic inflow and outflow from the head (Kohan EJ et al., 2014).

Sleep is seen as a period where the activities of the body is reduced to the bare minimum. According to the National Library of Medicine (Brinkman JE et al., 2023), sleep is a dynamic process where the brain, while in a state of relative rest, remains actively engaged with internal signals. Sleep has a lot of important benefits and roles that it plays in the human body. When there is a distortion of the regular sleeping pattern of human, it may lead to various adverse effects.

An office worker or computer desk workers often referred to as professionals who have roles which include managers, administrative staff, office clerks, secretaries, and others who primarily work with computers in an office environment. Depending on their specific roles, office workers take on a variety of responsibilities that may relate directly to their field—like sales, marketing, human resources, or development focus on keeping the office running efficiently.

Their tasks can vary widely and often include gathering and sharing information, entering data, organizing files and reports, and handling communications through phone calls, emails, video meetings, face-to-face interactions, or work management platforms. In general, office workers play a key role in ensuring that both day-to-day operations and long-term objectives are carried out smoothly. Due to their poor work positions or posture, they often develop acute neck pain and when this is left

untreated, it progresses to becoming a chronic neck disability, this would eventually result in decrease in their productivity.

With the growing dependence on computers in academic institutions, this study sets out to explore how common neck pain is among computer-based university workers in Nigeria and how it relates to their sleep quality. The results aim to inform practical, evidence-based recommendations for improving ergonomics and promoting better health within the workplace.

1.2 Statement of the Problem

Neck pain is a widespread health concern, especially for people who spend long hours working at computers. It's a major contributor to disability and lost productivity around the world (Vos et al., 2020). Sitting for extended periods in poorly designed workspaces and maintaining static postures can strain the muscles, leading to discomfort.

In fact, research shows that 30–50% of desk workers experience neck pain each year (Côté et al., 2008). What makes things worse is the two-way link between neck pain and sleep problems—pain can make it hard to sleep well, and not getting enough rest can heighten the feeling of pain (Alsaadi et al., 2014; Kelly et al., 2011). Although this connection is well known, many workplaces still overlook the need for solutions that address both ergonomics and sleep, particularly in high-risk groups like university staff (Cohen et al., 2012).

In West Africa, the growing dependence on computers in the workplace has outpaced the development of proper ergonomic setups and health policies, contributing to a

surge in work-related musculoskeletal issues (Toyosi Ayodeji Labeodan et al., 2013) et al., 2018). In Ghana, for example, 42% of office workers report experiencing neck pain, often tied to poorly designed workstations (Tettey et al., 2020).

Similarly, research in Nigeria shows that a significant number of university staff—between 38.5% and 45%—suffer from neck pain due to extended hours of computer use and a lack of ergonomic awareness or training (Balogun et al., 2018; Oyewole et al., 2020). Despite these troubling statistics, there's limited research on how neck pain might be linked to sleep quality among desk workers in the region.

Sleep problems are already common in West Africa, driven by socioeconomic pressures and work demands, and they could potentially make musculoskeletal pain even worse—a connection that has yet to be thoroughly studied (Ogunbode et al., 2015). Nigerian universities are rapidly shifting toward digital work processes, but the necessary infrastructure to protect computer-based workers from health risks hasn't kept pace.

In a study conducted in Southwestern Nigeria, 38.5% of university staff reported neck pain, largely due to extended periods of sitting and poorly designed workstations (Balogun et al., 2018). At the same time, sleep quality among Nigerian professionals remains a concern, with research showing that poor sleep is linked to lower cognitive function and reduced productivity (Omole et al., 2021).

Yet, despite these overlapping issues, no study in Nigeria has specifically examined how neck pain and sleep quality might be connected in university computer desk workers. This lack of research makes it difficult to create effective solutions that

address both physical discomfort and sleep-related problems in academic environments.

Without targeted evidence-based interventions, university staff may continue to face a cycle of poor health and diminishing work performance.

This study aims to fill the existing gap by exploring how common neck pain is and how it relates to sleep quality among computer-based staff in Nigerian universities. By shedding light on this connection, the research will help guide policies that support better ergonomic practices and healthier sleep habits—contributing to improved well-being and productivity across the academic workforce (Balogun et al., 2018; Omole et al., 2021).

Research Question(s)

1. What is the prevalence of neck pain among computer-based desk workers at the University of Benin?
2. Is there a significant association between the severity of neck pain and sleep quality among computer-based desk workers?
3. To what extent does prolonged sitting contribute to the development of neck pain?
4. How does prolonged sitting influence sleep quality among computer-based desk workers?
5. What ergonomic or behavioral interventions will reduce the impact of prolonged sitting on neck pain and sleep disturbances?

1.3 Aim of the Study

This study aimed to assess the prevalence of neck pain and its association with sleep quality among computer-based desk workers at the University of Benin, while examining the contributing role of prolonged sitting as a form of sedentary behavior.

1.3.1 Specific Objectives

1. Determine the prevalence of neck pain among computer-based desk workers at the University of Benin.
2. Investigate the association between neck pain severity and sleep quality among computer-based desk workers.
3. Evaluate the influence of prolonged sitting, as measured by the Sedentary Behavior Questionnaire (SBQ), on neck pain.
4. Determine and assess the effect of prolonged sitting on sleep quality among computer-based desk workers.
5. To explore the potential of ergonomic interventions to mitigate the effects of prolonged sitting on neck pain and sleep quality.

1.4 Hypotheses

1.4.1 Main Hypotheses

There would be a significant association between the neck pain and sleep quality among computer desk workers at the University of Benin.

1.4.2 Sub Hypotheses

1. There would be no significant relationship between sleep quality and neck pain severity.
2. There would be no significant relationship between sleep quality and sedentary behaviors .

3. There would be no significant relationship between neck pain severity and sedentary behaviors .
4. There would be no significant association between sleep quality and 12-month prevalence of neck pain.
5. There would be no significant association between sleep quality and 7-day prevalence of neck pain.

1.5 Significance of the study

This study would be significant for several reasons:

1. **Occupational Health Relevance**: As computer-based desk work becomes increasingly central to modern occupational settings, understanding the musculoskeletal and sleep-related consequences of prolonged sitting is critical. This study will contribute to occupational health by highlighting the prevalence of neck pain and poor sleep quality among desk workers—a population often overlooked in musculoskeletal health surveillance in Nigeria.
2. **Evidence-Based Ergonomic Planning**: By quantifying the relationship between prolonged sitting, neck pain, and sleep quality, the findings will inform evidence-based ergonomic interventions within academic institutions and other sedentary workplaces, promoting healthier work environments.
3. **Policy and Program Development**: The study will support institutional and national efforts to align with global occupational health recommendations (e.g., WHO, ILO) regarding sedentary behavior, workplace ergonomics, and employee well-being.
4. **Academic Contribution**: It will add to the limited body of localized research in sub-Saharan Africa, particularly Nigeria, on the interplay between sedentary

behavior, musculoskeletal discomfort, and sleep disturbances among white-collar workers.

5. **Practical Implications for Staff Wellness**: For administrators and occupational health units at the University of Benin, the findings will provide data-driven insights to guide workplace wellness programs, ergonomic training, and interventions that may reduce the burden of neck pain and improve sleep quality and overall productivity.

1.6 Scope of the Study

This study was confined to computer-based desk workers (non-academic) who are currently employed at the University of Benin and are engaged in prolonged sitting during work hours. The geographical location will be University of Benin, Benin City, Edo State, Nigeria.

This study was delimited by the following factors:

1. **Occupational Type**: It focused exclusively on computer desk workers and did not include other university staff whose work involves physical activity or fieldwork.
2. **Institutional Setting**: It was limited to one institution, University of Benin, and thus, findings may not be generalizable to other universities or work environments.
3. **Self-Reported Data**: Data on sitting time, pain levels, and sleep quality was based on self-reports, which may be subject to recall bias or social desirability bias.
4. **Time-frame**: The cross-sectional nature of the study captured relationships at a single point in time and may not establish causality.

5. **Specific Focus on Prolonged Sitting**: Other potential contributors to neck pain and sleep issues, such as mental health, physical activity, or lifestyle factors, are not the primary focus and will not be explored.

1.7 Limitations of the Study

I. Due to the relatively short data collection period, the study may not fully represent the experiences and pain of the computer desk workers in the University of Benin.

II. Getting the computer desk workers to fully participate in this study.

III. The study's outcomes were measured using self-report measures, which could be subjected to recall biases sch as over reporting bias.

1.8 Definition of Terms

i. **Association:** a connection or relationship, an organized group, or a mental link between ideas or memories. (Merriam Webster Dictionary).

ii. **Prevalence:** is the proportion of a population who have a specific characteristics in a given time period (National Institute of Mental Health (NIMH), 2023).

iii. **Sleep quality:** is an individual's self-satisfaction with all aspects of the sleep experience which include sleep efficiency, time it takes to fall asleep, duration of sleep, and wake after sleep begins (Nelson et al., 2021).

iv. **Desk Workers:** a person whose job primarily involves working at a desk.(Merriam Webster Dictionary)

v. **Neck Pain:** is defined as pain experienced from the base of the skull (occiput) to the upper part of the back and extending laterally to the outer and superior bounds of the shoulder blade (scapula).

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Review

Neck pain can be seen as a pain in the neck which may be with or without pain referred to one or both upper limb and which may often last for a least 1 day (Hoy et al., 2014). Acute neck pain which is neck pain that comes on suddenly is quite common and usually not a cause for concern. It is often caused by tense or strained muscles, which can happen after sitting at a computer for long periods, being in a drafty environment, or sleeping in an awkward position. Sometimes, though, the pain seems to appear without any obvious reason.

Most of the time, acute neck pain clears up on its own within one to two weeks. However, for some people, it tends to come back—often triggered by specific situations like long workdays or intense physical activity. If the pain persists for more than three months, it's considered chronic. In many of these long-term cases, psychological stress can play a significant role in keeping the pain going.

2.1.1 Sleep Quality

Sleep quality is more than just how long you sleep, it is about how well you sleep (Nelson KL et al., 2022; Phillips SR et al., 2020). Researchers have identified several important dimensions that, together, paint a clearer picture of what makes sleep restorative and healthy.

