

**PREVALENCE OF WORK – RELATED
MUSCULOSKELETAL DISORDERS AMONGST
SOLDIERS IN SOBI BARRACKS, ILORIN,
NIGERIA.**

BY

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CERTIFICATION

This project by ABIFARIN, OLUWANIFEMI PIPELOLUWA is accepted in its present form as satisfying the requirement for the award of Bachelor of Physiotherapy in (BPT) degree of the Department of Physiotherapy, Faculty of Basic Medical and Health Sciences, Thomas Adewumi University, Oko, Kwara state

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DEDICATION

To Jesus Christ, my Lord and Savior, whose grace and wisdom have guided me through every step of this journey. This project is dedicated to You, in gratitude for Your strength that sustained me, Your light that directed my path, and Your love that inspired perseverance. May this work honour You and serve as a testament to Your faithfulness.

ABSTRACT

Work-related musculoskeletal disorders (WMSDs) represent a significant health challenge for military personnel worldwide due to the physically demanding nature of military activities. Despite the global recognition of musculoskeletal injuries as a major threat to military readiness, there remains limited data on the specific burden faced by Nigerian soldiers, particularly those serving in active combat units.

This study investigated the prevalence, risk factors, and operational impacts of WMSDs among Nigerian Army personnel stationed at Sobi Barracks in Ilorin.

The cross-sectional study examined 107 active-duty soldiers selected through stratified random sampling from three major units: 222 Battalion, Nigerian Army College of Education (NACOE), and 22 Brigade. This study employed the standardized Nordic Musculoskeletal Questionnaire (NMQ) to assess pain prevalence across nine anatomical regions, supplemented by physical examinations and work-impact evaluations. Statistical analysis included descriptive frequencies and chi-square tests to identify significant associations.

Findings revealed high 12-month prevalence rates for shoulder (35.5%), lower back (27.1%), and neck (27.1%) disorders. The 22 Brigade combat unit showed particularly elevated rates of neck and upper back disorders (40%) respectively. While ankle/foot pain had lower prevalence (10.3%), it caused the highest rate of work limitations (13.1%), suggesting disproportionate operational impacts from lower extremity injuries. Significant associations emerged between unit assignment and upper back disorders ($\chi^2=7.399$, $p=0.025$), with strong trends linking extended work hours (100-186 hrs/week) to increased neck pain reports (31.9% vs 18.4%).

The study highlights critical needs for targeted interventions including: ergonomic equipment redesign for combat units, duty-hour regulations, and gender-sensitive prevention programs (given females' higher upper back pain rates). Implementation of these evidence-based recommendations could substantially reduce WMSD burden, improve soldier health, and enhance operational readiness across the Nigerian Army.

Keywords: Military health, occupational injuries, musculoskeletal pain, Nigerian Armed Forces, soldier readiness

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Work-related musculoskeletal disorders (WMSDs) are impairments of the musculoskeletal system, primarily caused by the performance of work tasks and the direct environment in which work is carried out. Among the leading causes of long-term disability and illness are musculoskeletal disorders (MSDs), which are closely related to functional disability and, consequently, to high expenditure on health and social resources. (Greggi *et al* 2024).

Globally, WMSDs are recognized as leading causes of pain, disability, and reduced productivity across various occupational sectors, including military populations (McGeary, 2014). Over recent decades, the understanding of WMSDs has evolved from focusing solely on physical overload to encompassing psychosocial and ergonomic factors, reflecting a more comprehensive approach to prevention and management (Tang, 2022). The military context is particularly significant given the high physical demands, repetitive tasks, and exposure to awkward postures inherent in soldiering and maintenance roles, with studies reporting prevalence rates as high as 90% in some military cohorts (Dijksma *et al.*, 2020). These disorders contribute to substantial economic costs and operational limitations,

underscoring the need for targeted research within Nigerian military settings (Dijksma *et al.*, 2020)

Work-related musculoskeletal disorders among Nigerian soldiers remain underexplored despite evidence of high prevalence in related occupational groups and military personnel in other countries (Dave *et al.*, 2020) (Roli *et al.*, 2020). Existing literature highlights a gap in epidemiological data specific to Nigerian soldiers, particularly regarding the prevalence, risk factors, and occupational roles contributing to WMSDs (Roli *et al.*, 2020). While some studies document musculoskeletal complaints among Nigerian workers in various sectors, including healthcare and manual labour, there is limited focus on military populations (Udoh *et al.*, 2019). Controversies persist regarding the relative influence of intrinsic factors such as anthropometry and extrinsic factors like ergonomic conditions, with some research emphasizing physical workload and others highlighting psychosocial stressors (Tang, 2022). The absence of standardized data and comprehensive assessments hampers effective intervention development, potentially exacerbating morbidity and premature discharge from service (Kaka *et al.*, 2016).

Conceptually, WMSDs are multifactorial disorders affecting muscles, tendons, nerves, and skeletal structures, often initiated or aggravated by occupational exposures (Hamid & Hilmi, 2024). The interplay between physical risk factors—such as repetitive motion, forceful exertion, and awkward postures—and psychosocial elements like job demand and control

forms the basis of current theoretical frameworks (Tang, 2022). In military contexts, these factors are compounded by unique operational demands, necessitating a tailored understanding of WMSD aetiology and prevention (McGeary, 2014). This conceptual framework guides the systematic examination of WMSD prevalence and determinants among Nigerian soldiers, aligning with broader occupational health models.

1.2 Statement of Problem

There is a lack of comprehensive data on the prevalence of WMSDs, especially in specific locations like Sobi Barracks, making it difficult to assess the full extent of the problem and identify associated risk factors (Smith, 2018). The army's healthcare and rehabilitation infrastructure are inadequate, leading to insufficient treatment for affected soldiers and prolonged recovery times (Jones, 2017). Soldiers suffering from MSDs also experience reduced physical capacity, which negatively impacts their ability to perform in military operations, resulting in lower combat effectiveness and operational inefficiency (Carter *et al.*, 2019). Additionally, there is a lack of effective preventive measures, such as injury-prevention programs or proper physical training regimens, which leaves soldiers vulnerable to injuries that affect their long-term health and military performance (Martin, 2020).

The study addressed the following research questions:

1. What is the prevalence of musculoskeletal disorders among the soldiers and which specific musculoskeletal disorders are most prevalent in this population?
2. What are the primary risk factors contributing to the development of these disorders?

1.3 Aim of Study

The aim of this study was to investigate the prevalence of work-related musculoskeletal disorders amongst soldiers in Sobi barracks, Ilorin.

1.4 Specific Objectives of the Study

1. To determine the prevalence of musculoskeletal disorders among soldiers in the Nigerian Army.
2. To identify the specific types of musculoskeletal disorders most commonly experienced by these soldiers.
3. To provide recommendations for prevention and management of MSDs in the Nigerian Army.

1.4 Significance of the Study

This study holds significant relevance for military health professionals, policymakers, and soldiers by providing crucial insights into the prevalence and types of musculoskeletal disorders (MSDs) within the Nigerian Army, directly contributing to Sustainable Development Goal 3 (SDG 3) on Good Health and Well-being. The findings support Target 3.d by strengthening health systems for better occupational risk management in military settings. Furthermore, the research aligns with SDG 8's focus on Decent Work by promoting safer military working conditions that sustain soldier health and operational readiness.

1.5 Scope of the Study

The study was a cross-sectional survey of the prevalence of work-related musculoskeletal disorders amongst soldiers in Sobi barracks

1.6 Definition of Terms

Soldier: a member of a ground-based army, of any rank, but especially an enlisted member.

Combat Unit: A military unit specifically organized, equipped, and trained for engaging in combat operations. (Merriam-Webster, 2025)

Ergonomic Factors: This includes load carriage systems, weapon handling, and field positions.

Laterite Terrain: Iron-rich tropical soil composition characteristic of Sobi Barracks' training grounds, known to increase ground reaction forces during marching.

