

**COMPARATIVE EFFECTS OF EIGHT-WEEK STRATIFIED BACK
CARE APPROACHES ON SELECTED CLINICAL OUTCOMES AMONG
INDIVIDUALS WITH NON-SPECIFIC LOW BACK PAIN**

BY

**MUHYIDDEEN S. BICHI
SPS/14/MPT/00015**

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FOR THE AWARD OF M.SC. ORTHOPAEDIC PHYSIOTHERAPY**

DECEMBER, 2017

DECLARATION

I hereby declare that this work is the product of my research efforts undertaken under the supervision of Dr. Bashir Bello and has not been presented elsewhere for the award of a degree or certificate. All sources have been duly acknowledged.

.....
Signature & Date

MUHYIDDEEN S. BICHI

SPS/14/MPT/00015

CERTIFICATION PAGE

I hereby certify that Muhyiddeen S. Bichi carried out this research dissertation independently under my supervision.

Supervisor

Signature and Date

Dr. Bashir Bello

.....

.....

Dr. Bashir Bello

Department of Physiotherapy

Faculty of Allied Health Sciences

Bayero University Kano

APPROVAL

This Dissertation has been examined and approved for the award of Master Degree in Orthopaedic and Sports Physiotherapy.

Dr. Christiana A. Odole	Signature & Date
(External Examiner)

Dr. Isa U. Lawal	Signature & Date
(Internal Examiner)

Dr. Bashir Bello	Signature & Date
(Supervisor)

Dr. Bashir Bello	Signature & Date
(Head of Department)

Board of School of Postgraduate
---------------------------------	-------

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This research work is dedicated to my beloved parents and all low back pain patients.

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ABSTRACT

Stratified Back care is a recently developed approach for treating low back pain. It involves matching a specific treatment to sub-groups of patients with similar characteristics, with an aim of improving patients' outcomes. This study compared the effect of 2 stratified care approaches [Sub-grouping for targeted treatment (STarT) & Specific treatment of the problems of the spine STOPS)] in patients with non-specific low back pain (NSLBP)]. Forty-six individuals, with NSLBP participated in this single blind randomized clinical trial. Participants were randomly assigned into one of two groups: Start Back Group (SBG; n = 23) or STOPS group (SPG; n = 23). Treatment was applied twice weekly for eight weeks. Outcomes assessed pre and post interventions were pain intensity (PI) using numeric pain rating scale (NPRS) and functional disability (FD) using Oswestry Disability Index (ODI). Data were analyzed using descriptive statistics, paired and independent t-tests at $\alpha < 0.05$. Participants in both groups were comparable in age (44.65 ± 9.03 vs 46.40 ± 7.39) years. At baseline, PI, FD and anthropometric values were comparable in both groups. There was a significant difference in pain intensity between the SBG and SPG [3.14 ± 1.15 vs 4.38 ± 1.56 , ($p < 0.05$)] respectively, with no significant difference in functional disability [29.33 ± 8.68 vs 31.43 ± 9.62 , ($p > 0.05$)] between the groups. However, there was a significant difference within each group in pain and functional disability with $p < 0.05$. It was concluded that STarT Back approach was more effective in reducing pain intensity only than STOPS approach in individuals with non-specific low back pain.

Keywords: *Non-specific low back pain, Stratified Back care, Sub-grouping for targeted treatment, Specific treatment of the problems of the spine*

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Low back pain is a common disabling condition that burdens individuals, families and societies (Williams, Peltzer, Yawson, Biritwum & Maximova, 2015). It is the most prevalent musculoskeletal condition in Orthopaedic practice that is ranked as the sixth highest overall morbidity and leading cause of disability across the world (Hoy et al., 2012). Malluf, Sahrman and Van (2000) reported back pain as the most commonly treated disorder in out-patient physiotherapy clinics worldwide, and considered as the most common health problem with 60% to 85% of the population experiencing it at some point in their lives (Anderson, 1999), thus having a negative impact on functional ability, occupational activities, activities of daily living and increases frequency of work absenteeism (Van Tulder, 2002). Moreover, Akinbo (1998) reported a dramatic increase in disability, loss of man power and increased amount of revenue loss due to Low back pain.

LBP is a medical condition that is described as a pain limited to the region between the lower margins of the 12th rib and gluteal folds (Bejia, Abid, Salem, Letaief, Younes & Touzi, 2005), the pain may or may not radiate down the legs. Back pain can be classified based on duration as acute, sub-acute or chronic and classified based on causal mechanism as either specific or non-specific low back pain. However, some of the risk factors associate with back pain include smoking, obesity, age, gender, physically strenuous work, sedentary work, low educational status, stress, anxiety and job dissatisfaction, low levels of social support in the workplace among others (Omokhodion, Umar & Ogunnowo, 2000).

The overall prevalence of low back pain was found to be increasing with age until 60–65 years and then gradually decline. However a recent review by Damian et al. (2012) identified low back pain as a major problem throughout the world and is most prevalent among females and persons who are 40–80 years of age. In another study conducted in Ibadan State of Nigeria, it was reported that the prevalence of low back pain among hospital workers is 46%, with the highest prevalence (69%) recorded among nurses, followed by secretaries/administrative staff (55%) and cleaners/aids (47%). Heavy physical work (45%), poor posture (20%) and prolonged standing or sitting (20%) were the most frequent activities associated with LBP among the population studied (Omokhodion, Umar & Ogunnowo, 2000). Epidemiologically, low back pain was shown to cause more global disability than any other condition (Hoy et al., 2010), with the cost of care in USA estimated to be over \$50 billion annually (Liliedahl, Finch, Axene & Goertz, 2010), also the estimated annual expenditure on LBP diagnosis and treatment was reported to be over fifty billion US dollars and a hundred million dollars in United States and United Kingdom respectively (Jameel & Robinson, 1996; Maniadakis & Gray, 2000). Although, limited data on the burden of low back pain in developing countries exists, the few available studies reported that the burden increases among Africans (Louw, Morris & Grimmer 2007). Similarly, not much published studies estimated the average cost of LBP management in Nigeria, the few ones published reported that; substantial part of the direct cost is spent on seeking physiotherapy for back care (Odole, Babatunde & Olatunji, 2011). Equally, another study reported that the annual average money spent on accessing back care in government and private owned hospitals in Nigeria, is on average N196, 200 and N781, 500 respectively (Birabi, Oke, Dienye & Okafor, 2013).