Below is a breakdown of these important elements:

1. Sleep Latency: Sleep latency refers to how long it takes you to fall asleep after you go to bed. Ideally, this should be around 10 to 20 minutes. Taking significantly longer could suggest issues like insomnia, while falling asleep

almost instantly may be a sign of extreme sleep deprivation or a sleep disorder.(Sleep Foundation, 2023),

2. Sleep duration: This is the total amount of time you actually spend sleeping during the night. For most adults, the sweet spot is between 7 and 9 hours. Consistently getting less than this can lead to problems with memory, concentration, and even long-term health risks.(Lo et al., 2016, Nature Human Behavior)
3. Sleep Efficiency: Sleep efficiency is the percentage of time you actually spend sleeping while you're in bed. A healthy sleep efficiency is about 85% or higher. If this number drops, it could point to frequent awakenings or restless sleep (Wikipedia, 2024).
4. Wake After Sleep Onset (WASO): WASO tracks the amount of time you're awake after initially falling asleep but before getting up for the day. High WASO means broken or fragmented sleep, which is often a red flag for poor sleep continuity (Mokhlesi et al., 2022, Journal of Clinical Sleep Medicine).
5. Sleep Satisfaction: This is how good you feel about your sleep. It's a subjective measure but still very important—people can get enough sleep and still feel tired if their sleep quality isn't great (St-Onge et al., 2016, Circulation).
6. Sleep Regularity: This refers to how consistent your sleep and wake times are from day to day. Irregular patterns can throw off your body’s internal clock and may contribute to various health problems (St-Onge et al., 2016).
7. Sleep Timing: Sleep timing looks at when you sleep during the 24-hour day—essentially your bedtime and wake-up time. Sleeping in sync with your circadian rhythm is crucial for quality rest (St-Onge et al., 2016).

8. Daytime functioning: Good sleep should leave you feeling refreshed and alert. If you're experiencing fatigue, trouble concentrating, or other cognitive issues during the day, it may be a sign your sleep quality is lacking (St-Onge et al., 2016).

2.1.2 Common Tools Used In Accessing Sleep Quality

The tools for assessing sleep quality include the following:

1. Pittsburgh Sleep Quality Index(PSQI): The PSQI is one of the most commonly used questionnaires for assessing how people feel about their sleep over the past month. It includes 19 self-rated questions and a few optional items for bed partners. The questionnaire is broken down into seven key components, including: overall sleep quality, time taken to fall asleep (sleep latency),total hours slept (sleep duration),sleep efficiency (how much of your time in bed is spent sleeping),sleep disturbances, use of sleep medication, daytime dysfunction caused by poor sleep.

   Each category is scored from 0 to 3, with the final score ranging from 0 to 21. A score over 5 generally suggests poor sleep. The PSQI has been validated in numerous studies and across different cultures and age groups (Buysse et al., 1989; Afolabi et al., 2021).

2. Epworth Sleepiness Scale: The ESS measures how likely you are to doze off in everyday situations, such as sitting and reading or watching TV. It's an 8-item survey where each item is scored from 0 (would never doze) to 3 (high chance of dozing). The total score ranges from 0 to 24:

   0–10 = Normal sleepiness

   11–12 = Mild excessive sleepiness

   13–15 = Moderate

16–24 = Severe

This tool is easy to use and has been shown to be consistent and reliable in both research and clinical settings (Johns, 1991; Vignatelli et al., 2013).

3. Insomnia Severity Index(ISI): The ISI focuses specifically on symptoms of insomnia. It includes 7 questions that ask about difficulty falling asleep, staying asleep, and how sleep issues affect your mood, daily performance, and stress levels. Each item is scored on a 0–4 scale, leading to a total score between 0 and 28:

   0–7: No insomnia

   8–14: Mild

   15–21: Moderate

   22–28: Severe

4. Sleep diaries: this is a simple but powerful tool. It involves keeping a daily log of when you go to bed, how long it takes to fall asleep, any awakenings during the night, and what time you wake up. It may also include notes on naps, caffeine or alcohol intake, and overall sleep satisfaction. Sleep diaries help identify patterns and are often used alongside other sleep assessments for a more complete picture.

2.1.3 Computer Desk Workers and Ergonomics

Computer desk workers—also known as office workers or sedentary computer users—are professionals whose main duties involve sitting at a desk and using a computer for prolonged periods. Their tasks often include activities such as data entry, document creation, software development, email communication, and other screen-based responsibilities.

This type of work typically demands long hours of sitting, limited physical movement, and repetitive use of the hands, all of which have been linked to various musculoskeletal and health-related issues (Janwantanakul et al., 2008; Wahlström et al., 2004).

These individuals fall under the broader category of sedentary workers, and their daily routines are generally marked by excessive screen exposure and minimal physical activity throughout the workday (Shrestha et al., 2018).

Prolonged sitting, often grouped under the broader term sedentary behavior, refers to any waking activity done while sitting, reclining, or lying down that involves very low energy expenditure—specifically 1.5 METs (metabolic equivalents) or less (Tremblay et al., 2017). In simpler terms, it's the kind of low-effort physical activity that doesn't require much movement or energy, such as sitting at a desk, watching TV, or driving for long periods.

What makes sitting "prolonged" is the duration—usually several uninterrupted hours spent in a seated or reclined position, especially when there are no regular breaks to stand or move around (Magnon, Dutheil & Auxiette, 2018).

It's important to note that prolonged sitting isn't the same as being physically inactive. A person might still exercise regularly, yet spend a large part of their day sitting, particularly if they work at a desk or use a computer extensively (Adedoyin et al., 2017).

Spending long periods sitting or engaging in low-energy activities—often referred to as sedentary behavior—has been consistently linked to a wide range of musculoskeletal problems.

Research has shown that extended sitting is strongly associated with increased risk of pain and discomfort in areas such as the neck, shoulders, and lower back. A large-scale meta-analysis revealed that individuals who spend more time in sedentary positions have a 24% higher chance of developing low back pain compared to those who are more active (Alzahrani et al., 2022).

Prolonged screen time, whether on computers or mobile devices, significantly contributes to neck pain. A systematic review found that people who use screens excessively are more likely to report neck discomfort—with odds increasing by over 50% in some cases (Mazaheri-Tehrani et al., 2023). Another study reported that sitting for more than 4 hours daily raises the risk of neck pain by 60%, and the risk climbs even higher if sitting extends to 6 hours or more (Meng et al., 2025).

Physiologically, long hours of sitting put added pressure on the spine—especially the lower back and neck. This reduces muscle engagement, leads to poor posture, and increases the likelihood of joint stiffness and spinal rigidity over time (Dzakpasu et al., 2021). Overworked or imbalanced muscles, particularly in the upper body, are often to blame.

Those working desk jobs or spending hours on a computer—like office workers and students—are particularly vulnerable. Musculoskeletal issues are common in these groups, but studies suggest that targeted interventions like posture training and movement breaks can help reduce symptoms and improve comfort (Shrestha et al., 2018).

2.1.4 Ergonomic Risk Factors Related To Prolonged Sitting and Screen Time

Common Ergonomic Risk Factors from Prolonged Sitting and Screen Use would often result the following:

1. Long Periods of Sitting

Spending more than 4 to 6 hours seated each day significantly increases the likelihood of developing neck and upper back pain—by as much as 88% in some cases. Office workers, in fact, spend around 76% of their working hours sitting down.

2. Static and Poor Postures

Maintaining positions like a forward head posture (leaning toward the screen) for extended periods places extra strain on neck and shoulder muscles. Remaining in the same position for too long without movement also puts added pressure on the spine and hinders muscle recovery.

3. Improper Workstation Setup

Workstations that aren't ergonomically designed—such as monitors set at incorrect heights or chairs without lumbar support—often cause awkward postures, leading to discomfort or chronic pain. Similarly, poorly placed keyboards and mice can result in shoulder tension, wrist strain, and even repetitive stress injuries over time.

4. Repetitive Motion and Pressure Points

Constant typing or mouse use without regular breaks can lead to overuse injuries, especially in the wrists and hands. This repetitive activity can contribute to conditions such as carpal tunnel syndrome or general wrist pain.

5. Lack of Breaks and High Workload

Working long hours (often 8 to 9 hours or more) with minimal breaks and performing repetitive tasks has been shown to significantly raise the risk of neck and shoulder problems. For example, one study found that women who used computers for over 40 hours per week were twice as likely to report neck discomfort.

6. Environmental and Psychological Strain

Factors like poor lighting, glare from screens, background noise, and stressful workloads can further aggravate physical discomfort. High work demands and inadequate recovery time only add to the problem by increasing muscle tension and delaying relaxation.

2.1.5 Postural and Musculoskeletal Strain in Computer Desk Workers

There is a high amount of postural and musculoskeletal strain in computer users due to their sedentary lifestyle and poor postures ,these include:

1. Forward Head Posture and Neck Flexion

Leaning the head forward while using a computer or mobile device puts excessive strain on the neck muscles and cervical spine. Even minor tilts can increase the pressure dramatically, leading to symptoms such as neck pain, headaches, and discomfort that radiates down the arms.

2. Sitting Still for Long Periods

Remaining in one position for too long—especially sitting for more than six hours a day—can almost double the risk of developing neck and back pain. This static posture increases pressure on the spinal discs and leads to fatigue in the supporting muscles.

3. Poor Workstation Fit

When a workstation isn't tailored to fit the user—like when a chair is too low or the monitor is too high—it can force awkward positions that contribute to discomfort in the neck, shoulders, and lower back. Over time, these misalignment can lead to chronic musculoskeletal issues.

4. Using Non-Ergonomic Equipment

Laptops, for example, often contribute to poor posture since the screen and keyboard are connected, forcing users to bend their necks and sit without lumbar support. This can result in strain on the neck, spine, and lower back, especially when used for extended periods.

5. Repetitive Hand and Arm Movements

Frequent typing or mouse use—especially beyond 15 hours per week for typing or 30 hours for mouse work—has been linked to repetitive strain injuries. These include pain in the shoulders, forearms, and wrists, often triggered by repetitive motion and poor wrist positioning.

6. Stress and Poor Posture

When bad posture is combined with high job stress, the chances of developing musculoskeletal issues go up significantly. Research has shown that workers exposed to both poor ergonomics and mental stress can face up to an 80% higher risk of developing neck, shoulder, and back symptoms.

2.1.6 Relevant Anatomy of the Cervical Spine

The cervical spine forms the uppermost segment of the vertebral column and serves several critical functions, including supporting the head, enabling a wide range of motion, and protecting the spinal cord and associated nerves. It is made up of seven

vertebrae, labeled C1 to C7, which provide the foundation for neck stability and movement (Standring, 2016).

The first cervical vertebra, known as the atlas (C1), connects with the base of the skull at the occipital bone, allowing the head to nod. The second vertebra, the axis (C2), is uniquely structured with a bony projection called the odontoid process (dens), which acts as a pivot for head rotation (Drake et al., 2019). From C3 to C7, the vertebrae have a more standard shape, each featuring a vertebral body, a central vertebral canal, and various bony projections that serve as attachment points for muscles and ligaments.

Between most of these vertebrae lie intervertebral discs, which cushion the bones and support flexible movement. These discs have two main components: the annulus fibrosus, a tough outer layer, and the nucleus pulposus, a gel-like core. When these discs degenerate or herniate—often as a result of prolonged sitting or poor posture—they can cause significant neck pain (Cagnie et al., 2007).