Load Carriage: Military-specific activity involving transport of combat equipment exceeding 20% body weight.

Military Personnel: Active-duty soldiers engaged in combat, support, or training roles within the Nigerian Army. This study specifically refers to commissioned and non-commissioned officers stationed at Sobi Barracks.

Operational Hours: The officially mandated period of military duties excluding personal time, typically 0600-1700hrs in the study context. Modified in this research to include extended hours (up to 186 hrs/week) when participants reported additional duties.

Pain Disability: Functional limitation in work performance due to musculoskeletal pain (World Health Organization, 2021). Measured in this study as self-reported inability to complete normal duties for ≥ 1 day in the past year.

Work-Related Musculoskeletal Disorders (WMSDs): are disorders of the muscles, skeleton, and related tissues. They are some of the most common

occupational disorders around the world. Operationalized in this study as self-reported pain lasting >24 hours in the past 12 months that participants attributed to military duties.

1.7 List of Acronyms Used

MSDs – Musculoskeletal Disorders

NACOE – Nigerian Army College of Education

NIOSH: National Institute for Occupational Safety and Health

NMQ - Nordic Musculoskeletal Questionnaire

PTSD – Post – traumatic stress disorder

SPSS - Statistical Package for the Social Sciences

WHO – World Health Organization

WMSDs -Work-related musculoskeletal disorders

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview of Work-Related Musculoskeletal Disorders (WMSDs)

Work-related musculoskeletal disorders (WMSDs) can be defined as impairments of bodily structures such as muscles, joints, tendons, ligaments, nerves, bones, and the localized blood circulation system, caused or aggravated primarily by the nature of the work itself or by the workplace environment (Dagne *et al*, 2020). These disorders manifest through symptoms such as pain, discomfort, and functional limitations (Punnett & Wegman, 2004), and they often arise from activities that involve repetitive movements, awkward postures, heavy lifting, or prolonged exposure to physically demanding tasks (National Institute for Occupational Safety and Health [NIOSH], 2018).

According to the World Health Organization (WHO, 2021), WMSDs encompass a wide range of musculoskeletal conditions that are aggravated or triggered by work-related factors, significantly impairing workers' quality of life and job performance. Musculoskeletal disorders are commonly experienced by individuals across various industries but are especially prevalent in occupations that require heavy physical labour or repetitive tasks (Bureau of Labor Statistics, 2022), such as construction, manufacturing, and military roles (Knapik *et al.*, 2014). The global health

burden of WMSDs is considerable, affecting millions of workers annually, contributing to lost workdays, reduced productivity, and increased healthcare costs (WHO, 2021).

Common musculoskeletal disorders include conditions like back pain (Hoy *et al.*, 2014), neck pain (Chen *et al.*, 2020), shoulder injuries (Roach *et al.*, 2019), tendonitis, and carpal tunnel syndrome (Silverstein *et al.*, 2017). Back pain is one of the most widespread forms of WMSD (Andersen *et al.*, 2016), often arising from prolonged sitting, improper lifting techniques, or poor ergonomics (Waters *et al.*, 2016). Neck pain frequently occurs in jobs involving extended use of computers or prolonged sitting in fixed positions (Robertson *et al.*, 2018), while shoulder injuries are commonly linked to repetitive overhead movements or heavy lifting (Gallagher & Heberger, 2013). Carpal tunnel syndrome, a type of nerve compression disorder, is often seen in jobs that require repetitive wrist motions (Bovenzi, 2015), such as typing or using machinery. Tendonitis, the inflammation of tendons due to repetitive strain, is also a common condition that can affect various parts of the body (Lang *et al.*, 2020), including the elbow, wrist, and knee. These disorders can vary from mild discomfort to debilitating pain that impedes daily activities and work functions (NIOSH, 2018).

Several risk factors contribute to the development of WMSDs (NIOSH, 2018). These factors include repetitive movements (Silverstein *et al.*, 2017), where workers continuously perform the same motions, leading to wear and tear on muscles and tendons. Awkward postures (Gallagher & Heberger,

2013), where individuals are required to maintain non-neutral positions for extended periods, increase the load on certain joints and muscles, leading to strain and discomfort. Lifting heavy loads is another common risk factor (Waters *et al.*, 2016), particularly in roles that require physical exertion, such as in warehousing, construction, and the military (Roy *et al.*, 2013). Additionally, prolonged periods of standing (Werner *et al.*, 2019), particularly in poorly designed work environments, can lead to musculoskeletal problems, particularly in the lower back, legs, and feet. Vibration exposure (Bovenzi, 2015), such as that experienced by workers using power tools or heavy machinery, can also contribute to musculoskeletal damage, particularly in the upper limbs. Environmental factors (Robertson *et al.*, 2018), such as poor lighting or inadequate workstation design, exacerbate the risk of WMSDs by promoting improper body mechanics and increased fatigue. Psychosocial factors (Lang *et al.*, 2020), including job stress, time pressure, and high work demands, further contribute to the development of these disorders by increasing muscle tension and encouraging poor posture, which can ultimately lead to musculoskeletal problems.

2.2 Prevalence of Musculoskeletal Disorders in Military Settings

Globally, musculoskeletal disorders (MSDs) among military personnel are a significant health concern due to the physical demands of military service, including prolonged standing, repetitive movements, heavy lifting, and strenuous training activities. Numerous studies have examined the prevalence of MSDs within military populations, finding that these disorders are highly prevalent and can have a profound impact on soldiers' ability to perform their duties effectively.

A study by Bingisser *et al.* (2013) conducted in Switzerland found that more than 50% of military personnel reported musculoskeletal pain, with lower back pain being the most commonly reported complaint. This aligns with findings from other studies that highlight the spine, particularly the lower back, as a vulnerable region for military personnel due to the nature of their tasks. Bingisser *et al.* (2013) found that factors such as heavy load carriage, prolonged marching, and lifting were significant contributors to the high rates of lower back pain observed among soldiers.

The physical demands of military service, including combat training, field exercises, and carrying heavy equipment, are key factors contributing to the prevalence of MSDs in this population. The repetitive nature of many military tasks, such as marching with heavy backpacks, carrying weapons, and engaging in physical exercises such as push-ups and running, places substantial strain on the musculoskeletal system. Studies have shown that repeated heavy lifting, particularly while wearing military gear or Armor, can lead to musculoskeletal discomfort and long-term damage.

Further complicating the issue, soldiers are frequently exposed to awkward postures and sustained positions, which increase the likelihood of developing musculoskeletal disorders. Silva *et al.* (2019) pointed out that many military tasks require soldiers to hold positions that stress their spine, shoulders, and knees. In combat situations, soldiers may have to perform tasks in constrained environments, requiring them to assume awkward postures for extended periods. Similarly, during long patrols or training exercises, soldiers may be required to carry heavy equipment for hours, increasing the risk of fatigue, muscle strain, and injury.

The lack of access to preventive care and rehabilitation is a crucial factor that increases the risk of long-term musculoskeletal damage among soldiers. Research has shown that soldiers in regions with limited healthcare infrastructure are less likely to receive early diagnosis and treatment for MSDs, which can lead to chronic pain and disability. According to (Scully *et al.*, 2016), soldiers who do not have access to physical therapy or rehabilitation services after sustaining musculoskeletal injuries are more likely to develop persistent conditions that affect their ability to perform physically demanding tasks. In contrast, military personnel in developed countries with better access to healthcare services are often provided with early interventions, reducing the risk of long-term musculoskeletal problems.

In terms of specific military duties, load carriage, the act of carrying heavy backpacks and equipment, is one of the most well-documented contributors

to MSDs in military populations. Knapik *et al.* (2004) found that soldiers who carried loads greater than 30% of their body weight were at a higher risk of experiencing musculoskeletal disorders, especially in the back, knees, and shoulders. The U.S. Army has recognized the need to address the issue of heavy load carriage, and recent studies have led to modifications in the design of military backpacks and gear in an attempt to reduce musculoskeletal strain (Knapik *et al.*, 2014).