Regarding the management of patients with LBP, medication plays an important role in relieving symptoms especially in acute conditions, consequently over use/or long term use might result in an unwanted side effects (Robert, 2013). However, number of physiotherapy techniques and modalities that focus on pain reduction, improving functional activities and restoring activities of daily living are available. The commonly used modalities/techniques that are shown to be beneficial include; TENS, Short wave diathermy Infrared radiation, lumber traction, lumber spine manipulation, programmed exercises, cryotherapy, relaxation technique, acupuncture etc. Although trials have reported the benefit of the aforementioned wide range of treatments, but lack of evidence about which patient is likely to benefit from a particular treatment has reduced the efficiency of the usual physiotherapy cares. Moreover, in most cases, patients treated with usual care (un-stratified) experience the effect of “one size fits all” i.e. subjecting different patients to uniform treatment (technique/exercise program) using the same frequency, intensity or duration regardless of the differences that exist between them, this could also be the reason why relapse of Back Pain is not uncommon as reported that up to 80% of the patients treated for back pain usually report pain or disability just a year after the first consultation (Kerry, 2010).

However, in an effort to overcome the relapse and enhance treatment of patients with low back pain, a much more interactive method called Stratified Back care was recently developed and proposed as an appropriate method to manage patients with LBP. This is in line with the recommendation by World Health Organization on initiating and standardization of evaluation and outcome measures (Ehrlich & Khaltaev, 2009). Stratified Back care aimed at tailoring a therapeutic decisions in ways that maximizes treatment benefit, reduce harm and increase healthcare efficiency by offering the right treatment to the right patient at the right time, the uniqueness and advantage of this approach over the usual care is; its ability to ‘fast tract’ patients

to appropriate treatment at baseline (Nadine, 2015), this is achieved by matching a specific treatment(s) to patients sub-grouped based on their key characteristics such as prognostic factors, likely response to treatment and/or underlying mechanisms, all with aim of improving patient's outcomes, reducing the inefficient variability of treatment associated with usual physiotherapy care and also helps provide a communication tool for managing patients with LBP (Cherkin, Kovacs, Croft, Borkan, Foster, Urrutia & Zamora, 2009).

Foster et al. (2015) identified three (3) different stratified care approaches that can be used to sub-group and treat patients with LBP. They include; a) Sub-grouping for Targeted Treatment (STarT Back Approach), which is based on patients prognosis i.e. matching treatment to patients' risk of poor outcome (likelihood of persistent pain and disability), the approach allows early decision making about amount and broad direction of therapy a patient should receive. b) Specific Treatment of the problems of the spine (STOPS), which is based on responsiveness to treatment i.e. matching a specific treatment to patients who are likely to respond to it, based on evidence and c) IMPacT Back which is also a stratified care method that is most appropriate for chronic conditions.

A randomized control trial by Hill et al., (2011) identified stratified back care as a clinically and cost effective method, and it was therefore suggested as an appropriate method to manage patients with back pain for better outcomes (Dinnant et al., 2007). Despite the evidence that treatment of patients based on sub-grouping (Stratified care) results in better outcome than the usual care (Fritz, Delitto & Erhard, 2003), it has not been established whether one stratified care approach is superior to the other in terms of effectiveness and yet no clear consensus as to which classification system to use (Fritz, Delitto & Erhard, 2003). However, kerayanis (2012) reported low use of these classification systems among physiotherapist, although that was

attributed to unfamiliarity with the classification system, inability to choose between the classifications systems or preference for other assessment methods. It was therefore suggested that; further studies should be conducted to ascertain the effect of Stratified Back care on pain and functional disability. As such, this study found the approaches (STarT and STOPS) worthy of further investigation to ascertain and compare their effects on pain and functional disability in patients with acute and sub-acute non-specific low back pain. As suggested that, STarT Back approach and/or treatment based approach (STOPS) are more appropriate for Acute and sub-acute conditions of NSLBP (Foster, Hill, O'Sullivan, Childs & Hancock, 2015).

1.2 STATEMENT OF THE PROBLEM

Low back pain posed as a major challenge to individuals and societies because it affects up to 84% of people at some point in their lives, creating high rate of activity limitation, work absenteeism, impaired quality of life and increase need for medical care (Dagenais, Caro & Haldeman, 2008). Back pain is now the 6th highest contributor to the global burden of disease which account for 14% of all consultations in the United Kingdom. About 60% to 90% of adult consult family physician for back pain annually with more than 60% still reporting pain and disability just a year later (Kerry, 2010). This necessitated the need to employ evidence based and clinically effective interventions to put a stop to this problem, the major goal of LBP treatment is to restore normal function, return the individual to work, and eradicate or reduce pain to the lowest minimal level. However, number of treatment options with different levels of evidence are available for the management of patients with LBP, they include; medication, use of supportive devices, physical therapy modalities, acupuncture, exercises, traction, manipulation etc. Alternatively, traditional medical approaches which focus on addressing the anatomical

problems in managing back pain are available, although not fully supported by scientific research evidence.