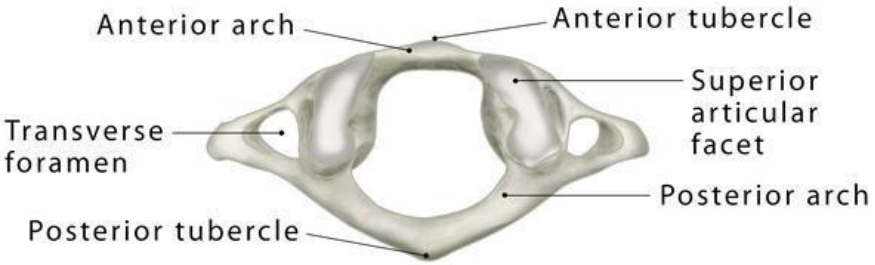
The facet joints, or zygapophyseal joints, located at the back of each vertebra, are key to guiding and limiting cervical motion. These synovial joints are prone to wear and tear, particularly in individuals who maintain static positions for long periods, leading to mechanical neck pain (Jun et al., 2017). The stability of the cervical spine is further enhanced by several important ligaments, including the anterior and posterior longitudinal ligaments, ligamentum flavum, and ligamentum nuchae, which help to maintain alignment and prevent excessive movement (Standring, 2016).

Muscles in the neck are categorized into deep stabilizers and superficial movers. Muscles such as the sternocleidomastoid, trapezius, levator scapulae, and scalenes are essential for positioning and moving the head and neck. Overuse or poor activation of these muscles—common among individuals who spend long hours at desks or computers—can result in muscle imbalances and chronic neck pain (Szeto et al., 2002).

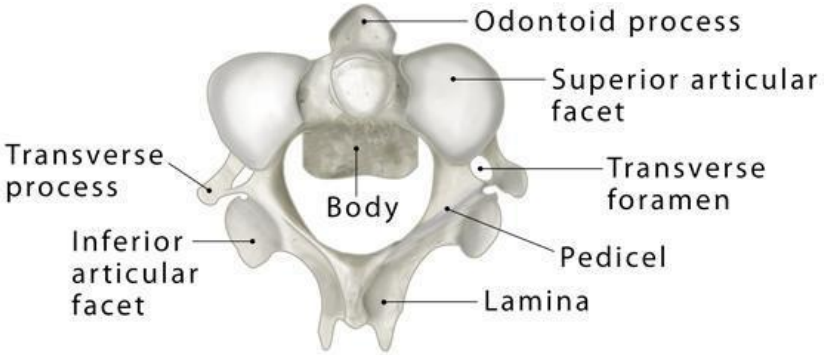
The cervical spine also encloses the spinal cord and gives rise to eight pairs of cervical spinal nerves (C1–C8). These nerves branch out to innervate the head, neck, shoulders, and upper limbs. When compressed by herniated discs or narrowed foramina, these nerves can become irritated, leading to cervical radiculopathy, a condition marked by pain, tingling, or weakness radiating from the neck into the arms (Caridi, Pumberger & Hughes, 2011).

In summary, the cervical spine's encompasses important anatomical structures which includes bones, discs, joints, ligaments, muscles, and nerves and it is very essential for both mobility and stability. However, this complexity also makes it particularly susceptible to problems, especially for people engaged in prolonged sedentary activities or repetitive tasks without proper ergonomic support.

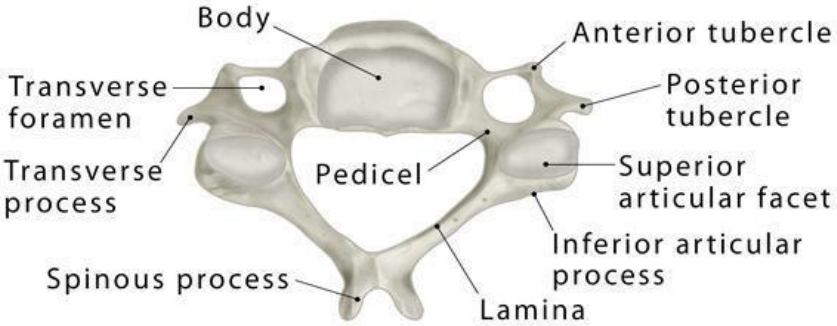
Cervical Vertebrae



Superior view of C1 (Atlas)



Superior view of C2 (Axis)



Superior view of C3-C7

TheSkeletalSystem.net

2.1.7 Neural Pathways And Pain Perception In The Neck

Pain perception in the cervical region is a complex neurophysiological process involving peripheral nociceptors, spinal transmission pathways, and higher central nervous system (CNS) processing centers. Pain in the neck typically arises due to mechanical strain, inflammation, or nerve compression, which activate specialized sensory neurons known as nociceptors.

Nociceptors in the neck are located in muscles, ligaments, facet joints, intervertebral discs, and dura mater. When these structures are injured or inflamed, chemical mediators such as prostaglandins, bradykinin, and substance P stimulate A delta fibres (fast, sharp pain) and C fibers (slow, dull pain), which carry signals to the dorsal horn of the spinal cord (Millan, 1999).

In the spinal cord, these afferent signals synapse in the dorsal horn, particularly in laminae I, II, and V. A key feature of cervical pain processing is the convergence of somatic and visceral inputs on common second-order neurons, which can result in referred pain—for example, pain felt in the shoulder that originates in the neck (Goadsby et al., 2017).

From the spinal cord, second-order neurons decussate and ascend via the spinothalamic tract to the thalamus, where sensory information is relayed to cortical areas. Some pain signals also travel through the spinoreticular and spinomesencephalic tracts, influencing arousal and the emotional response to pain (Willis & Westlund, 1997).

Persistent nociceptive input from the cervical region can lead to central sensitization, characterized by increased excitability of spinal neurons and reduced pain thresholds.

This mechanism is often implicated in chronic neck pain, where even non-painful stimuli may elicit a pain response (Woolf, 2011). Functional imaging studies have shown that chronic pain can alter activity in the anterior cingulate cortex, insula, and prefrontal cortex, regions involved in pain modulation and emotional processing (Apkarian et al., 2005).

A unique aspect of cervical pain is the role of the trigeminocervical complex (TCC), where sensory inputs from the upper cervical spinal nerves (C1–C3) converge with trigeminal nerve fibers. This anatomical overlap explains why cervicogenic headaches and neck pain frequently coexist (Bogduk,2009).

Understanding these neural mechanisms is critical for effective diagnosis and treatment. Interventions such as nerve blocks, neuromodulation, and targeted physiotherapy can influence different levels of the pain pathway from peripheral sensitization to central processing and are used in managing chronic neck pain.

2.2 Epidemiology of Neck Pain

2.2.1 Global Prevalence of Neck Pain

Neck pain is a common condition affecting a significant portion of the global population. According to Hoy et al. (2014), around 4.9% of people worldwide were experiencing neck pain at any given time as of 2010. By 2020, this number had increased, with about 203 million individuals affected globally (Safiri et al., 2024).

It is more common in women than men, with prevalence peaking between the ages of 45 and 74 (Kazeminasab et al., 2021). The annual incidence of neck pain in the general population varies between 10.4% and 21.3%, but this number can be significantly higher among specific occupational groups like office or computer workers (Cohen, 2015).

Neck pain is one of the leading causes of disability around the world. In 2020, it was linked to a global disability rate of approximately 244 years lived with disability (YLDs) per 100,000 people (Safiri et al., 2024). Although the age-standardized prevalence and incidence rates have remained relatively steady since 1990, the total number of cases has grown due to factors like population growth and aging (Kazeminasab et al., 2021).

Between 1990 and 2019, the global number of neck pain cases saw a dramatic increase—prevalence rose by nearly 98%, incidence by about 72%, and YLDs by 78% (Ravi et al., 2024). Projections suggest that the total number of cases could reach approximately 269 million by the year 2050 (Safiri et al., 2024). High-income regions like Northern Europe report the highest rates, while countries with limited healthcare infrastructure, such as South Sudan and Djibouti, report lower prevalence (Kazeminasab et al., 2021).

Age and sex play a role—women and older adults are generally more susceptible to neck pain. Those with a history of musculoskeletal problems are also at higher risk (Kazeminasab et al., 2021).

Work-related risks are significant, especially for individuals in sedentary or repetitive-motion jobs. For instance, prolonged desk work or poor ergonomic practices can contribute to the onset of neck pain (Cohen, 2015).

Research has shown that sitting for more than six hours a day—particularly while using a phone or computer—can raise the risk by as much as 82–88% (Washington Post, 2025; New York Post, 2025). Mental health factors such as high stress, anxiety,

depression, and low social support can also heighten the risk of developing neck pain (Kazeminasab et al., 2021).

Increased neck muscle tension is a known contributor to first-time neck pain episodes. Other factors like abnormal BMI and pre-existing health issues may also increase vulnerability (Kazeminasab et al., 2021). The economic cost of neck pain is enormous. In the United States alone, spending on neck and lower back pain was estimated to reach $134.5 billion in 2016, factoring in both medical treatment and lost productivity (Safiri et al., 2024; Ravi et al., 2024).

2.2.2 Prevalence of Neck Pain in Africa And Nigeria

Research conducted across different regions of Nigeria shows that neck pain is widespread across different occupations as well as many population groups:

A study conducted by Ogwumike et al. (2015) in a rural part of Kano State found that the lifetime prevalence of individuals with neck pain : 67.9%,one-year prevalence: 65.9% and the current (point) prevalence: 17.0%.

Among 532 undergraduates at a Nigerian university, 53.8% reported experiencing neck pain at some point in their lives. Additionally, 51.7% reported some form of musculoskeletal pain, with neck pain being the second most common after lower back pain (Ayanniyi & Udofia, 2016).

A survey of dentists and dental assistants revealed a high occurrence of neck pain, with 81.9% of participants reporting symptoms. Interestingly, men had slightly higher rates (83.2%) than women (80.6%) (Abiodun-Solanke et al., 2010). Similarly, among banking professionals, 70% reported neck, shoulder, or arm discomfort (commonly

known as CANS – Complaints of the Arm, Neck, and Shoulder) within a 12-month period (Anderson et al., 2010).

A study focused on men who carry goods on their heads at marketplaces in Kano and found a 12-month neck pain prevalence of 59% (Igwesi-Chidobe et al., 2024). A research was also carried on 310 nursing mothers in Enugu found that 51.7% experienced neck pain directly related to breastfeeding practices (Ojukwu et al., 2022).

In view of this, Neck pain is clearly a widespread issue in Nigeria, affecting a range of people—from students and healthcare professionals to laborers and nursing mothers. Lifetime and annual prevalence rates can be quite high, especially among professionals and manual workers, often ranging from 50% to over 80% in certain populations. These figures reflect a broader trend seen across parts of Africa, where poor ergonomic conditions and limited access to preventative care continue to contribute to high musculoskeletal pain rates.

2.2.3 Risk Factors among Computer Users, Sleep Disorders And Their Prevalence In Desk Workers

Working long hours at a computer desk has become the norm due to the digitalization of the world and the activities involved in our day to day lives , but it brings significant physical and mental health challenges with neck pain being one of the most common.

Spending more than 4–6 hours a day seated, especially in a poor posture, greatly increases the chances of developing neck pain. Research shows that extended sitting

raises neck pain risk by nearly 88%, and using devices like smartphones or computers contributes even more (Washington Post, 2025; New York Post, 2025).