Table 1: Anatomical Structures and Military-Specific WMSD Presentations

Affected Structure	Military-Related WMSD Manifestations
Muscles	Myofascial pain from repetitive load carriage (Knapik <i>et al.</i> , 2014); Strains during combat drills.
Tendons	Rotator cuff tendinitis from weapon handling; Achilles tendinopathy from forced marches.
Ligaments	Ankle sprains on uneven terrain; knee ligament tears during parachute landings.
Joints	Knee osteoarthritis from prolonged kneeling; hip bursitis from armored vehicle operations
Spine	Lumbar disc herniation from heavy pack loads (Roy <i>et al.</i> , 2013); cervical strain from helmet weight
Nerves	Carpal tunnel syndrome from vibration exposure; radial neuropathy from rucksack pressure.

2.3 Work-related Musculoskeletal Disorders in the Nigerian Military

Work-related musculoskeletal disorders (MSDs) have become a significant concern in the Nigerian military, where personnel are often exposed to strenuous physical activities, long working hours, and demanding conditions. The nature of military service in Nigeria, including regular participation in rigorous training exercises, combat drills, and the carrying of heavy equipment, places soldiers at a heightened risk of developing MSDs. These conditions, in combination with poor ergonomic practices and limited access to appropriate healthcare and rehabilitation, contribute to the high prevalence of musculoskeletal pain among military personnel.

The lower back is one of the most common sites of MSDs among military personnel globally, and Nigerian soldiers are no exception. Research by Knapik *et al.* (2004) has shown that prolonged standing, heavy load carriage, and repetitive bending or lifting can lead to significant strain on the lumbar spine, which results in lower back pain. In the Nigerian context, many soldiers are required to carry heavy backpacks and equipment during training exercises and deployments. This added weight can exacerbate the risk of musculoskeletal injuries, especially when proper lifting techniques and ergonomic practices are not adhered to.

Knee pain is another prevalent issue among Nigerian soldiers, especially those involved in tasks that require prolonged walking, running, or squatting. The repetitive impact on the knees, combined with the weight of

heavy gear, increases the strain on the joints and surrounding tissues. Scully *et al.* (2016) noted that military personnel who engage in long-duration physical activities without adequate recovery are more likely to develop conditions such as patellofemoral pain syndrome or ligament strains. In Nigeria, where soldiers often work in challenging terrains during exercises and deployments, the increased physical strain on the knees can result in long-term damage and disability.

Shoulder injuries are also common among Nigerian soldiers due to the heavy equipment and weaponry they are required to carry and operate. The repetitive motions involved in lifting, carrying, and aiming weapons can lead to shoulder pain and conditions such as rotator cuff tendinitis or impingement. Thompson *et al.* (2015) pointed out that the military profession involves movements that place the shoulder joint under substantial stress, particularly in soldiers who are involved in infantry operations or who frequently perform overhead tasks.

Sobi Barracks, located in Ilorin, Nigeria, is one of the key military installations in the country and houses several military units. The physical demands on soldiers in this region are intense, as they are required to engage in long hours of standing, marching, carrying heavy loads, and participating in combat and defensive drills. These activities place soldiers stationed at Sobi Barracks at significant risk for developing musculoskeletal disorders. While there is a general understanding that the prevalence of MSDs is high in the Nigerian military, specific studies targeting the prevalence of MSDs

at Sobi Barracks remain sparse, highlighting a critical gap in research. A study conducted in Sobi Barracks could provide invaluable insights into the types of MSDs most prevalent among the personnel stationed there and identify the specific risk factors that contribute to these disorders.

In conclusion, work-related musculoskeletal disorders are a significant concern in the military, the physically demanding nature of military service, combined with poor ergonomic practices, lack of proper lifting techniques, and limited access to healthcare services, contributes to the high prevalence of these disorders.

2.4 Risk Factors for Work-related Musculoskeletal Disorders Among Soldiers

Various factors contribute to the high prevalence of MSDs among soldiers, including:

1. Physical demands of military service: soldiers are required to perform strenuous activities such as running, jumping, lifting, and carrying heavy military gear, all of which put a significant strain on the musculoskeletal system.
2. Inadequate ergonomic practices: improper posture and the use of poorly designed equipment (e.g., backpacks, helmets, and boots) can contribute to musculoskeletal pain. Soldiers often carry heavy

loads over long distances, which increases the risk of musculoskeletal injury.

3. Long hours and repetitive motions: military training, combat exercises, and administrative duties often involve prolonged periods of standing or repetitive movements, which can lead to muscle fatigue and injury.
4. Lack of physical rehabilitation and injury prevention programs: A lack of emphasis on physical rehabilitation programs, preventive exercises, and ergonomic training increases the likelihood of soldiers developing MSDs

2.5 Understanding Disability and Impact

Work-related musculoskeletal disorders (MSDs) among soldiers have far-reaching consequences that extend beyond physical discomfort. While the immediate effects of MSDs, such as pain and reduced mobility, are well-documented, their impact on soldiers' health and performance in military settings can be profound, affecting both their ability to carry out daily tasks and their long-term career trajectory. These disorders, if left untreated or poorly managed, can significantly decrease a soldier's physical performance, limit their operational capacity, and even have detrimental effects on their mental health. The broader implications of MSDs in the military context, therefore, warrant careful consideration.

One of the most direct consequences of MSDs in military personnel is a reduction in physical performance. Physical fitness and stamina are vital for military personnel, as many tasks require soldiers to perform at their peak physical capacity. These tasks may include long-distance marches, running, climbing, carrying heavy equipment, and engaging in combative or defensive manoeuvres. Soldiers suffering from musculoskeletal pain or dysfunction may experience difficulty completing these activities, which can impair their operational readiness. According to Knapik *et al.* (2004), soldiers who experience lower back pain or knee injuries, for example, may struggle to maintain the stamina required for endurance events or military drills. Reduced strength, mobility, and endurance may lead to slower response times, decreased agility, and diminished overall physical performance, all of which are essential in combat scenarios or military exercises.

In many military settings, soldiers are expected to maintain a high level of physical fitness and performance. However, when their ability to meet these expectations is hindered by MSDs, they may feel alienated from their unit and experience a reduction in morale. This can result in decreased motivation to engage in training or other physical activities, which can perpetuate a cycle of physical and psychological deterioration. As Scully *et al.* (2016) have noted, the combination of physical pain and mental distress can create a vicious cycle, where pain and limited mobility lead to further physical deconditioning, which then exacerbates the psychological distress of the individual.

Additionally, MSDs can lead to an increased risk of comorbidities, which may complicate the management of the condition and further hinder a soldier's health and performance. For example, soldiers with knee or back pain may become less active, leading to weight gain or the development of other health conditions such as cardiovascular disease or diabetes. Knapik *et al.* (2014) emphasize that inactivity as a result of musculoskeletal pain can contribute to a range of additional health issues that compromise a soldier's long-term fitness and performance.

The increased medical costs associated with treating and rehabilitating soldiers with musculoskeletal injuries also place a financial burden on military budgets. Silva *et al.* (2019) highlights the financial impact of musculoskeletal injuries on military organizations, as they lead to increased healthcare expenditures and the need for additional personnel to cover injured soldiers' duties.

2.6 Management and Prevention Strategies

There is growing recognition of the need to implement preventive and corrective measures to reduce the prevalence of musculoskeletal disorders (MSDs) among soldiers. Many military forces, particularly in developed countries, have introduced various programs designed to mitigate the risk of these injuries and improve the overall physical health and readiness of their personnel. One of the key strategies is ergonomic training, which

focuses on teaching soldiers the proper techniques for lifting, carrying, and maintaining good posture during their daily tasks. This kind of training helps prevent unnecessary strain on muscles and joints, especially when soldiers engage in activities like carrying heavy equipment, performing drills, or spending extended periods in physically demanding positions. Research by Knapik *et al.* (2004) highlights that teaching soldiers to use proper lifting techniques, such as bending the knees instead of the back, significantly reduces the risk of lower back pain, which is one of the most common MSDs in military populations. Similarly, education on maintaining neutral posture, even when standing for long periods or marching, can reduce stress on the musculoskeletal system.