Because Low back pain is extremely a common problem that is often poorly managed, efforts been made to enhance back care identified a new approach that was shown to reduce variability of patients treatment among clinicians. The newly develop approach suggested by researchers is stratified care; the approach involves identifying risk level of patients at baseline thereby sub-grouping them to receive a specific treatment according to their level of disability and other key characteristics. The advantage of stratified care over usual care are; It 'fast tracks' patients to the appropriate treatment at right time thereby reducing the cost of care associated with back pain; it also reduces inefficient variability in treatment and provide a helpful communication tool to the clinicians. Furthermore, all the three classifications of stratified care studied, showed promising benefits in low back pain patients, but the evidence based for each approach needs further development, also it is not yet clear if one approach is superior to other in terms of improving patients' outcome (Foster, Hill, O'Sullivan, Childs & Hancock, 2015). However, Hill et al. (2008) reported that stratification method showed a better outcome when compared with clinical guideline of usual care, yet no clear consensus as to which classification system to use in patients with non- specific back pain. The available classifications for stratified care are prognostic based, treatment responsiveness and Patho-anatomical base classification. Although, classification base on treatment responsiveness e.g. STOPS and classification base on prognosis e.g. STarT Back are suggested as more appropriate for managing acute and sub-acute back pain while the patho-anatomical classification mostly deal with chronic conditions and this research focused on patients with acute and sub-acute NSLBP, the researcher therefore, found

the approaches (STarT and STOPS) worthy of further investigation to ascertain their effects on pain and functional disability.

1.3 OBJECTIVE OF THE STUDY

The main objectives of this study were:-

- To investigate the effect of STarT Back approach on pain intensity and Functional Disability among individuals with NSLBP
- To investigate the effect of STOPS approach on pain intensity and Functional Disability among individuals with NSLBP
- To compare the effects of an 8-week STarT Back and STOPS treatment approaches on selected clinical outcomes.

1.4 HYPOTHESES

1.4.1 Major hypothesis

There would be no significant difference between STarT Back and STOPS treatment approaches on selected clinical outcomes at baseline and 8 week-post intervention.

1.4.2 Sub hypothesis

- i. There would be no significant difference in pain intensity (PI) before and after 8 weeks of intervention using STarT Back tool among individuals with NSLBP.
- ii. There would be no significant difference in Functional Disability (FD) before and after 8 weeks of intervention using STarT Back tool among individuals with NSLBP.
- iii. There would be no significant difference in pain intensity (PI) before and after 8 weeks of intervention using STOPS tool among individuals with NSLBP.

- iv. There would be no significant difference in Functional Disability (FD) before and after 8 weeks of intervention using STOPS tool among individuals with NSLBP.
- v. There would be no significant difference in Pain intensity between STarT Back and STOPS tools among individuals with NLBP after 8 weeks of intervention.
- vi. There would be no significant difference in Functional Disability (FD) between STarT Back and STOPS tools among individuals with NSLBP after 8 weeks of intervention

1.5 LIMITATION

The study did not consider patients with chronic and specific low back pain. Also, it could not be ascertained whether or not patients received additional treatment somewhere else, because the study recruited only those that were not receiving any form of therapy during the course of the study.

1.6 SIGNIFICANCE OF THE STUDY

- The study would reveal more effective Stratified Back care treatment approach for treating patients with non-specific low back pain.
- The study would identify available stratified back care/screening tool(s) which would help standardize evaluation and treatment of low back pain, which in turn would reduce the inefficient variability of treatment typical with usual therapy.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

The study was conducted to investigate the effects of stratified back care Approaches (STarT Back and STOPS) on pain and functional disability among individuals with non-specific Low Back pain. This chapter reviewed some related literatures about LBP and was discussed under the following sub headings as follows:-

- Overview of Low back pain
- Etiology/risk factors of low back pain
- Epidemiology of Low back pain
- Pathogenesis of Low back pain
- Classification of Low back pain
- Clinical features of Low back pain
- Examination and Diagnosis of Low back pain
- Prognosis of Low back pain
- Management of Low back pain
- Overview of Stratified care {STarT & STOPS}
- Other approaches
- Summary of Literature review

2.1 OVERVIEW OF LOW BACK PAIN

Low back pain is neither a disease nor a diagnostic entity of any sort. The term refers to pain of variable duration in an area of the anatomy afflicted so often that it has become a paradigm of responses to external and internal stimuli. The incidence and prevalence of low back pain are roughly the same worldwide. However epidemiological data gathered ranked back pain as first leading cause of disability which interferes with the quality of life and a reason for most of hospital visits (Hoy et al., 2012). In many instances, the cause is obscure, and only in a minority of cases does a direct link to some defined organic disease exist. Example is low back pain resulting from trauma, osteoporotic fractures, infections, neoplasms, and other mechanical derangements (Odendal, 2014).