Leaning the head forward—often caused by low monitor placement or reading from paper—can more than double the risk of neck and shoulder pain (Ariëns et al., 2001). Non-Ergonomic Workstations; Improper setups—like poor monitor height, lack of armrests, or bad lighting—lead to muscle strain. One study found that nearly 60% of people working at non-ergonomic desks experienced neck pain (Gerr et al., 2004).

Researches consistently show that women are more likely to experience neck pain than men, and the risk increases with age—particularly after 30 (Marcus et al., 2002) and when individuals do not engage in regular physical activity, it can also increase susceptibility to neck pain. People who exercise regularly tend to have lower risks (Korhonen et al., 2003).

Individuals with a history of musculoskeletal issues are more likely to experience recurring neck pain (Cohen, 2015) as we as individuals with high workloads, tight deadlines, and lack of support from colleagues or supervisors have all been linked to a higher likelihood of neck pain (Korhonen et al., 2003). Rest is important to improve metabolism and reduce stress levels when individuals do not take enough breaks during the workday, it can strain neck and shoulder muscles, increasing the risk of chronic pain (Szeto et al., 2004).

Sleep problems are also common among people who spend a lot of time at a computer, especially those who work late or under pressure.Prolonged exposure to blue light from screens can reduce melatonin production, making it harder to fall

asleep and stay asleep. This leads to shorter, more fragmented sleep (Turner et al., 2015).

When you do not have inadequate sleep, you are not only tired but it also increases your perception of pain. People with poor sleep quality are more likely to develop chronic neck pain (Cohen, 2015). Desk workers on rotating or night shifts are particularly vulnerable. Up to 38% report getting less than 7 hours of sleep, and around 9% suffer from insomnia (Turner et al., 2015).

2.3 Association between Sleep Quality And Musculoskeletal Pain

There are a lot of evidences showing that poor sleep quality and musculoskeletal (MSK) pain are closely connected. In fact, research suggests that sleep disturbances often play a stronger role in causing pain than pain does in disrupting sleep .Studies over time have shown that people with poor sleep—especially those dealing with insomnia—are more likely to develop chronic pain. This connection is often stronger than the reverse (pain causing poor sleep).

A long-term study following participants for 22 years found that those with consistently poor sleep were nearly twice as likely to suffer from disabling back pain. This risk remained even after accounting for factors like physical activity(Skarpsno.,et al 2021). National health surveys have revealed that individuals who report poor sleep are significantly more likely—up to nine times—to develop musculoskeletal issues compared to good sleepers (Chun, Min Young .,et al 2018).

Daily monitoring studies show that a poor night's sleep often leads to increased pain the next day. While pain can also disturb sleep, the reverse relationship (sleep affecting pain) seems to be stronger. Even among hospital staff, higher levels of MSK

pain were linked to poor sleep, with risk ratios between 1.18 and 1.48. Similarly, teachers experiencing sleep disorders were more likely to report widespread body pain.

There is a clear back-and-forth link between sleep and pain. However, poor sleep tends to drive pain more than the other way around.(Finan PH .,et al 2013). Emotional health—particularly negative moods—can mediate the effect of poor sleep on pain intensity. Staying physically active might help reduce the negative impact of poor sleep on back pain (Eivind Schjelderup Skarpsno ., et al 2021).

2.3.1 Theoretical Framework Linking Pain and Sleep

Pain and sleep have a complex, bidirectional relationship that's been explored through several key theoretical models. These frameworks help us understand why people experiencing chronic pain often struggle with sleep—and vice versa.

1. Biopsychosocial Model

This foundational framework suggests that pain and sleep issues are not just physical—they're also shaped by psychological and social influences. Stress, mood, and even support systems can play a role in how pain is experienced and how well someone sleeps.(Engel, 1977)

2. Fear-Avoidance Model

This model explains how fear of pain can cause people to avoid movement or activity, which leads to worse pain and poorer sleep. Over time, this creates a cycle of avoidance, increased anxiety, and sleep disruption(Lethem et al.,1983).

3. Theory of Unpleasant Symptoms

This nursing-based theory views symptoms like pain and insomnia as interrelated. One symptom can worsen the other, and both are influenced by psychological and environmental factors (Lenz et al., 1997).

4. Sleep–Pain Diathesis Model

This model builds on the idea that people who are predisposed to pain (due to genetics or temperament) may develop negative thoughts or behaviors under stress. These can heighten both pain and sleep problems.(Hamilton et al.,2008).

5. Mutual Maintenance Model

Here, the idea is that pain and poor sleep fuel each other. For instance, insomnia can increase emotional distress, making pain feel worse, while chronic pain can keep someone awake or disrupt sleep. (Pavlova et al.,2011)

6. Cognitive Model of Insomnia (Harvey, 2002)

This model focuses on how racing thoughts, anxiety about sleep, and unhelpful bedtime routines can make insomnia worse. In people with chronic pain, these mental habits can intensify both the pain and sleep issues. Harvey (2002)

7. Pain-Related Beliefs about Sleep (PBAS Model)

This framework looks at how certain beliefs—like “I need to be pain-free to sleep”—can actually worsen insomnia in people with chronic pain. The PBAS scale helps measure these types of thoughts. Lee et al. (2021)

2.3.2 Mechanism by Which Poor Sleep May Contribute To Neck Pain

There’s growing evidence that poor sleep isn’t just a side effect of neck pain—it may actually be a key factor in causing or increasing it. Several mechanisms explain this connection:

Sleeping in uncomfortable positions—like on your stomach or with an unsupportive pillow—can put extra pressure on the neck. Since your head weighs around 4.5 kg, poor alignment during sleep strains muscles like the trapezius, leading to micro-injuries and morning stiffness. Add in daytime posture problems (like slouching at a computer), and the stress on your neck increases—especially if your body isn't recovering properly due to lack of quality sleep (Artner et al., 2022; Neupane et al., 2013).

When you don’t get enough rest, your body becomes more sensitive to pain. Poor sleep alters how the brain processes pain signals (central sensitization), making normal sensations feel more intense. At the same time, inflammatory chemicals like interleukin-6 increase, further irritating tissues around the neck and slowing down recovery (Smith et al., 2004; Haack et al., 2007).

Sleep plays a critical role in muscle recovery. Without enough of it, your muscles can’t properly heal or rebuild. This makes neck muscles more prone to fatigue and discomfort over time, especially in people who already have high levels of physical or mental stress (Dattilo et al., 2011).

Chronic stress, anxiety, or insomnia can keep the body in a constant state of alertness—even at night. This “hyperarousal” limits deep sleep stages, when most muscle recovery happens. The result would be A tired body that never fully heals, making you more vulnerable to neck pain (Tang et al., 2012).

Studies show that sleep problems often come before neck pain shows up, and those who sleep poorly are more likely to develop chronic pain. Once neck pain starts, it can make falling or staying asleep harder—creating a frustrating loop that’s tough to break (Artner et al., 2022; Sivertsen et al., 2008).

Understanding these mechanisms shows how important sleep is for preventing and managing neck pain. Simple change such as upgrading your pillow, improving your posture, reducing stress, or treating insomnia, this can go a long way and make a big difference in both pain relief and long-term recovery.

2.3.3 Effects of Chronic Pain on Sleep Architecture

Chronic pain doesn’t just make it hard to fall asleep—it actually reshapes how the brain experiences sleep. People living with long-term pain often experience real changes in their sleep architecture that can worsen both their pain and overall well-being.

One of the most common issues among people with chronic pain is fragmented sleep. That means it takes longer to fall asleep, they wake up more during the night, and their overall sleep efficiency drops. Studies using sleep monitoring (like polysomnography) consistently show that people in chronic pain have more broken sleep than those without pain (Finan et al., 2013; Smith & Haythornthwaite, 2004).

Deep sleep—also known as slow-wave sleep (SWS)—is when the body repairs itself. Unfortunately, chronic pain tends to reduce time spent in this stage. Many also

experience “alpha intrusions,” where brain waves typical of being awake interrupt deep sleep. REM sleep, which is important for mood and memory, is also shorter or delayed in people with pain, especially those with musculoskeletal conditions (Herrero Babiloni et al., 2024; McBeth et al., 2005).

Even if someone with chronic pain seems to sleep through the night, their sleep may still be shallow and unstable. They often experience frequent microarousals, which are very brief wake-ups that disrupt the flow between sleep stages. This leads to poor-quality sleep, even if they’re unaware of these interruptions (Finan et al., 2013).

Brainwave studies have found that people with chronic pain—particularly conditions like fibromyalgia—often have lower delta wave activity, which is linked to the most restorative stage of sleep. At the same time, intrusive alpha waves (usually seen in waking states) can reduce sleep quality. This combination, known as the alpha-delta anomaly, has been linked to waking up feeling unrefreshed and achy (McBeth et al., 2005).

Poor sleep architecture doesn’t just make you tired, it can also make your pain feel worse. Without proper restorative sleep, the brain becomes more sensitive to pain (a process called central sensitization). In addition, emotional issues like depression, anxiety, and poor concentration tend to increase, making it even harder to cope with chronic pain (Smith & Haythornthwaite, 2004; Finan et al., 2013).

Understanding how chronic pain changes your sleep helps explain why just “getting more sleep” doesn’t always help. The goal would be to improve the quality of your sleep, not just the quantity. This might include treatments like cognitive behavioral therapy for insomnia (CBT-I), medication, pain management, or changes to your sleep environment.

2.5 Empirical Review

Author/Date/Title	Method	Results	Aim of the Study	Discussion
Alsaadi et al., 2014 "The bidirectional relationship between pain and sleep disturbances"	Longitudinal cohort study	Poor sleep was both a predictor and consequence of chronic pain	To investigate the temporal relationship between pain and sleep quality	Treating sleep disturbances can reduce the intensity and duration of musculoskeletal pain.
Balogun et al., 2018 "Work-related musculoskeletal disorders among Nigerian university staff"	Cross-sectional survey of 370 university staff	38.5% reported neck pain; prolonged sitting and poor posture cited as key causes	To determine the prevalence and risk factors of neck pain in university staff	Confirms high ergonomic risks. Suggests institutional reforms.
Buysse et al. (1989) - PSQI	To develop and	Questionnaire-	Developed 7	The PSQI is effective in

Development	validate the Pittsburgh Sleep Quality Index.	based development and psychometric testing.	components to evaluate sleep quality with scoring up to 21.	distinguishing good and poor sleepers.
Côté et al., 2008 "The burden and determinants of neck pain in workers"	Systematic review of epidemiological studies	30–50% of adults experience neck pain annually; desk workers particularly at risk	To evaluate the global burden and key risk factors for neck pain among workers	Neck pain is widespread and significantly associated with sedentary work and poor posture.
Hoy et al. (2014) - Neck Pain	To define neck pain and identify common causes and duration patterns.	Systematic literature review and population survey data.	Neck pain often lasts at least one day, may refer to upper limbs.	Acute neck pain is often due to muscle tension or awkward posture; chronic cases are often influenced by psychological stress.
Kumar et al. (2022). "Ergonomic	To evaluate ergonomic	Quasi-	Post-intervention,	Ergonomic intervention is an