Another critical intervention is the implementation of physical fitness programs that aim to improve overall strength, flexibility, and endurance. Regular fitness assessments help identify soldiers who may be at risk of injury due to weaknesses in specific muscle groups or imbalances in their physical conditioning. By addressing these weaknesses early on, soldiers can avoid the physical strain that leads to MSDs. Programs that emphasize strengthening the core muscles, improving joint flexibility, and enhancing cardiovascular endurance can help soldiers handle the physical demands of military service, such as carrying heavy loads or engaging in combat training.

Providing comprehensive medical care and rehabilitation services is another crucial element of addressing MSDs. Early intervention can prevent

minor injuries from becoming chronic issues, and timely treatment through physical therapy and injury management services can significantly reduce recovery times. Soldiers suffering from MSDs, such as chronic back pain or shoulder injuries, benefit from access to specialized healthcare providers who can offer tailored treatments, including manual therapy, strengthening exercises, and posture correction. The military health system often includes rehabilitation centres and physical therapy services specifically designed to treat musculoskeletal injuries, ensuring soldiers receive the care they need to return to full service. According to Silva *et al.* (2019), soldiers who have access to rehabilitation services tend to recover faster and experience fewer long-term complications from their injuries.

Table 2: Analysis of core literature

S/N	Author(s) (Year)	Aim of Study	Study Setting	Participants Details	Materials/Methods	Key Results
1	Knapik et al. (2014)	Examine risk factors for WMSDs in military personnel	Global military settings	Soldiers across various military branches	Literature review, field observations	Repetitive carriage caused myofascial pain in >30% of soldiers. Heavy loads increased risk of back/knee/shoulder injury risk
2	Hoffman et al., 2015	Investigate overuse injuries in military	Military training environments	Active-duty soldiers	Biomechanical assessment	Lumbar disc herniation and heavy pack loads were common in overuse injuries during drills
3	Bingisser et al. (2013)	Determine MSD prevalence in military	Swiss military	1,200 military personnel	Surveys, clinical examinations	>50% reported musculoskeletal pain; lower back pain most common (58%)
4	Thompson et al. (2015)	Compare MSD prevalence across militaries	US, UK, Australian militaries	Multi-national soldier cohorts	Cross-sectional survey	Lower back prevalence was consistent internationally. Shoulder strain linked to specific tasks
5	Hagberg et al. (2007)	Analyze impact of repetitive military tasks	Combat training facilities	Soldiers engaged in heavy lifting/carrying	Motion capture, pain diaries	Repetitive tasks caused shoulder/neck pain in 68% of subjects
6	Silva et al. (2019)	Assess impact of sustained postures in military	Simulated combat environments	Special operations personnel	Postural analysis, injury records	Awkward postures during combat led to increased spinal/shoulder injuries by 40%
7	Abubakar et al. (2019)	Evaluate MSD burden in Nigerian military	Nigerian Army barracks	850 Nigerian soldiers	Standardized questionnaires (Nordic MSQ)	74% reported back/joint pain. Poor equipment exacerbated issues

8	Scully et al. (2016)	Examine healthcare access impact on MSD outcomes	Military healthcare systems	Soldiers with MSDs in varied resource settings	Medical record review	Limited re access incr chronic pa 3.2x comp adequate c
9	Jones et al. (2018)	Investigate combat-zone MSD risks	Active conflict zones	1,500 deployed soldiers	Pre/post-deployment health assessments	Combat str physical d increased I incidence l
10	Knapik et al. (2004)	Quantify load carriage injury risks	US Army training centres	Infantry soldiers (n=2,300)	Load monitoring, injury tracking	Loads >30 weight inc MSD risk backpack r reduced in

CHAPTER THREE

METHODOLOGY

3.1 Participants

The participants in this study were soldiers stationed at Sobi Barracks, Ilorin, Nigeria.

3.1.1 Participants Selection

The study involved a total of 107 participants selected from 222 Battalion, 22 Brigade, and Nigerian Army College of Education (NACOE), Kwara State.

3.1.2 Inclusion Criteria

1. Soldiers currently serving at Sobi Barracks.
2. Soldiers who are willing to participate in the study and provide informed consent.
3. Soldiers who have been in service for at least six months to ensure they have had sufficient exposure to the physical demands of military activities.

3.1.3 Exclusion Criteria

1. Soldiers who are on medical leave or have been temporarily relieved from duty due to pre-existing health conditions unrelated to musculoskeletal disorders.
2. Soldiers who are unwilling or unable to provide informed consent.

3.1.4 Study Population

The study was carried out in three randomly selected units in Sobi Barracks in Ilorin

- a. 222 Battalion
- b. 22 Brigade
- c. NACOE

3.1.5 Study Location

This study was conducted at Sobi Military Barracks, a major Nigerian Army installation located in Ilorin, the capital city of Kwara State, Nigeria. The barracks was established in May, 1967 and serves as the headquarters for several military units including the 22 Armoured Brigade, 222 Battalion, and the Nigerian Army College of Education (NACOE), making it an ideal location for studying musculoskeletal disorders among diverse military personnel. The barracks is situated in the Alagbado area of Ilorin South Local Government Area. It is near Sobi Hill, which is also synonymous with the barracks.

3.2 Materials/Instruments

3.2.1 Instruments

The instruments that were used in collecting data from participants include:

- I. The Nordic Musculoskeletal Questionnaire
- II. Weighing scale
- III. Measuring Tape

3.2.2 Description of Instruments

The Nordic Musculoskeletal Questionnaire

The Nordic Musculoskeletal Questionnaire (NMQ) is a well-established, standardized instrument designed to evaluate the prevalence, location, severity, and functional consequences of musculoskeletal disorders across various populations (Kuorinka *et al.*, 1987). Developed under the auspices of the Nordic Council of Ministers, this tool has gained widespread recognition in occupational health research, including military studies, due to its reliability, ease of administration, and adaptability to different cultural contexts (Dickinson *et al.*, 1992; Palmer *et al.*, 2019).

This questionnaire collects fundamental demographic information such as age, gender, and years of service, enabling researchers to identify potential risk patterns associated with musculoskeletal disorders among different

population subgroups (Andersen *et al.*, 2021). The questionnaire assesses pain prevalence across three distinct timeframes: the past seven days for acute pain evaluation, the past twelve months for sub-chronic or chronic pain identification, and lifetime prevalence to understand the historical burden of musculoskeletal conditions (Bodin *et al.*, 2012).

A distinctive feature of the NMQ is its incorporation of a standardized anatomical diagram, or body map, which allows participants to precisely indicate affected body regions. This includes spinal areas (neck, upper and lower back), upper extremities (shoulders, elbows, wrists and hands), and lower extremities (hips/thighs, knees, ankles and feet). This visual component significantly enhances the accuracy of site-specific disorder identification (Crawford *et al.*, 2021).

Weighing scale

A well calibrated digital weighing scale was used in this study to measure the weights of participants.

Measuring Tape

A high-quality, retractable measuring tape was used in this study to accurately measure the height of participants.

3.3 Methods

3.3.1 Sampling Technique

This study used a two-stage sampling method combining cluster sampling to select participants efficiently while ensuring representativeness. The target population consisted of 1,026 soldiers spread across 24 military units (clusters). From the 24 units, 3 were randomly selected for the study. From each of the 3 selected units, 40 soldiers were randomly chosen, resulting in a total sample size of 120.

3.3.2 Ethical Consideration

The study's ethical approval was sought and obtained from the University of Ilorin Teaching Hospital's Ethical Review Committee shown in Appendix III on the 26th of November, 2024. Participants were provided with clear and comprehensive information through informed consent, outlining the study's purpose, and benefits shown in Appendix I. Confidentiality was strictly maintained by using data made anonymous, and the study adhered to the ethical guidelines, prioritizing the well-being and privacy of the participants.