2.2 ETIOLOGY/RISK FACTORS OF LOW BACK PAIN

Although the etiological factors of low back pain are diverse, but majority of patients seen in primary care have non-specific low back pain (>85 percent), meaning that back pain occur in the absence of a specific underlying pathology that can be reliably identified and many of these patients may have musculoskeletal pain (Anderssen, 1999), though most of the patients with non-specific back pain improve within few weeks while others persist. Minority of LBP cases occur due to physical causes e.g. trauma to the back caused by a motor vehicle crash or a fall and lesser traumas, osteoporosis with fractures, or prolonged corticosteroid use among older people are antecedents to back pain of known origin in most instances. Relatively less common vertebral infections and tumors or their metastases account for other forms of back pain. Specific causes account for less than 20% of cases of back pain and probability that a particular case of back pain has a specific cause is only 0.2%. (Anderson, 1999)

Risk factors associated with back pain include smoking, obesity, age, gender, physically strenuous work, sedentary work, psychologically strenuous work, low educational attainment, and psychological factors such as somatization disorder, anxiety, and depression (Burton et al., 2012). Furthermore, heavy lifting and prolonged sitting (especially in cars, trucks, and poorly designed chairs) can provoke back pain.

2.3 EPIDEMIOLOGY OF LOW BACK PAIN

Globally, about 40% of people have LBP at some point in their lives, with an estimate of as high as 80% of people in the developed world (Vinod; Yao & Fun-Sun; Fontes & Manuel, 2011). Approximately 9 to 12% of people (632 million) have LBP at any given point in time, and nearly one quarter (23.2%) report having it at some point over any one-month period (Hoy, Bain & Williams, et al. 2012). Low back pain is more common among people aged 40 -80 years, with the overall number of individuals expected to increase as the population ages (Hoy et al., 2012). It is not clear whether men or women have higher rate of low back pain because a systematic review in 2012 reported a rate of 9.6% among males and 8.7% among female (Vos, 2012), while another review in the same year found a higher rate in females than males, which the reviewers felt was possibly due to greater rate of pain due to osteoporosis, menstruation, and pregnancy among women, or possibly because women were more willing to report pain than men. An estimated 70% of women experience back pains during pregnancy with the rate being higher as the pregnancy matures (Cunningham, 2009). Also current smokers and especially those who are adolescents are more likely to have low back pain than former smokers, and former smokers are more likely to have low back pain than those who have never smoked (Shiri, Karppinen, Leino, Solovieva & Vikari, 2010).

2.4 PATHOPHYSIOLOGY OF LOW BACK PAIN

The five lumbar vertebrae defined the lower back region (L1-L5) and sometime sacrum is included, in between these vertebrae are fibro-cartilaginous discs which act as a cushion preventing the vertebrae from rubbing together and at the same time protecting the spinal cord. Nerves emerged from and passed to the spinal cord through specific openings between the vertebrae, providing the skin with sensations and messages to muscles. Stability of the spine is provided by the ligaments, muscles of the back and abdomen while the small joints called facet joints limits and direct the motion of the spine (Floyd, & Thompson, 2008). The multifidus muscles run up and down along the back of the spine, and are important for keeping the spine straight and stable during many common movements such as sitting, walking and lifting (Salzberg, 2012). However any problem to these structures can be a source of pain.

The human spine formed an infrastructure of a biological machine that anchors the kinetic chain and transfers biomechanical forces into co-ordinated functional activities. The spine acts as a conduit for precious neural structures and possesses the physiological capacity to act as a crane for lifting and a crankshaft for walking. As the spine subjected to aging, it adjusts to the wear and tear of gravity and biomechanical loading through compensatory structural and neuro-chemical changes, some of which can be mal-adaptive and cause pain, functional disability, and altered neurophysiologic circuitry. Some compensatory reactions are benign while some are destructive and interfere with the organism's capacity to function. Spinal pain is multifaceted, involving structural, biomechanical, biochemical, medical, and psychosocial influences that result in dilemmas (Anthony & Stephen, 2015).

2.5 CLASSIFICATION OF LOW BACK PAIN

There are number of ways to classify low back pain. Generally, there are three ways by which low back pain can be classified. They are as follows:-

2.5.1 Classification Base on cause

Low back pain is classified based on cause as mechanical which include non-specific musculoskeletal strains, herniated discs, compressed nerve roots, degenerative discs and joint disease, or non-mechanical back pain which include back pain due to tumors, inflammatory conditions such as arthritis, and infections. It can also be referred pain from internal organs e.g. gall bladder disease, kidney stones, kidney infections, and aortic aneurysm, among others. Mechanical or musculoskeletal problems account for most of the cases 90% or more (Manusov, 2012; Cohen, Argoff & Carragee, 2008)

2.5.2 Classification Base on signs and symptoms:

Back pain is classified base on symptoms as either diffuse pain that does not change in response to particular movements, and is localized to the lower back without radiating beyond the buttocks or Radiating pain which radiates down the leg below the knee, usually located on one side (in case of disc herniation), or on both sides and changes in severity in response to certain positions or maneuvers (Manusov, 2012).

2.5.3 Classification Base on Duration:

The symptom is classified based on duration as acute, sub-acute or chronic. Generally pain lasting less than six weeks is classified as acute, pain lasting six to twelve weeks is sub-acute, while pain that last more than twelve weeks is termed chronic back pain (Koes, 2010; van Tulder, 2011; Lin & Macedo, 2010; McAuley & Maher, 2010)

2.6 CLINICAL FEATURES OF LOW BACK PAIN

The symptoms of Low back pain typically include: Muscle spasms, cramping, stiffness, pain in the back and sometimes in the buttock which may come on quickly or gradually. Certain movements make it worse, and performing light activities such as walking makes it feel better. The worst pain usually lasts 48 to 72 hours and may be followed by days or weeks of less severe pain. Symptoms of nerve-related problems include tingling, numbness, or weakness in one leg or in the foot, lower leg, or both legs. Tingling may begin in the buttock and extend to the ankle or foot. Generally, pain is worse in the morning or after prolonged periods of inactivity (Casazza, 2012).