Interventions and Neck Pain"	modifications in reducing neck pain and improving sleep.	experimental study; 150 participants received ergonomic training and adjustments.	neck pain reduced by 45% and sleep quality improved (PSQI ↓ by 4 pts).	effective non-pharmacological approach to mitigate occupational neck pain.
Lee and Wong (2020). "Sleep Quality and Postural Health in IT Professionals"	To examine sleep disturbances among desk workers with neck pain.	Survey-based study with 250 IT workers using PSQI and ergonomic assessment.	62% had poor sleep quality; strong correlation with poor ergonomics and neck pain.	Sleep disruption in sedentary workers may be mediated by neck strain and workstation ergonomics.
Moreno CR et al., 2016	Meta-analysis of	Irregular work	To understand how	Suggests integrating sleep

“Working hours, sleep, and musculoskeletal disorders”	studies on occupational sleep and pain	schedules and sleep loss correlated with higher MSD risk	work patterns influence sleep and musculoskeletal health	education into MSD prevention programs.
Nelson KL et al. (2022) - Sleep Quality Dimensions	To define and examine the components of sleep quality.	Literature review and conceptual analysis of sleep quality dimensions.	Identified key components: latency, duration, efficiency, WASO, satisfaction, regularity, timing, and daytime functioning.	Each sleep component affects overall restfulness and health outcomes.
Omole et al., 2021 “Impact of poor sleep on	Questionnaire-based survey	Poor sleep quality significantly	To explore how sleep quality affects	Highlights the role of sleep in work efficiency.

occupational performance in Nigerian professionals”		associated with reduced job performance	productivity among professionals	
Oyewole et al., 2020 “Digital work and musculoskeletal pain among Nigerian university employees”	Cross-sectional study of 302 staff members	High prevalence of neck and back pain; 45% reported neck discomfort	To examine the health effects of transitioning to digital work	Digital shift has increased musculoskeletal strain due to poor workstation setup.
Smith et al. (2021). "Impact of Sedentary Work on Musculoskeletal Health"	To assess the relationship between prolonged sitting and neck pain among office workers.	Cross-sectional study involving 300 administrative staff using NMQ and ONDI.	70% reported neck pain; higher ONDI scores correlated with sitting >6 hours/day.	Prolonged sedentary behaviour is strongly associated with neck discomfort and disability.

Tettey et al., 2020 "Ergonomics and neck pain prevalence among Ghanaian office workers"	Cross-sectional design with 350 participants	42% reported neck pain, linked to poorly designed workstations	To assess the effect of ergonomics on neck pain prevalence	Highlights the need for ergonomic interventions.
Vos et al., 2020 "Global burden of 369 diseases and injuries"	Global Burden of Disease Study data analysis	Neck pain ranks 4th as a global cause of disability	To rank major causes of global disability	Neck pain is a growing public health issue. Workplace ergonomic interventions are essential.

CHAPTER THREE

METHODS

3.1 Participants

The study was conducted within the University of Benin comprising of participants who are computer desk workers within the Libraries, Student Affairs Division, Academic Planning Division, Exams and Records Division and School of Basic Medical Sciences (SBMS) of the University of Benin, located in Benin City, Edo State, Nigeria. The SBMS is one of the core academic units within the College of Medical Sciences and comprises multiple departments such as Anatomy, Physiology, Medical Biochemistry, Nursing Science, Radiography, Medical Laboratory Science and Physiotherapy. It employed a substantial number of non-academic staffs whose roles involve extensive use of computers and prolonged sitting during desk-based tasks, making it an appropriate setting for examining the impact of sedentary behavior on neck pain and sleep quality.

Participants Selection

The target population for this study was comprised of non-academic computer-based desk workers within the Libraries, Student Affairs Division, Academic Planning Division, Exams and Records Division and the School of Basic Medical Sciences (SBMS) at the University of Benin. This population includes staff members who are routinely engaged in sedentary occupational tasks characterized by prolonged sitting and extensive computer use. These individuals perform essential administrative, clerical, and technical roles across various units within SBMS, such as faculty administrative offices, departmental secretariats, records and admissions units, finance sections, and ICT support services. Their job functions typically involve extended hours of desk work, data entry, documentation, report preparation, and other computer-dependent activities,

placing them at elevated risk for musculoskeletal complaints such as neck pain and potential disturbances in sleep quality due to occupational strain and sedentary behavior.

3.1.1 Inclusion Criteria

i. Employees who spend at least 4-6 hours per day working at a computer or desk.

ii. Individuals who have been in their current role for a minimum of 6 months.

iii. Adults aged between 18 years and above

iv. Willingness to provide informed consent.

3.1.2 Exclusion Criteria

i. Workers with preexisting diagnosed spinal or neurological conditions unrelated to occupational factors.

ii. Pregnant women (due to postural and physiological changes influencing sleep and pain).

iii. Individuals with recent trauma, surgery, or hospitalization within the past 3 months..

3.2 Materials

3.2.1 APPARATUS/INSTRUMENTS

To ensure a comprehensive assessment of the variables under investigation, namely, sedentary behavior, neck pain, sleep quality, and ergonomic factors, this study employed a structured, self-administered questionnaire composed of six major sections. The questionnaire integrates standardized and validated instruments widely used in occupational health and epidemiological research.

1. **Section A: Socio-Demographic Characteristics**

This section collected essential background information on participants to allow for descriptive and subgroup analyses. Variables to be captured include:

- Age
- Sex
- Marital status
- Department/unit within the School of Basic Medical Sciences (SBMS)
- Educational qualification
- Job designation
- Years of work experience

These characteristics provided contextual data that may influence or correlate with sedentary behavior, neck pain prevalence, and sleep quality.

2. **Section B: Nordic Musculoskeletal Questionnaire (NMQ)**

The NMQ is a widely used, validated tool for screening musculoskeletal symptoms across multiple body regions. In this study, the NMQ will be used to:

- Assess the presence, location, and duration of neck pain over the past 12 months and past 7 days.
- Identify functional limitations due to musculoskeletal discomfort.

The NMQ provides a binary response format (yes/no) for each anatomical region, followed by questions about interference with daily activities and whether the respondent has sought medical attention.

3. **Section C: Oswestry Neck Disability Index (ONDI)**

The ONDI is a validated, self-reported instrument designed to quantify the degree of disability caused by neck pain. It includes 10 items that evaluate how neck problems affect an individual's ability to perform daily tasks. These domains include:

- Pain intensity
- Personal care (e.g., washing, dressing)
- Lifting
- Reading
- Headaches
- Concentration
- Work performance
- Driving
- Sleep quality
- Recreational activities

Each item is scored on a 6-point Likert scale (0–5), with higher scores indicating greater functional limitation. The total score is expressed as a percentage to categorize disability as minimal, moderate, severe, or complete.

4. **Section D: Pittsburgh Sleep Quality Index (PSQI)**

The PSQI is a 19-item standardized instrument used to assess subjective sleep quality over the past month. It yields seven component scores:

- Subjective sleep quality
- Sleep latency

- Sleep duration
- Habitual sleep efficiency
- Sleep disturbances
- Use of sleep medication
- Daytime dysfunction

The component scores are summed to generate a global PSQI score ranging from 0 to 21. A global score >5 is indicative of poor sleep quality. The PSQI is validated for diverse populations and is particularly suitable for research in occupational settings where sleep disturbances may be influenced by ergonomic and psycho-social stressors.

5. **Section E: Sedentary Behavior Questionnaire (SBQ)**

The SBQ is a validated tool designed to measure sedentary time across multiple daily contexts. It captures self-reported sitting time (in hours and minutes) across different activities on both weekdays and weekends, including:

- Sitting at work
- Watching television
- Using a computer outside work
- Sitting while commuting
- Talking on the phone
- Reading
- Engaging in hobbies or leisure

The total sedentary time per day will be computed to assess the duration and distribution of prolonged sitting, which is a key exposure variable in this study.

6. **Section F: Ergonomic Self-Assessment Checklist**

This section includes a structured ergonomic checklist adapted from established workplace ergonomic guidelines. It is designed to assess the participant's computer workstation setup and work posture. Key domains include:

- Chair design and seating posture
- Desk and monitor height/position
- Keyboard and mouse placement
- Typing and mousing technique
- Lighting and glare
- Frequency of breaks and micro-movements
- Awareness of ergonomic principles

This checklist helped to identify modifiable ergonomic risk factors that may contribute to neck pain and poor sleep quality among desk-based workers.

3.2.2 DESCRIPTION OF INSTRUMENTS

All instruments are standardized and widely used in occupational health research. Prior to data collection, face validity and content validity will be re-affirmed through expert review by physiotherapists. A pilot test will be conducted with 5 respondents (excluded from the main

study) to confirm internal consistency, with Cronbach's alpha coefficients ≥0.70 considered acceptable.

SUMMARY OF INSTRUMENTS AND CONSTRUCTS MEASURED

INSTRUMENT	CONSTRUCT MEASURED	SCORING	INTERPRETATION
Nordic Musculoskeletal Questionnaire (NMQ)	Presence and duration of neck pain	Categorical (Yes/No)	Presence/absence of musculoskeletal symptoms
Oswestry Neck Disability Index (ONDI)	Functional impact of neck pain	0–100%	Minimal to complete disability
Pittsburgh Sleep Quality Index (PSQI)	Sleep quality	0–21	>5 = Poor sleep quality
Sedentary Behavior Questionnaire (SBQ)	Daily sitting/sedentary time (weekday vs weekend)	Minutes per activity	Total sedentary time per day
Ergonomic Self-Assessment Checklist	Workstation setup and posture	Checklist format	Identification of ergonomic risk factors

These instruments collectively provided a comprehensive profile of the physical, behavioral, and environmental factors relevant to neck pain and sleep quality in sedentary occupational contexts.

3.3 METHODS

3.3.1 RESEARCH DESIGN

This study adopted a **cross-sectional descriptive and analytical survey design.** This design was appropriate for determining the prevalence of a condition (e.g., neck pain), assessing associations between variables (e.g., neck pain and sleep quality), and evaluating the influence of behavioral exposures such as prolonged sitting. The design allowed data collection at a single point in time from a defined population, enabling statistical inferences without manipulating the study environment.

3.3.2 SAMPLING TECHNIQUE/ SAMPLE SIZE CALCULATION

A convenient sampling technique was employed for this study. Eligible participants were selected based on their availability and willingness to participate from departments within the Libraries, Student Affairs Division, Academic Planning Division, Exams and Records Division the School of Basic Medical Sciences (SBMS) known for prolonged computer-based work. This approach allowed for efficient recruitment of participants who met the study criteria within the available time-frame.

The sample size was determined using the Cochran formula for prevalence studies:

n = (Z^2 p (1 - p)) / d^2 (for infinite population)

Where:

- Z = 1.96 (standard normal deviate at 95% confidence interval),

- p = 0.5 (assumed prevalence of neck pain based on literature),

- d = 0.05 (desired degree of precision).

n = (1.96)^2 0.5 0.5 / (0.05)^2 = 384

Adjusted Cochran's Formula (for finite population)

n =\frac{n_0}{1+\frac{n_0-1}{N}}

Where: n= adjusted sample size = 281

N= total population size = 1,050 (the total population of computer desk workers obtained from Registry and Academic Planning Division, University of Benin).