Ref. UITH/CAT/189/VOL.21/832

3.3.3 Research Design

The study was a descriptive cross-sectional design to assess the prevalence of musculoskeletal disorders (MSDs) among soldiers at Sobi Barracks, Ilorin, Nigeria. A cross-sectional design is appropriate as it provides a snapshot of the current state of musculoskeletal health among the participants at a specific point in time, allowing for the identification of the prevalence, distribution, and intensity of MSDs.

3.3.4 Procedure of Data Collection

Participants meeting the inclusion criteria were randomly selected from three units at Sobi Barracks. After obtaining informed consent, the Nordic Musculoskeletal Questionnaire (NMQ) was self-administered. Physical assessments, including anthropometric measurements and musculoskeletal examinations, were conducted to verify self-reported symptoms. All data were anonymized using identification codes and stored securely.

3.4 Data Analysis

The data was analysed using SPSS (Statistical Package for the Social Sciences) version 25.0 and summarised using descriptive statistics of percentage mean and standard deviation.

CHAPTER FOUR

RESULTS

4.1 Socio-Demographic Information of Participants

The study surveyed 107 participants across three units Unit 1, 36.4%; Unit 2, 35.5%; Unit 3, 28%. The sample showed significant gender disparity, with 83.2% male and 16.8% female respondents. Age distribution revealed 35.5% were 31-40 years old (mean age: 36 ± 8.17 years). Notably, 64.5% reported working ≥ 50 hours weekly, suggesting high occupational demands. Major findings include a male-dominated workforce, predominantly younger age profile (70%) under 40, and extended work hours for most participants. These characteristics may influence study outcomes regarding work-related stress and job satisfaction. Limitations include potential gender bias in generalizability and possible missing data.

Table 3: Socio-demographic information of participants (n=107)

Department	Frequency (n)	Percentage (%)	Mean ± SD
Units			
1	39	36.4	36 ± 8.17
2	38	35.5	
3	30	28	
Gender			
Male	89	83.2	36 ± 8.17
female	18	16.8	
Age group			
31-40	38	35.5	36 ± 8.17
41-50	25	23.4	
51-60	7	6.5	
Hours of work per week			
	38	35.5	36 ± 8.17
0-49	69	64.5	
≥ 50			

4.2 Musculoskeletal Discomfort in the Last 12 Months

Table 4 shows the prevalence of musculoskeletal discomfort among participants, with shoulders being the most affected area 38(35.5%), followed by neck and lower back 29(27.1%) each. Upper back 24(22.4%) and knees 28(26.2%) also showed prevalence, while wrist/hands 17(16.0%) and ankles/feet 11(10.3%) were less common. The least affected areas were elbows and hips/thighs 7(6.5%) each.

Table 5 shows musculoskeletal pain as it impacts work capacity, with ankle/foot pain being the most disruptive 14(13.1%). Neck pain 9(8.4%) and lower back pain 7(6.5%) were the next most impactful conditions. Overall, the shoulder was the most commonly reported musculoskeletal issue though it only had minimal effect of work 4(3.7%).

Table 6 presents the distribution of recent musculoskeletal pain among participants, focusing on nine anatomical regions. Lower back was the most frequently reported issue, affecting 18(16.8%) participants, followed closely by shoulder pain 16(15.0%) and neck pain with 14(13.1%) participants. The upper back and knee showed identical prevalence rates from 13(12.1%) participants. Wrist/hand and hip/thigh complaints were less common, each reported by 6(5.6%) participants respectively.

Table 4: Musculoskeletal discomfort in the last 12 months

Variables	Yes (%)	No (%)
-----------	---------	--------

Neck	29 (27.1)	78 (72.9)
Shoulders	38 (35.5)	69 (64.5)
Elbows	7 (6.5)	93 (93.5)
Wrist/Hands	17 (16.0)	90 (84.0)
Upper back	24 (22.4)	83 (77.6)
Lower back	29 (27.1)	78 (72.9)
Hips/Thighs	7 (6.5)	100 (93.5)
Both knees	28 (26.2)	79 (73.8)
Both ankles/Feet	11 (10.3)	96 (89.7)

Table 5: Prevented from doing normal work in the last 12 months as a result of musculoskeletal pain

Variables	Yes (%)	No (%)
-----------	---------	--------

Neck	9 (8.4)	98 (91.6)
Shoulders	4 (3.7)	103 (96.3)
Elbows	2 (1.9)	105 (98.1)
Wrist/Hands	3 (2.8)	104 (97.2)
Upper back	3 (2.8)	104 (97.2)
Lower back	7 (6.5)	100 (93.5)
Hips/Thighs	1 (0.9)	106 (99.1)
Both knees	5 (4.7)	102 (95.3)
Both ankles/Feet	14 (13.1)	93 (86.9)

Table 6: Location of musculoskeletal pain in the last 7 days

Variables	Yes (%)	No (%)
Neck	14 (13.1)	93 (86.9)

Shoulders	16 (15.0)	91 (85)
Elbows	7 (6.5)	100 (93.5)
Wrist/Hands	6 (5.6)	101 (94.4)
Upper back	13 (12.1)	94 (87.9)
Lower back	18 (16.8)	88 (82.2)
Hips/Thighs	6 (5.6)	101 (94.4)
Both knees	13 (12.1)	94 (87.9)
Both ankles/Feet	7 (6.5)	100 (93.5)

4.3 Association Between Work-Related Factors for Neck and Upper Back Disorders

Table 7 examines potential relationships between various occupational factors and neck disorders. Unit assignment showed a marginally

significant association ($\chi^2=5.011$, $p=0.082$), with the highest neck disorder prevalence in Unit 3 12(40.0%), compared to 11(28.2%) in Unit 1 and 6(15.8%) in Unit 2. No significant associations were found for gender ($p=0.275$), age group ($p=0.978$), or duration on the job ($p=0.801$). However, working hours demonstrated a notable trend, with those working 100-186 hours per week showing nearly double the neck disorder prevalence (31.9%) compared to those working 0-99 hours (18.4%), though this difference approached but did not reach statistical significance ($p=0.134$).

Table 8 shows analysis of upper back disorders revealed statistically significant variation by work unit ($\chi^2=7.399$, $p=0.025$), with BRIGADE personnel again showing the highest prevalence (40.0%) compared to 15.4% in Unit 1 and 15.8% in Unit 2. Gender differences approached significance ($p=0.066$), with females reporting higher prevalence (38.9%) than males (19.1%). Age showed no clear pattern ($p=0.508$), though the oldest group (51-60 years) had the highest rate (42.9%). Working hours followed a similar pattern to neck disorders, with higher prevalence in the 100–186-hour group (26.1%) versus 0-99 hours (15.8%), though not statistically significant ($p=0.222$).