2.7 PROGNOSIS OF LOW BACK PAIN

Generally, the outcome for acute low back pain is positive. Pain and disability usually improves within the first six weeks, sometimes with complete recovery reported by 40 to 90% (Menezes, Costa, Maher, Hancock, McAuley & Herbert, 2012), improvement in those with persistent pain after six weeks is generally slower. While at one year, pain and disability levels are low to minimal in most people. Distress, previous low back pain, and job satisfaction are predictors of long-term outcome after an episode of acute pain (Menezes et al., 2012). Certain psychological problems such as depression or unhappiness due to loss of employment may prolong the episode of low back pain and following the first episode of back pain, recurrences occur in more than half of people. For persistent low back pain, the short-term outcome is also positive, with improvement in the first six weeks but very little improvement after that. At one year, those with chronic low back pain usually continue to have moderate pain and disability (Menezes et al., 2012). According to Chou and Shekelle (2010) people at higher risk of long-

term disability include those with poor coping skills or those with fear of activity are 2.5 times more likely to have poor outcomes at one year (Chou, 2010).

2.8 EXAMINATION AND DIAGNOSIS OF LOW BACK PAIN

The structure of the back is complex and pain reporting is subjective and affected by many factors such as social factors. Accurate history and physical examination are essential for evaluating acute low back pain. The diagnosis of back pain is not straight forward (Manusov, 2012). While most low back pain is caused by muscle and joint problems, this must be separated from neurological problems, spinal tumors, fracture of the spine, and infections among others (Casazza, 2012). Numbers of factors are considered in the diagnosis and examination of patients with back pain and different radiological investigation are available although imaging is not warranted for most patients with acute/sub-acute low back pain in absence of any signs and symptoms indicating serious pathology (Chou, Carrino & Deyo, 2009). Radiographic investigation use in the diagnosis of back pain includes magnetic resonance imaging (MRI), X-ray etc. (Davis, Wippold & Brunberg, 2011). However, laboratory tests such as complete blood count, erythrocyte sedimentation rate, and C-reactive protein level may be beneficial if infection or bone marrow neoplasm is suspected. These tests might be most sensitive in cases of spinal infection because lack of fever and a normal complete blood count are common in patients with spinal infection (Acosta, Galvez, Aryan& Ames, 2006).

2.9 MANAGERMENTS OF LOW BACK PAIN

The treatment of LBP solemnly depends on its cause and type i.e. mechanical problems, non-mechanical problems, or referred pain. But generally, the treatment of acute non-specific low back pain of rapid onset is typically with simple pain medication or exercise, because it is normally not a serious condition and resolves without much being done, and recovery is helped

by attempting to return to normal activities as soon as possible within the limits of pain and providing individuals with coping skills through reassurance (Menezes, Maher, Hancock, McAuley, Herbert & Costa, 2012). Other multidisciplinary treatments are also available for those with persistent sub-acute or chronic low back pain as explained below:-

2.9.1 Physiotherapy Intervention

The aim of physiotherapy management of low back pain is to restore function, alleviate pain and improve the quality of life. Treatments available include; use of physical therapy modalities such as Short wave, TENS, supportive devices, cryotherapy among others. Because low back pain is often multifactorial, Physiotherapists are highly trained to diagnose problems in the joints and soft tissues of the body through a comprehensive assessment. Treatment is then planned to help successfully manage the problem. Physiotherapy interventions include but not limited to manual therapy, acupuncture and other specific exercises. Manual therapy such as spinal manipulation/ mobilization is often use to alleviate symptoms and manage low back pain. Acupuncture is another special technique administered by certified physiotherapists who specialize in Acupuncture. Also, thermotherapy modalities and exercise techniques such as Mckenzie and core stability exercises are also shown to be beneficial and briefly explained below;

i. McKenzie exercise activity is one of the low back pain exercises prescribed based on patient presentation and assessment. The goal of McKenzie exercise is to centralize the pain, as low back pain is generally better tolerated than leg pain. Also, education of the patient undergoing McKenzie training is critical so as to realize a sustained pain relief and know how to manage future occurrence.

ii. Core stability exercise

Core stability training is another exercise used to treat low back pain. It focuses on either the stabilization (that is ability to create extremity movement without compensatory movements of the spine or pelvis), endurance or strengthening of the core muscles. The aim of core stability training is to effectively recruit the trunk musculature and then learn to control the position of the lumbar spine during dynamic movements.

iii. Acupuncture involves the use of special sterile dry needle to stimulate specific points on the body.

2.9.2 Surgical intervention

Surgery may be indicated in those with serious conditions such as herniated disc that is causing significant pain radiating into the leg, significant leg weakness, bladder problems, or loss of bowel control. It may also be useful in those with spinal stenosis and in the absence of these; there is no clear evidence of a benefit from surgery (Manusov^b, 2012; Chou, Baisden, Carragee, Resnick, Shaffer & Loeser, 2009)

2.9.3 Behavioral Therapy

Behavioral therapy might be useful for patients with chronic pain. There are several types, which include; operant conditioning, which uses reinforcement to reduce undesirable behaviors and increase desirable behaviors; cognitive behavioral therapy, which helps people identify and correct negative thinking and behavior; and respondent conditioning, which can modify an individual's physiological response to pain (Henschke et al., 2010). However, the evidence is inconclusive as to whether mindfulness-based stress reduction reduces chronic back pain intensity or associated disability, although suggested that it might be useful in improving the

acceptance of existing pain (Rubinstein; Terwee; Assendelft; de Boer; van Tulder, 2012). However, tentative evidence supported neuro reflex therapy (NRT), in which a small pieces of metal is placed just under the skin of the ear and back for non-specific low back pain (Urrtia, Burton, Morral, Bonfill & Zanolli, 2005; Marlowe, 2012).