3.3.3 PROCEDURE FOR DATA COLLECTION

Eligible participants were approached during their office hours. The purpose of the study was explained, and informed consent was obtained. Questionnaires were distributed and retrieved on the spot or through an online link, depending on convenience.

3.3.4 ETHICAL CONSIDERATIONS

- Ethical clearance was obtained from the University of Benin Research Ethics Committee.
- Participants were informed of their right to voluntary participation and withdrawal at any stage without penalty.
- Written informed consent was secured before data collection.
- All information were kept confidential and used solely for academic purposes.
- Data was anonymized and stored in encrypted files accessible only to the research team.

3.3.5 DATA ANALYSIS

Data obtained from the study were coded, entered, and analysed using the Statistical Package for the Social Sciences (SPSS) version 27. The level of statistical significance was set at $p < 0.05$.

The following statistical methods were employed:

1. **Descriptive Statistics:**

   Descriptive statistics, including means, standard deviations, frequencies, and percentages,

was used to summarize and describe the socio-demographic characteristics of participants, as well as the prevalence of neck pain, levels of sedentary behavior (as measured by the SBQ), and sleep quality (as assessed using the PSQI). These statistics also helped identify distribution patterns and trends in the data.

2. **Pearson's Correlation Coefficient:**

   Pearson's correlation analysis was used to determine the strength and direction of linear relationships between continuous variables such as:

- Duration of sedentary behavior and neck pain severity (ONDI scores),
- Sedentary time and sleep quality scores (PSQI),
- Neck pain severity and sleep quality scores.

This helped assess whether increased sedentary behavior is significantly associated with greater neck disability and poorer sleep quality.

3. **Chi-Square Test of Independence:**

   The Chi-square (χ^2) test was used to examine the association between categorical variables, such as:

- Presence or absence of neck pain (from the NMQ) and quality of sleep (good vs. poor based on PSQI),
- Ergonomic risk levels and presence of neck pain.

This test assessed whether there were statistically significant relationships between categorical occupational health factors and health outcomes.

CHAPTER FOUR

RESULTS

4.1 Introduction

The primary aim of this study was to assess the prevalence of neck pain and its association with sleep quality among computer-based desk workers at the University of Benin, while examining the contributing role of prolonged sitting as a form of sedentary behavior. A total of 281 computer-based desk workers at the University of Benin were recruited for this study

4.1.1 Sociodemographic variables of the participants

A total of two hundred and eighty-one participants were recruited for this study, out of which 145(51.6%) were females while 136(48.4%) were males. 227(80.8%) were married. 101(35.9%) were civil servants, 53(18.9%) were Admin officers, 35(12.5%) were librarians. 182(64.8%) of the respondents uses ergonomic chairs and 65(23.1%) of the respondents takes break during work. The mean age, duration of employment and the average hours of computer use per day were 41.98 ±7.83, 13.17 ± 4.68 and 4.26 ± 1.96 respectively as shown in table 1.

Table 1: Sociodemographic variables of the participants

Variable	frequency	Percentages
Gender		
Female	145	51.6
Male	136	48.4
Marital status		
Married	227	80.8
Single	48	17.1
Others	6	2.1
Job title		
Academic planning officer	28	10.0
Admin officer	53	18.9
Bindery department	12	4.3
Civil servant	101	35.9
Deputy director ICT	5	1.8
Librarian	35	12.5
Public servants	10	3.6
Records officer	12	4.3
Reward officer	2	0.7
Secretary	12	4.3
Senior planning officer	11	3.9
Ergonomic chair		
No	99	35.2
Yes	182	64.8
Take breaks		
No	216	76.9
Yes	65	23.1
	Range	**Mean ± SD**
Age	28 - 58	41.98 ±7.83
Duration of employment	5 - 25	13.17 ± 4.68
Average Hours of Computer Use per Day	1 - 10	4.26 ± 1.96

4.1.2 Prevalence of neck pain

The 12-month prevalence of neck pain among the participants was 51.2% as 144 of them reported to have had neck pain at some point in the last 12-months. The 7-day prevalence of neck pain was 41.3% as 116 of them reported to have experienced some discomfort on the neck at some point in the last 7days as shown in table 2.

Table 2: Prevalence of neck pain

Variable	Frequency	Percentages
12-month prevalence of Neck pain		
No	137	48.8
Yes	144	51.2
7-day prevalence of Neck pain		
No	165	58.7
Yes	116	41.3

4.1.3 Descriptive statistics on sleep quality, Oswestry Neck Disability Index, sedentary behavior.

The mean scores for the Oswestry Disability Index (ODI), Pittsburgh Sleep Quality Index (PSQI), and Sedentary Behavior Questionnaire (SBQ) were 44.29 ± 19.53, 15.54 ± 4.28, and 345.00 ± 181.71, respectively. ODI: 44.29 indicates moderate to severe disability (range: 0-100) PSQI: 15.83 indicates poor sleep quality (range: 0-21), SBQ: 345.00 minutes (or 5.75 hours) of sedentary time per day, with a large variability (SD = 181.71) as shown in table 3.

Table 3: Descriptive statistics on sleep quality, Oswestry Neck Disability Index, sedentary behavior.

Variable	Range	Mean ± SD
ODI (%)	0-75	44.29 ± **19.53**
SBQ (Mins)	40 - 560	345.00 ± 181.71
PSQI	2 – 20	15.54 ± 4.28
	Frequency	**Percentages**
Good sleep quality	17	6.0
Poor sleep quality	264	94.0

ODI= Oswestry Neck Disability Index
SBQ= Sedentary Behavior Questionnaire
PSQI= Pittsburgh Sleep Quality Index

4.1.4 Ergonomic Self-Assessment Checklist

209(74.4%) of the respondents reported that their chairs are adjustable and supportive. 217(77.2%) of the respondents reported that their lower back is well supported when sitting. 219(77.9%) of the respondents reported that their feet are flat on the floor or on a footrest. 200(71.2%) of the respondents reported that their computer monitor is at eye level. 199(70.8%) of the respondents reported that their monitor is approximately arm's length away. 215(76.5%) of the respondents reported they take frequent short breaks (micro-breaks) to stretch as shown in table 4.

Table 4: Ergonomic Self-Assessment Checklist

Questions	No n(%)	Yes n(%)
Is your chair adjustable and supportive ?	72(25.6%)	209(74.4%)
Is your lower back well supported when sitting?	64(22.8%)	217(77.2%)
Are your feet flat on the floor or on a footrest?	62(25.6%)	219(77.9%)
Are your knees at about the same height as your hips when sitting?	72(25.6%)	209(74.4%)
Is there enough space under your desk for your legs?	64(22.8%)	217(77.2%)
Is your computer monitor at eye level?	81(28.8%)	200(71.2%)
Is your monitor approximately arm's length away?	82(29.2%)	199(70.8%)
Are your elbows at a 90-degree angle while typing?	145(51.6%)	136(48.4%)
Do you avoid bending or twisting your neck while working?	87(31.0%)	194(69.0%)
Do you take frequent short breaks (micro-breaks) to stretch?	66(23.5%)	215(76.5%)

4.1.5 Sitting Duration and Ergonomics

89(24.6%) of the respondents reported that they rarely take breaks from sitting. 202(71.9%) of the respondents reported that their computer is at eye level. 197(70.1%) of the respondents reported that their keyboard positioned at elbow height. 97(34.5%) of the respondents reported that they always practice proper posture while sitting as shown in table 5.

Table 5: Sitting Duration and Ergonomics

Questions	Frequency	Percentages
How often do you take breaks from sitting?		
Every 30 mins	66	23.5
Every hour	66	23.5
Every 2 hours	80	28.5
Rarely	89	24.6
Is your computer screen at eye level?		
No	79	28.1
Yes	202	71.9
Is your keyboard positioned at elbow height		
No	84	29.9
Yes	197	70.1
Do you practice proper posture while sitting		
Always	97	34.5
Often	64	22.5
Sometimes	54	19.2
Never	66	23.5

4.1.6 Pearson correlation between sleep quality, neck pain severity and prolonged sitting

Sleep Quality and Neck Pain Severity: A strong positive correlation was found ($r = 0.799$, $p < 0.001$), indicating that poorer sleep quality is associated with increased neck pain severity. Sleep Quality and Sedentary Behavior: A weak positive correlation was observed ($r = 0.196$, $p < 0.001$), suggesting that poorer sleep quality is associated with increased sedentary behavior. Sedentary Behavior and Neck Pain Severity: A weak positive correlation was found ($r = 0.170$, $p = 0.004$), indicating that increased sedentary behavior is associated with increased neck pain severity

Table 6: Pearson correlation between sleep quality, neck pain severity and prolonged sitting

Variable	r	p-value
PSQI * ODI	0.799	<0.001
PSQI * SBQ	0.196	<0.001
SBQ * ODI	0.170	0.004

4.1.7 Chi-square association between sleep quality and the prevalence of neck pain

Chi-square shows that there was no significant association between sleep quality and the 12-month prevalence of neck pain (p=0.392). However, there was a significant association between sleep quality and the 7-days prevalence of neck pain as shown in table 7

Table 7: Chi-square association between sleep quality and the prevalence of neck pain

Variable		Sleep Quality			
		Good	Poor	X^2	P
12-month prevalence of neck pain	**No**	10	127	0.734	0.392
	Yes	7	137		
7-day prevalence of neck pain	**No**	16	149	9.354	0.002
	Yes	1	115		

4.2 Hypothesis testing

Hypothesis one: There would be no significant relationship between sleep quality and neck pain severity

Test: Pearson correlation

Alpha level: 0.05

Observed p value: <0.001

Judgement: since the observed p value is less than 0.05, the null hypothesis was therefore REJECTED

Hypothesis two: There would be no significant relationship between sleep quality and sedentary behaviors

Test: Pearson correlation

Alpha level: 0.05

Observed p value: <0.001

Judgement: since the observed p value is less than 0.05, the null hypothesis was therefore REJECTED

Hypothesis three: There would be no significant relationship between neck pain severity and sedentary behaviors

Test: Pearson correlation

Alpha level: 0.05

Observed p value: 0.004

Judgement: since the observed p value is less than 0.05, the null hypothesis was therefore REJECTED

Hypothesis four: There would be no significance association between sleep quality and 12-month prevalence of neck pain

Test: chi-square

Alpha level: 0.05

Observed p value: 0.392

Judgement: since the observed p value is greater than 0.05, the null hypothesis was therefore ACCEPTED

Hypotheses five: There would be no significance association between sleep quality and 7-day prevalence of neck pain

Test: chi-square

Alpha level: 0.05

Observed p value: 0.002

Judgement: since the observed p value is less than 0.05, the null hypotheses was therefore REJECTED

CHAPTER FIVE

DISCUSSION, CONCLUSION, RECOMMENDATIONS, AND IMPLICATIONS

5.1 Discussion

This study investigated the prevalence of neck pain among computer-based desk workers at the University of Benin and explored its relationship with sleep quality and prolonged sitting. The findings revealed that 51.2% of respondents experienced neck pain within the past 12 months, while 41.3% reported pain within the last seven days. On average, participants demonstrated very poor sleep quality (PSQI mean ≈ 15.5) and reported approximately 345 minutes (about 5.75 hours) of sedentary time each day. Together, these results paint a concerning picture of a workforce exposed to multiple interrelated risk factors for neck musculoskeletal disorders. These findings align with previous occupational studies that link sedentary, screen-based work with a higher risk of neck pain and functional limitations (Meng et al., 2025).