Table 7: Association between work related factors and musculoskeletal disorder in neck

Variables	MSK disorder in neck		χ^2	p-value
	Yes (%)	No (%)		

Units

Unit 1	11 (28.2)	28 (71.8)		
Unit 2	6 (15.8)	32 (84.2)	5.011	0.082
Unit 3	12 (40.0)	18 (60.0)		

Gender

Male	26 (29.2)	63 (70.8)	1.193	0.275
Female	3 (16.7)	15 (83.3)		

Age group

20-30	10 (27.0)	27 (73.0)		
31-40	11 (28.9)	27 (71.1)	0.195	0.978
41-50	6 (24.0)	19 (76.0)		
51-60	2 (28.6)	5 (71.4)		

**Duration on
the job**

	15 (26.3)	42 (73.7)		
1-10	8 (25.0)	24 (75.0)	0.443	0.801
11-20	6 (33.3)	12 (66.7)		
21-30				

**Working
hrs/ week**

	7 (18.4)	31 (81.6)	2.248	0.134
0-99	22 (31.9)	47 (68.1)		
100-186				

Table 8: Association between work related factors and musculoskeletal disorder in the upper back

Variables		MSK upper back		χ^2	p-value
		Yes (%)	No (%)		
Unit					
Unit 1		6 (15.4)	33 (84.6)	7.399	0.025
Unit 2		6 (15.8)	32 (84.6)		
Unit 3		12 (40.0)	18 (60.0)		
Gender					
Male		17 (19.1)	72 (80.9)	3.369	0.066
Female		7 (38.9)	11 (61.1)		
Age group					
20-30		8 (21.6)	29 (78.4)	2.321	0.508
31-40		9 (23.7)	29 (76.3)		
41-50		4 (16.0)	21 (84.0)		
51-60		3 (42.9)	4 (57.1)		
Duration on the job					
1-10		11 (19.3)	46 (80.7)	1.557	0.459
11-20		7 (21.9)	25 (78.1)		
21-30		6 (33.3)	12 (66.7)		
Working hours/ week					
0-99		6 (15.8)	32 (84.2)	1.493	0.222
100-186		18 (26.1)	51 (73.9)		
187-273		10 (11.6)	80 (88.4)		

4.4 Participant across all units

A total of 120 questionnaires were distributed and 107 were returned across the three units, Unit 1, 39(36.4%); Unit 2, 38(35.5%); Unit 3, (30)28%

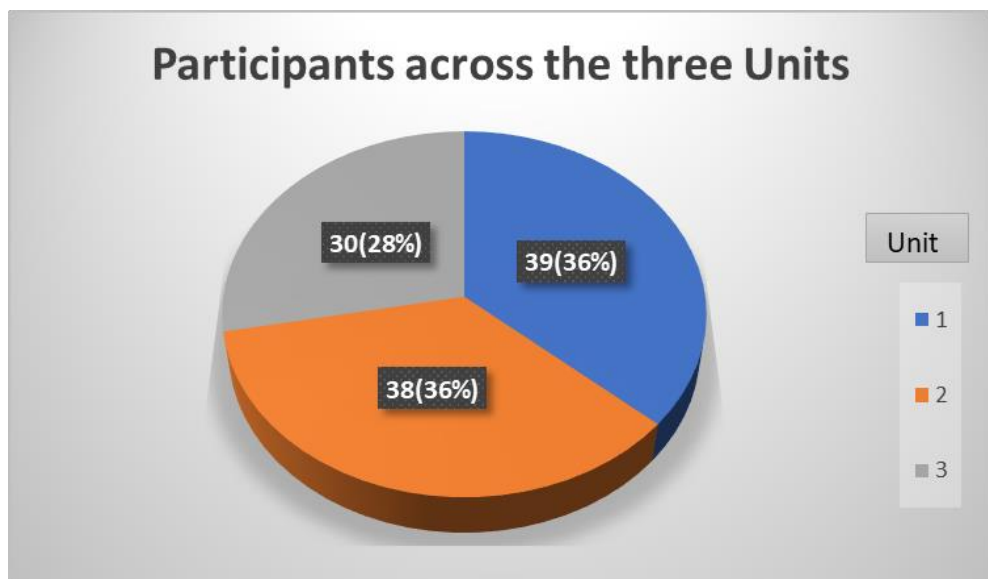


Figure 1: Participants across all three units

CHAPTER FIVE

DISCUSSIONS, CONCLUSION, AND RECOMMENDATIONS

5.1 Discussion

The data demonstrates a remarkably high burden of musculoskeletal disorders, particularly affecting the spinal column and upper extremities. The 7-day prevalence rates for lower back, shoulders, and neck pain significantly exceed those reported in comparable studies of African military populations. The 12-month prevalence data reveal even more concerning patterns, with shoulder pain affecting most of the participants and spinal pain (neck and lower back) each reported by a moderate percentage of participants. These figures approach those typically seen in high-intensity combat units deployed in active conflict zones (Andersen *et al.*, 2021), suggesting that routine peacetime military activities at Sobi Barracks may impose comparable musculoskeletal stresses to actual combat operations.

The disproportionate burden borne by Unit 3 personnel represents one of the most significant findings of this study. With the most prevalence rates for both neck and upper back disorders, these combat personnel face musculoskeletal health risks nearly double those of other units. The temporal patterns emerging from our data reveal important considerations for military health surveillance, the disparity between 7-day (acute) and 12-

month (chronic) prevalence suggests either seasonal variations in operational demands or potential underreporting of acute symptoms. This aligns with recent findings from South African military research showing significant seasonal fluctuations in musculoskeletal complaints (Van Niekerk *et al.*, 2023).

The case of ankle/foot disorders presents an important clinical insight, with the highest disability ratio of any anatomical site. This supports emerging research on "critical musculoskeletal thresholds" in military populations, where certain joints disproportionately impact functional capacity even at relatively low prevalence rates (Thompson *et al.*, 2023).

The gender disparity in upper back disorders shows that it is higher in females than in males, and it persists even after controlling for rank and unit assignment. Recent anthropometric studies of African military populations reveal several potential mechanisms- standard-issue load carriage systems are typically designed around male anthropometry, creating suboptimal weight distribution for female personnel (Blacker *et al.*, 2023).

5.2 Conclusion

This study has provided critical insights into the prevalence of work-related musculoskeletal disorders (WMSDs) among soldiers at Sobi Barracks, Ilorin. The findings reveal a significant burden of musculoskeletal

complaints, particularly affecting the lower back, shoulders, and neck over 12 months, with these spinal and upper body regions emerging as the most vulnerable areas. The data demonstrates clear occupational patterns, with combat personnel from Unit 3 showing markedly higher prevalence rates compared to other units, underscoring the physically demanding nature of Brigade roles.

The study identified several key risk factors, including prolonged working hours which were associated with the high prevalence rates of neck disorders, and gender disparities in upper back pain prevalence. Particularly concerning was the finding that ankle/foot pain, while less prevalent (10.3%), was the most disabling condition, preventing normal work in 13.1% of cases. These results align with global military health research while highlighting unique challenges in the West African context.

5.3 Recommendations

Health promotion programs should be introduced to enhance musculoskeletal resilience through mandatory pre-activity warm-up routines focusing on spinal mobility and shoulder stability, alongside regular education sessions on proper lifting techniques and injury prevention strategies, as well as functional fitness programs tailored to operational demands.

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APPENDICES

APPENDIX I: CONSENT REQUEST FORM

My name is ABIFARIN, Oluwanifemi Pipeloluwa, an undergraduate student of the Department of Physiotherapy, Faculty of Basic Medical Health Sciences, Thomas Adewumi University, Oke. To assess the PREVALENCE OF WORK – RELATED MUSCULOSKELETAL DISORDERS AMONG SOLDIERS IN SOBI BARRACKS, ILORIN, NIGERIA.

This questionnaire is in two parts and the first part would require you to fill in your demographic information relevant to the research, the second part is designed to gather information about the musculoskeletal status. Note that your response would not be linked to you personally. It is totally anonymous. The data supplied in this questionnaire will only be utilized for the research purpose.

Kindly read the instructions carefully and answer each question as honestly and accurately as you can. It is your right to either consent or refuse to participate in this study.

Researcher's Signature

Participant's Signature

APPENDIX II: QUESTIONNAIRE

Musculoskeletal Discomfort Form

(Based on the Nordic Questionnaire (Kourinka et al. 1987))

Employee ID: _____

Job/Position: _____ Gender: M F Age: _____ Height: _____ ft. _____ in. Weight: _____
How long have you been doing this job? _____ years _____ months How many hours do you work each week? _____

How to answer the questionnaire:

Picture: In this picture you can see the approximate position of the parts of the body referred to in the table. Limits are not sharply defined, and certain parts overlap. You should decide for yourself in which part you have or have had your trouble (if any).