2.9.4 Overview of Stratified Back Care

Stratified Back care simply means matching of subgroups of patients to a specific treatment which could be based on prognostic factors, likely response to treatment or underlying mechanisms of the disease (Nadine, 2015).

Foster et al., 2015 identified 3 broad classification approaches that focus on directing specific treatment as explained below;-

i. Patient prognosis: Stratification of patients based on prognosis involves matching treatment to patient's risk of poor outcome (i.e. likelihood of persistent pain and disability). This approach is proven to be clinically and cost effective. Also, allows early decisions on amount and broad direction of therapy patients should receive. E.g. STarT Back. The approach classifies patients into low, moderate or high risk subgroups using Keele STarT Back Tool (Appendix C). Specific treatments are administered according to patients' risk level. As such, low risks patients are not over treated rather supported to self-manage with advice and reassurance, while those at risk get early on with evidence based physiotherapy and enhanced comprehensive care.

ii. Responsiveness to treatment: This involves matching treatments to subgroups of patients categorized based on characteristics and response to a particular treatment as it is evident. It identifies categories of interventions such as manual therapy and exercise, motor control training,

specific directional exercises, stabilization exercises (Hahne, Ford, Surkitt, Richards, Chan & Thompson, 2011; Ford et al., 2015). Example of this approach is Specific Treatment of the problems of the spine (STOPS).

iii. Underlying mechanisms: This also matches treatment to the patients based on mechanisms of the injury that resulted in pain and disability (pathology, pain mechanisms, provocative behaviors, negative thoughts/distress). This approach was studied and found beneficial in chronic back pain patients. Examples include; Multidimensional Behavioral Approach (O'Sullivan & Lin, 2014; Fersum, O'Sullivan, Skouen, Smith, & Kvåle, 2013).

Generally, the steps involved in usual management of patients with LBP involve Diagnostic triage by first contact clinician to rule out serious spinal pathology such as inflammatory disorders, metastases, infection or specific conditions such as radiculopathy or cauda equina syndrome, once above conditions are ruled out, a diagnosis of non-specific LBP is confirmed, and treatment to be administered is at clinician's discretion e.g. thermotherapy, exercise, cryotherapy, manipulation etc. as oppose to Stratified Back care whereby patients are screen at baseline, sub-grouped and then subject to receive most appropriate intervention according to their screening tool score/characteristics and sub-group they belong. All treatments given under stratified back care are determined or guided by the results of screening tool.

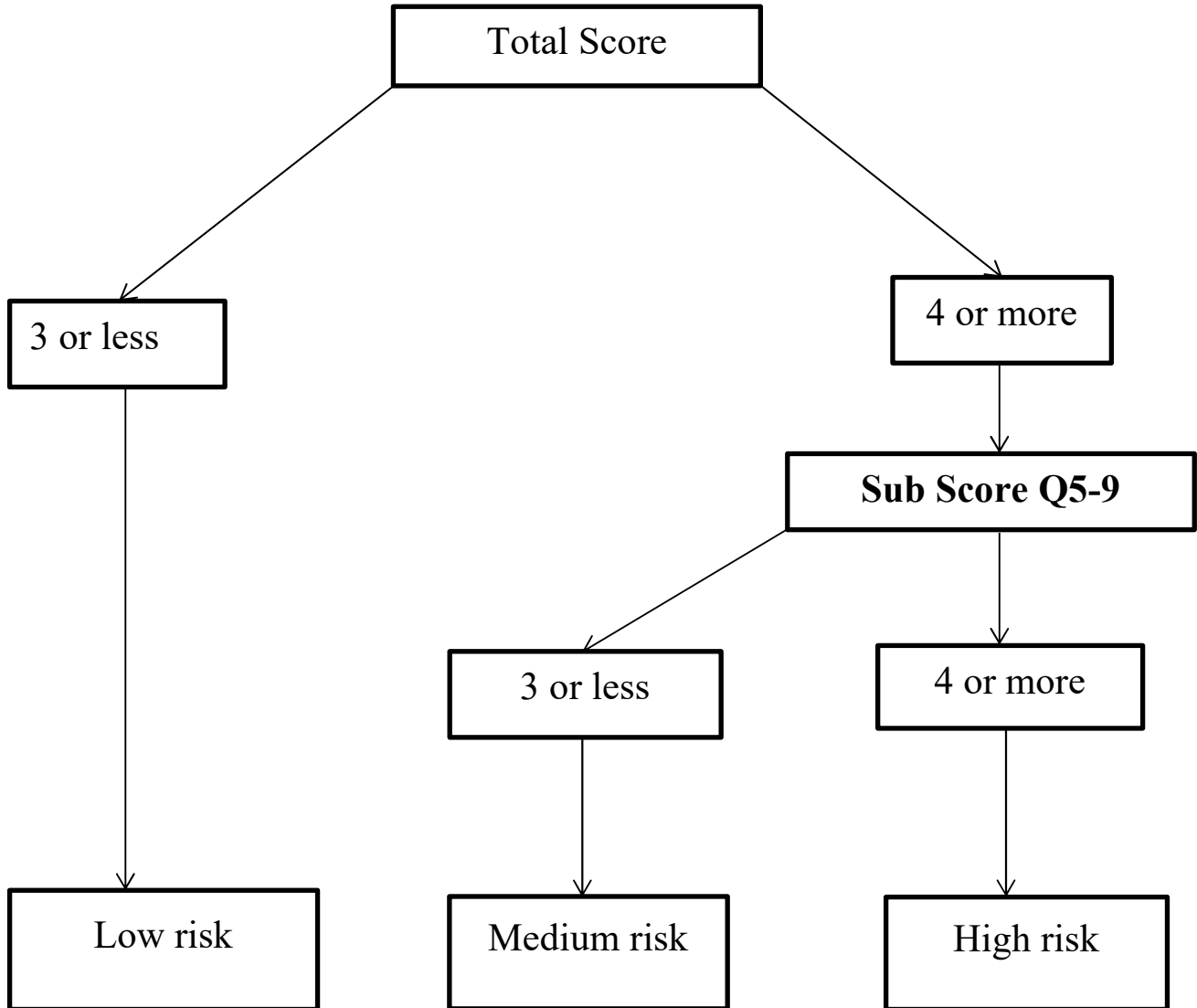
The two approaches (STarT Back & STOPS) investigated in this study are further explained below;