The prevalence rates observed in this study are both clinically and occupationally significant. A 12-month neck pain rate exceeding 50% places this population at the upper end of global prevalence figures for office workers. Such high rates indicate that neck pain is not only common but also recurrent, potentially impairing daily function and productivity. The average Oswestry Disability Index score (ODI ≈ 44.3%) signifies moderate to severe disability among a considerable number of participants, echoing findings from similar studies among sedentary professionals where neck pain was shown to hinder work performance and overall wellbeing (Zapponi, 2025).

Neck pain is a prominent occupational health problem among computer-based desk workers, and the current study reaffirms this: over half of the sample reported neck pain in the preceding 12 months (51.2%), with 41.3% reporting symptoms in the last 7 days. These prevalence figures align with ranges reported in contemporary occupational studies and reflect the ongoing burden of neck musculoskeletal disorders in sedentary office populations. The prevalence numbers are particularly concerning when considered alongside the study's functional data — a mean Oswestry Neck Disability Index of 44.3% (±19.5) indicates moderate to severe disability for a substantial subset of participants, pointing to clinically meaningful impact on daily activities and work capacity. A recently published systematic review of the literature quantified the dose–response relationship between sedentary time and neck pain, showing a higher risk associated with ≥4–6 hours of sedentary behavior per day (Meng et al., 2025). This underlines a direct, high-quality evidence base to interpret the SBQ mean (≈345 min/day ≈ 5.75 h/d) reported in the present study.

Sleep disturbance emerged as a dominant feature in this study's cohort, with 94% of participants meeting the criteria for poor sleep on the PSQI (mean PSQI ≈ score 15.5). Statistically, the relationship between sleep quality and neck pain severity was strong and robust (Pearson $r = 0.799$, $p < 0.001$), implying a tight coupling between sleep dysfunction and pain intensity in this occupational group. From both a physiological and a statistical perspective, such a strong correlation invites two parallel interpretations. First, poor sleep plausibly lowers pain thresholds, impairs central descending pain inhibition, and slows musculoskeletal recovery, thereby exacerbating the severity of neck pain. Second, ongoing neck pain increases nocturnal arousal and sleep fragmentation, producing a feed-forward loop between pain and sleep

disturbance. Large population analyses and NHANES-based studies have reported non-linear and sex-specific patterns in sleep duration–pain associations, suggesting the effects observed here are consistent with broader epidemiologic evidence and may differ by subgroup (e.g., sex, age). In Nigeria, evidence from construction labourers suggests that psychosocial constraints, such as a lack of task autonomy and the inability to take unscheduled breaks, substantially heighten the intensity of neck pain, whereas biomechanical factors, including load weight and duration of carriage, more strongly influence neck disability and sick leave (Igwesi-Chidobe et al., 2024).

In contrast, among Taiwanese nurses, short sleep duration (<7 hours) was a key determinant of chronic neck and shoulder discomfort, underscoring the contribution of sleep deprivation and fatigue to musculoskeletal morbidity (Chin et al., 2021). The latter evidence is similar to that recorded in the present study. Nonetheless, these studies collectively suggest that interventions to mitigate neck pain should integrate ergonomic redesign, workload flexibility, and sleep-hygiene promotion, rather than focusing solely on physical risk reduction.

Prolonged sitting also contributed to the problem, but with smaller effect sizes. Mean reported sedentary time was approximately 345 minutes per day (~5.75 hours), and sedentary behavior correlated weakly but significantly with both PSQI ($r = 0.196$, $p < 0.001$) and ODI ($r = 0.170$, $p = 0.004$). These small magnitudes are consistent with meta-analytic evidence showing that sedentary behavior increases risk of neck pain in a dose-responsive manner — the relationship persists but is often modest when measured cross-sectionally, reflecting multiple interacting risk pathways (ergonomics, psycho-social stress, physical activity, and individual susceptibility) (Meng et al.,

2025). Importantly, meta-analytic data indicate thresholds: sedentary exposure of≥4 hours per day is where the risk becomes evident, and it increases further at ≥6 hours per day. This study cohort's mean sits within this risk window, supporting the plausibility that sitting time in the population materially contributes to neck pain risk.

The chi-square results provide an interesting temporal nuance to findings in the present study. Sleep quality was not associated with 12-month prevalence of neck pain ($p = 0.392$), yet it was associated with 7-day prevalence ($p = 0.002$). This suggests that poor sleep may be more tightly linked to short-term or recent symptom flares rather than cumulative, year-long prevalence. Findings by Parto and colleagues support this analogy, where they reported that sleep issues might potentially not be a primary driver of chronic neck pain, or their effects become diluted over time when other factors like genetics, age, or sedentary lifestyles become more influential for long-term pain (Parto et al., 2023). Clinically, this makes sense: recent sleep loss or disturbance often translates quickly into increased muscle tension, reduced pain tolerance, and heightened symptom reporting; conversely, long-term prevalence likely reflects cumulative occupational exposures (chronic poor posture, prolonged sitting, repetitive use) and may therefore be less acutely tied to sleep at the level of simple cross-tabulation.

A notable finding is the discrepancy between ergonomic availability and ergonomic behaviour. While a majority reported access to adjustable chairs, eye-level monitors, and legroom, only a minority always practiced proper posture (34.5%) or took breaks (23.1%). This availability–practice gap is critical — equipment alone is insufficient. This argument is a common phenomenon that occurs due to several factors, ranging

from habit, lack of awareness, time pressure, to a failure to recognize the benefits of ergonomic setups, ultimately leading to poor posture, strain, and injuries (Ergonomics - Identify Problems | Occupational Safety and Health Administration, n.d.). Furthermore, behavioural adherence, organizational norms, workload expectations, and education determine whether ergonomic resources translate into risk reduction. Therefore, interventions that combine equipment provision with behavioral training, scheduled micro-breaks, and organizational policy (e.g., break reminders, workload management) are more likely to succeed.

Taken together, these results suggest a multidimensional model: sedentary exposure sets the stage (dose-dependent risk), poor sleep amplifies pain severity and short-term flares, and inconsistent ergonomic practice permits the mechanical stresses that perpetuate chronicity. From a clinical and public-health perspective, the data advocate for integrated workplace strategies that address ergonomics, promote regular movement breaks, and include sleep-focused components (sleep hygiene education, screening for sleep disorders) to achieve meaningful reductions in neck pain burden. The systematic review literature supports such an approach, particularly targeted efforts to reduce sitting time below the 4–6 h/day risk threshold and to prioritize high-risk subgroups (employees, females) for interventions (Meng et al., 2025).

5.2 Conclusion

This study underscores a high prevalence of neck pain and poor sleep quality among computer-based desk workers, with sedentary exposure that falls within known risk thresholds. Together, these factors form a triad where prolonged sitting creates mechanical strain, poor sleep amplifies pain perception, and inadequate ergonomic habits sustain the problem. Future research should employ objective tools and

longitudinal methods to clarify causality and evaluate integrated interventions. In the interim, adopting workplace policies that combine ergonomic adjustments, structured movement, and sleep health promotion offers a practical and evidence-based pathway to reducing neck pain and improving worker well-being.

5.3 Recommendations

Building on these results, several steps are recommended for future studies and workplace applications:

1. Longitudinal designs with objective measurement: Future research should use actigraphy and accelerometry to monitor sleep and sedentary time continuously, establishing causality and identifying temporal patterns (Meng et al., 2025).

2. Cluster-randomized workplace interventions: Departments could be randomized into ergonomic, sleep, or combined intervention arms, with outcomes evaluated over 3–6 months. Integrated approaches are more effective than single-component interventions (Raut et al., 2024).

3. Advanced statistical modeling: Employ multivariate regression and mediation analyses to test causal pathways (e.g., sedentary time, poor sleep, and pain) while controlling for confounders.

4. Targeted interventions for high-risk groups: Given that women and older employees often exhibit higher susceptibility, future studies should stratify participants accordingly.

5. Behavioral and organizational integration: Beyond providing ergonomic furniture, interventions should include training, scheduled breaks, and management-level support to sustain behavioral change.

6. For physiotherapists and occupational health practitioners, these findings highlight the importance of assessing both physical and behavioral factors when managing neck

pain. Sleep assessment tools and sedentary behavior screening should complement standard musculoskeletal evaluations. Employers should implement holistic wellness programs that integrate ergonomic optimization, regular movement breaks, and sleep education. Evidence suggests that multi-component interventions yield better outcomes than those targeting a single risk factor.

5.4 Implications for Further Studies

This study shows that neck pain and poor sleep quality are common among computer-based desk workers at the University of Benin. The findings suggest that prolonged sitting and poor ergonomic habits can negatively affect both musculoskeletal health and sleep. Physiotherapists and workplace health managers should therefore emphasize regular movement breaks, ergonomic education, and proper workstation setup to reduce these risks.

Researchers should also explore the effectiveness of physiotherapy-led interventions, such as ergonomic counseling, posture correction programs, and sleep-focused physical activity regimens, in mitigating neck pain and improving overall well-being among desk workers. Additionally, further studies could investigate the psychological mediators (e.g., stress, job satisfaction, or burnout) that may modulate the relationship between neck pain and sleep disturbances. Comparative studies across different occupational settings and institutions would also provide a broader understanding of environmental and organizational influences on musculoskeletal health.

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APPENDIX A

My name is **OGBEBOR OSAMA FRANCES**, a final year student of the Department of Physiotherapy, College of Basic Medical Sciences, University of Benin, Benin City, Edo State. I am carrying out a research titled: **'PREVALENCE OF NECK PAIN AND ITS ASSOCIATION WITH SLEEP QUALITY IN RELATION TO PROLONGED SITTING AMONG COMPUTER-BASED DESK WORKERS IN THE UNIVERSITY OF BENIN'.** This research study will be conducted as part of the requirement for the award of Bachelor of Physiotherapy (B.PT). Your participation is voluntary and you are free to ask questions about the study and you are also free to withdraw at any time you desire. Your response will be strictly confidential and will be used solely for the purpose of this research. Please kindly include your signature and date if you are willing to participate.

…… **…….**

Participant's signature **Researcher's signature**

APPENDIX B

The following questionnaires aims to assess the Prevalence Of Neck Pain And Its Association With Sleep Quality In Relation To Prolonged Sitting Among Computer-Based Desk Workers In The University Of Benin. Your honest and confidential responses are valuable to this research.