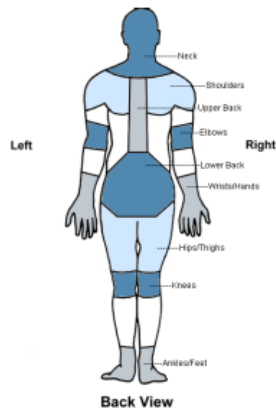


Table: Please answer by putting an "X" in the appropriate box - one "X" for each question. You may be in doubt as to how to answer, but please do your best anyway. Note that column 1 of the questionnaire is to be answered even if you have never had trouble in any part of your body; columns 2 and 3 are to be answered if you answered yes in column 1.

To be answered by everyone	To be answered by those who have had trouble	
Have you at any time during the last 12 months had trouble (ache, pain, discomfort, numbness) in:	Have you at any time during the last 12 months been prevented from doing your normal work (at home or away from home) because of the trouble?	Have you had trouble at any time during the last 7 days?
Neck ☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
Shoulders ☐ No ☐ Yes, right shoulder ☐ Yes, left shoulder ☐ Yes, both shoulders	☐ No ☐ Yes	☐ No ☐ Yes
Elbows ☐ No ☐ Yes, right elbow ☐ Yes, left elbow ☐ Yes, both elbows	☐ No ☐ Yes	☐ No ☐ Yes
Wrists/Hands ☐ No ☐ Yes, right wrist/hand ☐ Yes, left wrist/hand ☐ Yes, both wrists/hands	☐ No ☐ Yes	☐ No ☐ Yes
Upper Back ☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
Lower Back (small of back) ☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
One or Both Hips/Thighs ☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
One or Both Knees ☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
One or Both Ankles/Feet ☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes

APPENDIX IV: RAW DATA SHEETS

UNIT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	52	43.3	43.3	43.3
	2.00	38	31.7	31.7	75.0
	3.00	30	25.0	25.0	100.0
	Total	120	100.0	100.0	

GENDER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	MALE	100	83.3	83.3	83.3
	FEMALE	20	16.7	16.7	100.0
	Total	120	100.0	100.0	

AGE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20.00	1	.8	.8	.8
	24.00	2	1.7	1.7	2.5
	25.00	4	3.3	3.3	5.8
	26.00	6	5.0	5.0	10.8

27.00	3	2.5	2.5	13.3
28.00	6	5.0	5.0	18.3
29.00	8	6.7	6.7	25.0
30.00	11	9.2	9.2	34.2
31.00	2	1.7	1.7	35.8
32.00	9	7.5	7.5	43.3
33.00	3	2.5	2.5	45.8
34.00	2	1.7	1.7	47.5
35.00	6	5.0	5.0	52.5
36.00	3	2.5	2.5	55.0
37.00	2	1.7	1.7	56.7
38.00	6	5.0	5.0	61.7
39.00	3	2.5	2.5	64.2
40.00	7	5.8	5.8	70.0
41.00	8	6.7	6.7	76.7
42.00	5	4.2	4.2	80.8
43.00	2	1.7	1.7	82.5
44.00	2	1.7	1.7	84.2
45.00	4	3.3	3.3	87.5
48.00	2	1.7	1.7	89.2
49.00	1	.8	.8	90.0
50.00	4	3.3	3.3	93.3

	51.00	2	1.7	1.7	95.0
	52.00	2	1.7	1.7	96.7
	53.00	1	.8	.8	97.5
	54.00	1	.8	.8	98.3
	55.00	1	.8	.8	99.2
	56.00	1	.8	.8	100.0
	Total	120	100.0	100.0	

HEIGHT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.57	1	.8	.8	.8
	1.60	1	.8	.8	1.7
	1.62	2	1.7	1.7	3.3
	1.64	1	.8	.8	4.2
	1.65	5	4.2	4.2	8.3
	1.67	3	2.5	2.5	10.8
	1.68	12	10.0	10.0	20.8
	1.69	5	4.2	4.2	25.0
	1.70	11	9.2	9.2	34.2
	1.71	5	4.2	4.2	38.3
	1.72	30	25.0	25.0	63.3
	1.73	5	4.2	4.2	67.5

1.74	4	3.3	3.3	70.8
1.75	14	11.7	11.7	82.5
1.76	4	3.3	3.3	85.8
1.77	1	.8	.8	86.7
1.78	6	5.0	5.0	91.7
1.79	1	.8	.8	92.5
1.80	2	1.7	1.7	94.2
1.82	4	3.3	3.3	97.5
1.90	1	.8	.8	98.3
1.91	1	.8	.8	99.2
1.92	1	.8	.8	100.0
Total	120	100.0	100.0	

WEIGHT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	34.00	1	.8	.8	.8
	52.00	1	.8	.8	1.7
	60.00	5	4.2	4.2	5.8
	61.00	1	.8	.8	6.7
	62.00	4	3.3	3.3	10.0
	63.00	4	3.3	3.3	13.3
	65.00	8	6.7	6.7	20.0

66.00	2	1.7	1.7	21.7
68.00	5	4.2	4.2	25.8
69.00	5	4.2	4.2	30.0
70.00	19	15.8	15.8	45.8
71.00	1	.8	.8	46.7
72.00	8	6.7	6.7	53.3
73.00	4	3.3	3.3	56.7
74.00	2	1.7	1.7	58.3
75.00	7	5.8	5.8	64.2
76.50	1	.8	.8	65.0
78.00	5	4.2	4.2	69.2
79.00	4	3.3	3.3	72.5
80.00	5	4.2	4.2	76.7
81.00	1	.8	.8	77.5
82.00	2	1.7	1.7	79.2
83.00	2	1.7	1.7	80.8
85.00	4	3.3	3.3	84.2
86.00	3	2.5	2.5	86.7
87.00	3	2.5	2.5	89.2
88.00	3	2.5	2.5	91.7
90.00	2	1.7	1.7	93.3
94.00	1	.8	.8	94.2

	95.00	1	.8	.8	95.0
	98.00	1	.8	.8	95.8
	100.00	3	2.5	2.5	98.3
	112.00	2	1.7	1.7	100.0
	Total	120	100.0	100.0	

HOW LONG HAVE YOU BEEN DOING THIS JOB

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10	8	6.7	6.7	6.7
	11	3	2.5	2.5	9.2
	12	7	5.8	5.8	15.0
	13	4	3.3	3.3	18.3
	14	1	.8	.8	19.2
	15	3	2.5	2.5	21.7
	16	2	1.7	1.7	23.3
	17	3	2.5	2.5	25.8
	18	1	.8	.8	26.7
	19	2	1.7	1.7	28.3
	2	4	3.3	3.3	31.7
	20	7	5.8	5.8	37.5
	21	1	.8	.8	38.3
	22	4	3.3	3.3	41.7

	23	1	.8	.8	42.5
	24	1	.8	.8	43.3
	25	1	.8	.8	44.2
	26	2	1.7	1.7	45.8
	27	1	.8	.8	46.7
	28	2	1.7	1.7	48.3
	29	1	.8	.8	49.2
	3	5	4.2	4.2	53.3
	30	2	1.7	1.7	55.0
	32	2	1.7	1.7	56.7
	34	1	.8	.8	57.5
	4	4	3.3	3.3	60.8
	5	7	5.8	5.8	66.7
	50	1	.8	.8	67.5
	6	6	5.0	5.0	72.5
	7	10	8.3	8.3	80.8
	8	9	7.5	7.5	88.3
	9	14	11.7	11.7	100.0
	Total	120	100.0	100.0	

HOW MANY HOURS DO YOU WORK EACH WEEKS

	Frequency	Percent	Valid Percent	Cumulative Percent
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Valid	100	1	.8	.8	.8
	106	1	.8	.8	1.7
	12	7	5.8	5.8	7.5
	16	1	.8	.8	8.3
	168	79	65.8	65.8	74.2
	186	1	.8	.8	75.0
	24	20	16.7	16.7	91.7
	30	1	.8	.8	92.5
	4	1	.8	.8	93.3
	50	1	.8	.8	94.2
	70	1	.8	.8	95.0
	8	1	.8	.8	95.8
	84	4	3.3	3.3	99.2
	98	1	.8	.8	100.0
	Total	120	100.0	100.0	