2.9.4.1 Sub-grouping for Targeted Treatment (STarT) approach:

STarT Back Approach developed in UK uses a Keele STarT Back screening tool (Appendix C), which is a simple prognostic questionnaire that helps identify modifiable risk factors

(biomedical, psychological and social) for back pain disability. The resulting score stratified patients into low, medium or high risk categories to receive allocated treatment as shown below;

The STarT Back Tool Scoring System



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Funded by Arthritis Research UK

Figure 1: Keele STarT Back Tool

- i. Low risk: patients in this category are not over treated, rather supported to self-manage with advice, reassurance, and medication.
- ii. Medium Risk: This builds on the assessment from the low risk package. The main aims are to restore function (including work), minimize disability even if pain is unchanged and to support appropriate self-management coupled with specific exercises e.g. Back stabilization exercises
- iii. High Risk: This builds on the low and medium risk packages. The aims are to reduce pain, reduce disability and improve psychological functioning. It also emphasize on providing adequate combined physical & cognitive- behavioral approach.

2.9.4.2 Specific Treatment of the problems of the spine (STOPS) approach:

This stratified care approach originated from Australia was established in 2009 by Dr. Jon Ford to prove that high quality Physical Therapy is effective. The approach subgroup patients based on known or hypothesize causal factors thereby allowing specific treatment to be developed targeting the causal mechanism of the back pain (Ferreira, Herbert & Latimer, 2009). It classify patients into sub-groups using the Decision rule algorism (Appendix I) coupled with physical examination. The Decision rule contains characteristics patients should have to be classified into one of the five pre-defined subgroups, and there exist, a specific treatment package for each of the five subgroups; Reducible discogenic pain, Non reducible discogenic pain, disc herniation with associated radiculopathy, multifactorial persistent pain and Zygapophyseal joint dysfunction. Treatments common to these sub-groups include; Preference directional movement base on McKenzie method, manual therapy, motor control training and cognitive-behavioral approach as presented in STOPS treatment protocol (Appendix G).

3.0 SUMMARY OF LITERATURE REVIEW

This section presents the summary of the related literature on low back pain and it is summarized as follows:-

Reviewed literature identified low back pack pain as the most common condition seen in Orthopaedic clinics of physiotherapy out-patient departments, also ranked as the sixth highest overall morbidity according to the global burden of disease, and was shown to affect female more than their male counterpart with the highest prevalence recorded in people aged 40 -80 years, and overall incidence expected to increase as the population ages (Hoy et al., 2012). Furthermore, about 40% of people have LBP at some point in their lives and relapse was not uncommon (Vinod; Yao & Fun-Sun; Fontes & Manuel, 2011). Gender prevalence of LBP was inconclusive because a systematic review in 2012 reported a rate of 9.6% among males and 8.7% among female (Vos, 2012), while another review in the same year found a higher rate in females than males (Cunningham, 2009). Also current smokers especially adolescents are more likely to have low back pain than former smokers or those who have never smoked (Shiri, Karppinen, Leino, Solovieva & Vikari, 2010).

Number of treatments options with different levels of evidence for treating low back pain was identified. However, stratified back care which is a much more interactive approach that was shown to be superior to usual care was recently developed and proposed as the most appropriate method to manage patients with NSLBP because of specificity achieved through thorough evaluation which help minimize variability of treatments that exist among clinicians. This review identified three (3) main approaches under stratified back care namely; IMPacT Back, STOPS and STarT Back. Furthermore, the latter two approaches were considered worthy of further investigation in this study being recommended for acute and sub-acute conditions

CHAPTER THREE

MATERIALS AND METHODS

3.0 INTRODUCTION

The study was conducted to investigate the effect of Stratified Back care approaches (STarT Back & STOPS) on pain and Functional Disability among individuals with non-specific low back pain. This chapter explained how data was gathered and analyzed and was discussed under the following sub-headings:-

- Materials
- Instrumentation
- Study design
- Sample size and sampling technique
- Ethical consideration and informed consent
- Data collection procedure
- Intervention
- Data analysis

3.1 MATERIAL/METHODS

This study was a single blinded randomized clinical trial design, registered with Pan Africa Clinical Trial Registry PACTR 201707002001797. Consecutive sampling technique was used to recruit participants for the study as they become available. The subjects were screened to determine whether they met the inclusion criteria for the study. The participants for this study were patients with NSLBP, who were able to comprehend instruction in English or Hausa language, who were not involved in any other treatment during the course of the study. Ethical approval (APPENDIX F) was sought and obtained from the Research ethics committee Aminu Kano Teaching Hospital, Kano, Nigeria (AKTH/MAC/SUB/12A/P-3/VI/1825).