Section A: Demographic and Occupational Information

1. Age: _____

2. Sex: Male [ ] Female [ ]

3. Marital Status: Single [ ] Married [ ] Other: _____

4. Job Title: _____

5. Duration of Employment: _____ years

6. Average Hours of Computer Use per Day: _____ hours

7. Do you use an ergonomic chair or desk? Yes [ ] No [ ]

8. Do you take breaks while working on the computer? Yes [ ] No [ ]

Section B: Oswestry Neck Disability Index (ONDI)

This questionnaire is designed to help us better understand how your neck pain affects your ability to manage everyday life activities. Please check the box for *the one statement* in each section that applies to you. Although you may consider that two of the statements in any one section relate to you, please mark the box that *most closely* describes your present-day situation. Thank you.

Please check one box in each section

Section 1 – Pain Intensity

☐ 0 I have no pain at the moment.
☐ 1 The pain is very mild at the moment.
☐ 2 The pain is moderate at the moment.
☐ 3 The pain is fairly severe at the moment.
☐ 4 The pain is very severe at the moment.
☐ 5 The pain is the worst imaginable at the moment.

Section 2 – Personal Care (washing, dressing, etc.)

☐ 0 I can look after myself normally without causing extra pain.
☐ 1 I can look after myself normally, but it causes extra pain.
☐ 2 It is painful to look after myself; I am slow and careful.
☐ 3 I need some help but manage most of my personal care.

☐ 4 I need help every day in most aspects of self-care.
☐ 5 I do not get dressed; I wash with difficulty and stay in bed.

Section 3 – Lifting
☐ 0 I can lift heavy weights without extra pain.
☐ 1 I can lift heavy weights, but it gives me extra pain.
☐ 2 Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned—for example on a table.
☐ 3 Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.
☐ 4 I can lift only very light weights.
☐ 5 I cannot lift or carry anything at all.

Section 4 – Reading
☐ 0 I can read as much as I want to with no pain in my neck.
☐ 1 I can read as much as I want to with slight pain in my neck.
☐ 2 I can read as much as I want with moderate neck pain.
☐ 3 I can't read as much as I want because of moderate neck pain.
☐ 4 I can hardly read at all because of severe pain in my neck.
☐ 5 I cannot read at all.

Section 5 – Headaches
☐ 0 I have no headaches at all.
☐ 1 I have slight headaches that come infrequently.
☐ 2 I have moderate headaches that come infrequently.
☐ 3 I have moderate headaches that come frequently.
☐ 4 I have severe headaches that come frequently.
☐ 5 I have headaches almost all the time.

Section 6 – Concentration
☐ 0 I can concentrate fully when I want to with no difficulty.
☐ 1 I can concentrate fully when I want to with slight difficulty.
☐ 2 I have a fair degree of difficulty in concentrating when I want to.
☐ 3 I have a lot of difficulty in concentrating when I want to.
☐ 4 I have a great deal of difficulty in concentrating when I want to.
☐ 5 I cannot concentrate at all.

Section 7 – Work
☐ 0 I can do as much work as I want to.
☐ 1 I can only do my usual work, but no more.
☐ 2 I can do most of my usual work, but no more.
☐ 3 I cannot do my usual work.
☐ 4 I can hardly do any work at all.
☐ 5 I can't do any work at all.

Section 8 – Driving

☐ 0 I can drive my car without any neck pain.
☐ 1 I can drive my car as long as I want with slight pain in my neck.
☐ 2 I can drive my car as long as I want with moderate pain in my neck.
☐ 3 I can't drive my car as long as I want because of moderate pain in my neck.
☐ 4 I can hardly drive at all because of severe pain in my neck.
☐ 5 I can't drive my car at all.

Section 9 – Sleeping

☐ 0 I have no trouble sleeping.
☐ 1 My sleep is slightly disturbed (less than 1 hour sleepless).
☐ 2 My sleep is mildly disturbed (1–2 hours sleepless).
☐ 3 My sleep is moderately disturbed (2–3 hours sleepless).
☐ 4 My sleep is greatly disturbed (3–5 hours sleepless).
☐ 5 My sleep is completely disturbed (5–7 hours sleepless).

Section 10 – Recreation

☐ 0 I am able to engage in all my recreation activities with no neck pain at all.
☐ 1 I am able to engage in all my recreation activities, with some pain in my neck.
☐ 2 I am able to engage in most, but not all of my usual recreation activities because of pain in my neck.
☐ 3 I am able to engage in a few of my recreation activities because of pain in my neck.
☐ 4 I can hardly do any recreation activities because of pain in my neck.
☐ 5 I can't do any recreation activities at all.

Section C: Pittsburgh Sleep Quality Index (PSQI)

1. When do you usually go to bed? _____

2. How long (in minutes) does it usually take you to fall asleep? _____

3. When do you usually get up in the morning? _____

4. How many hours of actual sleep do you get per night? _____

5. How would you rate your overall sleep quality? Very good [ ] Fairly good [ ] Fairly bad [ ] Very bad [ ]

6. How often do you have trouble sleeping because you cannot fall asleep within 30 minutes? Not during the past month [ ] Less than once a week [ ] Once or twice a week [ ] Three or more times a week [ ]

7. Do you take any sleep medication? Yes [ ] No [ ]

8. Do you feel sleepy or fatigued during the day? Never [ ] Sometimes [ ] Often [ ] Always [ ]

Section D: Sitting Duration and Ergonomics

1. How many hours per day do you sit continuously at your workstation? _____

2. How often do you take breaks from sitting? Every 30 mins [ ] Every hour [ ] Every 2 hours [ ] Rarely [ ]

3. Is your computer screen at eye level? Yes [ ] No [ ]

4. Is your keyboard positioned at elbow height? Yes [ ] No [ ]

5. Do you practice proper posture while sitting? Always [ ] Often [ ] Sometimes [ ] Never [ ]

Section E: Ergonomic Self-Assessment Checklist

Please mark Yes or No for each of the following ergonomic practices at your workstation:

1. Is your chair adjustable and supportive? Yes [ ] No [ ]

2. Is your lower back well supported when sitting? Yes [ ] No [ ]

3. Are your feet flat on the floor or on a footrest? Yes [ ] No [ ]

4. Are your knees at about the same height as your hips when sitting? Yes [ ] No [ ]

5. Is there enough space under your desk for your legs? Yes [ ] No [ ]

6. Is your computer monitor at eye level? Yes [ ] No [ ]

7. Is your monitor approximately arm's length away? Yes [ ] No [ ]

8. Are your elbows at a 90-degree angle while typing? Yes [ ] No [ ]

9. Do you avoid bending or twisting your neck while working? Yes [ ] No [ ]

10. Do you take frequent short breaks (micro-breaks) to stretch? Yes [ ] No [ ]

Section F: Sedentary Time Behavior Questionnaire (7-Day Recall)

	Monday	Tuesday	Wednesday	Thursday	Friday
	Hours / Minutes	Hours / Minutes	Hours / Minutes	Hours / Minutes	Hours / Minutes
Watching videos/DVDs?					
Using the computer for fun?					
Using the computer for doing homework?					
Doing homework not on the computer?					
Reading for fun?					
Being tutored?					

Travel (car/bus/train)?					
Doing crafts or hobbies?					
Sitting around (chatting with friends/on the phone/chilling)?					
Playing/practicing a musical instrument?					

1. For each day of the past week, please estimate the total number of hours you spent sitting during waking hours. Include activities such as working at a computer, reading, watching TV, or driving.

2. Think about a normal weekend, and write down how long you spend doing the following activities on the weekend

Activity	Saturday	Sunday
	Hours / Minutes	Hours / Minutes
Watching TV?		
Watching videos/DVDs?		
Using the computer for fun?		
Using the computer for doing homework?		
Doing homework not on the computer?		
Reading for fun?		
Being tutored?		
Travel (car/bus/train)?		
Doing crafts or hobbies?		
Sitting around (chatting with friends/on the phone/chilling)?		
Playing/practicing a musical instrument?		
Going to church or Saturday school?		

Include only time spent sitting or reclining. Do not include sleeping hours.

Section G: Nordic Musculoskeletal Questionnaire

Please answer by using the tick boxes ☑ one tick for each question
Please note that this part of the questionnaire should be answered, even if you have never had trouble in any parts of your body.

Have you at any time during the last 12 months had trouble (such as ache, pain, discomfort, numbness) in:
1. Neck: ☐ No ☐ Yes

Have you had trouble during the last 7 days:
2. Neck ☐ No ☐ Yes

During the last 12 months have you been prevented from carrying out normal activities (e.g. job, housework, hobbies) because of this trouble:
3. Neck ☐ No ☐ Yes

4. Shoulders ☐ No ☐ Yes
   ☐ In the right shoulder
   ☐ In the left shoulder
   ☐ In both shoulders

5. Shoulders (both/either) ☐ No ☐ Yes

6. Elbows ☐ No ☐ Yes
   ☐ In the right elbow
   ☐ In the left elbow
   ☐ In both elbows

7. Elbows (both/either) ☐ No ☐ Yes

8. Wrists/hands ☐ No ☐ Yes
   ☐ In the right wrist/hand
   ☐ In the left wrist/hand
   ☐ In both wrists/hands
9. Wrists/hands (both/either) ☐ No ☐ Yes

10. Upper back ☐ No ☐ Yes
11. Lower back (small of the back) ☐ No ☐ Yes
12. Lower back ☐ No ☐ Yes
13. One or both hips/thighs/buttocks ☐ No ☐ Yes
14. Hips/thighs/buttocks ☐ No ☐ Yes
15. One or both knees ☐ No ☐ Yes
16. Knees ☐ No ☐ Yes
17. One or both ankles/feet ☐ No ☐ Yes
18. Ankles/feet ☐ No ☐ Yes

RESEARCH ETHICS COMMITTEE

COLLEGE OF MEDICAL SCIENCES
UNIVERSITY OF BENIN, BENIN CITY, NIGERIA.

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P.M.B 1154, BENIN CITY
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Our Ref: CMS/REC/01/VOL.2/796 **Date:** 13th July, 2025

Re: PREVALANCE OF NECK PAIN AND ITS ASSOCIATION WITH SLEEP QUALITY IN RELATION TO PROLONGED SITTING AMONG COMPUTER DESK WORKERS IN UNIBEN

Name of Principal Investigator: **OGBEBOR, OSAMA FRANCES**
Department Of Physiotherapy,
School of Basic Medical Science,
College of Medical Sciences,
University of Benin

REC Approval No: CMS/REC/2024/796

This is to inform you that the research described in the submitted proposal, the Informed Consent Forms and other participant information materials have been reviewed and approved by the College Research Ethics Committee, University of Benin.

This approval dates from **13th July, 2025 to 12th July, 2026.** In multi-year research, Endeavour to submit your annual report to the REC early in order to obtain renewal of your approval and avoid disruption of your research.

The National Code of Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the code including ensuring that all adverse events are reported promptly to the REC. No, changes are permitted in the research without prior approval by REC except in circumstances outlined in the code. REC reserves the right to conduct compliance visit to your research site without prior notice. Thank you.

PROF. F.A IMARHIAGBE
Chairman, REC