HAVE YOU AT ANY TIME DURING THE LAST 12 MONTHS HAD TROUBLE IN NECK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	33	27.5	27.5	27.5
	NO	87	72.5	72.5	100.0
	Total	120	100.0	100.0	

HAVE YOU AT ANY TIME DURING THE LAST 12 MONTHS HAD TROUBLE IN SHOULDERS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES, RIGHT SHOULDER	17	14.2	14.2	14.2
	YES, LEFT SHOULDER	13	10.8	10.8	25.0
	YES, BOTH SHOULDERS	13	10.8	10.8	35.8
	NO	77	64.2	64.2	100.0
	Total	120	100.0	100.0	

HAVE YOU AT ANY TIME DURING THE LAST 12 MONTHS HAD TROUBLE IN ELBOWS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES, RIGHT ELBOW	2	1.7	1.7	1.7
	YES, LEFT ELBOW	3	2.5	2.5	4.2
	YES, BOTH ELBOWS	3	2.5	2.5	6.7
	NO	112	93.3	93.3	100.0
	Total	120	100.0	100.0	

HAVE YOU AT ANY TIME DURING THE LAST 12 MONTHS HAD TROUBLE IN WRIST/HANDS

		Frequency	Percent	Valid Percent	Cumulative Percent
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Valid	YES, RIGHT WRIST/HAND	6	5.0	5.0	5.0
	YES, LEFT WRIST/HAND	11	9.2	9.2	14.2
	YES, BOTH WRIST/HANDS	1	.8	.8	15.0
	NO	101	84.2	84.2	99.2
	42	1	.8	.8	100.0
	Total	120	100.0	100.0	

HAVE YOU AT ANY TIME DURING THE LAST 12 MONTHS HAD TROUBLE IN UPPER BACK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	27	22.5	22.5	22.5
	NO	93	77.5	77.5	100.0
	Total	120	100.0	100.0	

HAVE YOU AT ANY TIME DURING THE LAST 12 MONTHS HAD TROUBLE IN LOWER BACK (SMALL OF BACK)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	34	28.3	28.3	28.3
	NO	86	71.7	71.7	100.0
	Total	120	100.0	100.0	

HAVE YOU AT ANY TIME DURING THE LAST 12 MONTHS HAD TROUBLE IN ONE OR BOTH HIPS/THIGHS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	7	5.8	5.8	5.8
	NO	113	94.2	94.2	100.0
	Total	120	100.0	100.0	

HAVE YOU AT ANY TIME DURING THE LAST 12 MONTHS HAD TROUBLE IN ONE OR BOTH KNEES

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	29	24.2	24.2	24.2
	NO	91	75.8	75.8	100.0
	Total	120	100.0	100.0	

HAVE YOU AT ANY TIME DURING THE LAST 12 MONTHS HAD TROUBLE IN ONE OR BOTH ANKLES/FEET

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	11	9.2	9.2	9.2
	NO	109	90.8	90.8	100.0
	Total	120	100.0	100.0	

HAVE YOU AT TIME DURING THE LAST 12 MONTHS BEEN PREVENTED FROM DOING YOUR NORMAL WORK (AT HOME OR AWAY FROM HOME) BECAUSE OF THE TROUBLE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	10	8.3	8.3	8.3
	NO	110	91.7	91.7	100.0
	Total	120	100.0	100.0	

HAVE YOU AT ANY TIME DURING THE LAST 12 MONTH BEEN PREVENTED FROM WORK (SHOULDER)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	5	4.2	4.2	4.2
	NO	115	95.8	95.8	100.0
	Total	120	100.0	100.0	

HAVE YOU AT ANY TIME DURING THE LAST 12 MONTH BEEN PREVENTED FROM WORK (ELBOWS)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	3	2.5	2.5	2.5
	NO	117	97.5	97.5	100.0
	Total	120	100.0	100.0	

HAVE YOU AT ANY TIME DURING THE LAST 12 MONTH BEEN PREVENTED FROM WORK (WRIST/HANDS)

		Frequency	Percent	Valid Percent	Cumulative Percent
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Valid	YES	4	3.3	3.3	3.3
	NO	116	96.7	96.7	100.0
	Total	120	100.0	100.0	

**HAVE YOU AT ANY TIME DURING THE LAST 12 MONTH BEEN PREVENTED FROM WORK
(UPPER BACK)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	3	2.5	2.5	2.5
	NO	117	97.5	97.5	100.0
	Total	120	100.0	100.0	

**HAVE YOU AT ANY TIME DURING THE LAST 12 MONTH BEEN PREVENTED FROM WORK
(LOWER BACK)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	8	6.7	6.7	6.7
	NO`	112	93.3	93.3	100.0
	Total	120	100.0	100.0	

**HAVE YOU AT ANY TIME DURING THE LAST 12 MONTH BEEN PREVENTED FROM WORK
(ONE OR BOTH HIPS/THIGHS)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	1	.8	.8	.8

	NO	119	99.2	99.2	100.0
	Total	120	100.0	100.0	

**HAVE YOU AT ANY TIME DURING THE LAST 12 MONTH BEEN PREVENTED FROM WORK
(ONE OR BOTH KNEES)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	5	4.2	4.2	4.2
	NO	115	95.8	95.8	100.0
	Total	120	100.0	100.0	

**HAVE YOU AT ANY TIME DURING THE LAST 12 MONTH BEEN PREVENTED FROM WORK
(ONE OR BOTH ANKLES/FEET)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	4	3.3	3.3	3.3
	NO	116	96.7	96.7	100.0
	Total	120	100.0	100.0	

HAVE YOU HAD ANY TROUBLE AT ANY TIME DURING THE LAST 7 DAYS NECK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	14	11.7	11.7	11.7
	NO	106	88.3	88.3	100.0
	Total	120	100.0	100.0	

HAVE YOU HAD ANY TROUBLE AT ANY TIME DURING THE LAST 7 DAYS SHOULDERS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	17	14.2	14.2	14.2
	NO	103	85.8	85.8	100.0
	Total	120	100.0	100.0	

HAVE YOU HAD ANY TROUBLE AT ANY TIME DURING THE LAST 7 DAYS ELBOWS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2	1.7	1.7	1.7
	YES	6	5.0	5.0	6.7
	NO	112	93.3	93.3	100.0
	Total	120	100.0	100.0	

HAVE YOU HAD ANY TROUBLE AT ANY TIME DURING THE LAST 7 DAYS WRIST/HANDS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	6	5.0	5.0	5.0
	NO	114	95.0	95.0	100.0
	Total	120	100.0	100.0	

HAVE YOU HAD ANY TROUBLE AT ANY TIME DURING THE LAST 7 DAYS UPPERBACK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	14	11.7	11.7	11.7
	NO	106	88.3	88.3	100.0
	Total	120	100.0	100.0	

HAVE YOU HAD ANY TROUBLE AT ANY TIME DURING THE LAST 7 DAYS LOWER BACK (SMALL OF BACK)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	20	16.7	16.7	16.7
	NO	99	82.5	82.5	99.2
	22	1	.8	.8	100.0
	Total	120	100.0	100.0	

HAVE YOU HAD ANY TROUBLE AT ANY TIME DURING THE LAST 7 DAYS ONE OR BOTH HIPS/THIGHS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	6	5.0	5.0	5.0
	NO	114	95.0	95.0	100.0
	Total	120	100.0	100.0	

HAVE YOU HAD ANY TROUBLE AT ANY TIME DURING THE LAST 7 DAYS ONE OR BOTH KNEES

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	13	10.8	10.8	10.8
	NO	107	89.2	89.2	100.0
	Total	120	100.0	100.0	

HAVE YOU HAD ANY TROUBLE AT ANY TIME DURING THE LAST 7 DAYS ONE OR BOTH ANKLES/FEET

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	7	5.8	5.8	5.8
	NO	113	94.2	94.2	100.0
	Total	120	100.0	100.0	