The following categories of patients were excluded from the study: Patients with history of a prior surgery to the lumbosacral spine; patients with evidence of systemic disease, carcinoma or organ diseases; patients with evidence of pregnancy and patients who are below 18 years. They were recruited from the Aminu Kano Teaching Hospital, Kano and Dawakin Tofa General Hospital. The consented participants were randomly allocated into two groups: STarT Back group (SBG; n = 23) and STOPS group (SPG; n= 23). See figure 2 on flow chart of the participants' recruitment.

3.2 DATA COLLECTION INSTRUMENTS

- **Owestry Disability Index Questionnaire:** This questionnaire was used to assess the level of disability of patients in both groups at baseline and post intervention periods.
- **Numerical Pain Rating Scale:** Numerical rating scale is a scale of 0-10 that assesses the intensity of pain due to various conditions (Hawker, 2011). It was used to assess the intensity of low back pain.

- **The Keele STarT Back screening Tool:** This is a (9- items questionnaire) that classifies participants into subgroups. It was used to identify the risk level of the participants which determined specific treatment administered in STarT group.
- **Subjective Complaints Questionnaire:** This questionnaire was used to get the subjective information of the patients relating to the history and pattern of back pain.
- **Decision Rule Algorithm:** Decision rule Algorithm was used to further classify participants in STOPS group into one of the five pre-defined subgroups.

3.3 DESCRIPTION OF THE INSTRUMENTS

Owestry Disability Index

This is a questionnaire that has been found to have high levels of test-retest reliability, internal consistency and responsiveness (Fritz & Irrigang, 2001; Fairbank & Pynsent 2000; Roland, Fairbank 2000). It measures the level of disability in patients with various conditions and has a total of ten (10) sections with an independent domain assessing how LBP affects common daily activities, with each domain having a score ranging from 0 to 5. The total score is calculated by adding the sub-groups scores (Point total) and is referred as Percentage disability which ranges from 0% (“no disability due to LBP”) to 100% (“completely disabled due to LBP”), with higher scores indicating higher disability due to LBP.

The scoring and interpretation of the questionnaire is shown below:-

Percentage Disability (PD) = Point total ÷ 50 x 100

Interpretation

0-20 = Minimal Disability

21-40= Moderate Disability

41-60= Severe Disability

61-80= Crippled (see Appendix D)

Numerical Pain Rating Scale

Numerical pain rating scale (NPRS) is a measure of pain intensity in which a respondent select a whole number (0-10) that best reflects the intensity of his/her pain (see Appendix E). The most commonly format is horizontal bar which can be administered verbally or graphically for self-completion (Hawker, 2011). Some of the psychometric properties of this tool are; responsiveness, high test-retest reliability ($r=0.96$), construct validity and highly correlated ($r=0.95$) with VAS (Ferraz, Quaresma, Aquino, Atra, Tugwell & Goldsmith, 1990)

Scoring and Interpretation

Scores range from 0-10 points, with higher scores indicating greater pain intensity

A Keele STarT Back screening Tool

This is a (9- items questionnaire) that classifies participants in to one of the three possible subgroups, i.e. low, medium or high risk group, depending on the assessment scores.

Interpretation

Score of 3 or less = low risk

Sub score Q5-9; Score of 3 or less = medium risk

Score of 4 or more = high risk.

Decision Rule Algorism

Decision rule sheet (Appendix I) contain characteristics that qualify patients to be in one of the five pre-defined subgroups of STOPS approach. Also, the use of treatment protocol (Appendix G) is determined by the results from decision rule algorism.

3.4 SAMPLE SIZE AND SAMPLING TECHNIQUE

The following formula was used to calculate the sample size of this study as presented below;

$$n = 2/d^2 \times Cp \text{ power (Whitley \& Ball, 2002)}$$

Where;

n= number of participants needed in each group

Cp power constant is 7.9 (constant) for alpha level set at 0.05 and power of 80%

d= standardize difference =0.87 obtained from a previous study.

Thus,

$n = 2 / (0.87)^2 * 7.9 = 20.80$, approximately = 21. This means that a minimum of 42 patients with 21 in each group would be needed for this study. Because the study involved repeated measure, an additional 10% attrition rate was considered thus, making it a total of 46 patients with 23 in each group.

Eligible participants were randomly allocated to either STarT Back or STOPS group using block randomization technique. Sealed envelope soft software was used to generate the block sequence which was then selected at random. A block size of 2 was used in order to achieve equal number of participants in each group. However, ordering of blocks and block size used was blinded to further avoid selection bias.

3.5 DATA COLLECTION PROCEDURE

Pre-intervention Assessment

Participants were assessed to rule out any red flags. Outcomes measured before intervention were pain intensity using numerical pain rating scale (NPRS) and functional disability via Oswestry disability index (ODI). Participants' socio-demographic variables such as age, gender, occupation and marital status were also recorded using personal information sheet.

Post-intervention Assessment

Participants in both groups were reassessed for clinical outcomes (pain and functional disability), at four (4) and eight (8) weeks post intervention. The outcomes were measured by an independent assessors (3 Physiotherapists) who were blinded of the patient's group and treatment received.

Interventions:

Participants in both groups received allocated treatment which was determined by the results of the screening tools (STarT Back tool/ Decision rule tool), the tools categorized patients into subgroups based on their risk level/characteristics and then subjected to a specific treatment. Treatment in both groups was administered twice per week, for a period of eight (8) weeks with each treatment session lasting 30 minutes, as detailed below;

STarT Back Approach:

Low Risk: Because patients in the low risk category are very likely to improve, the aims of this package are to support and enable self-management. The key factors are to address patient concerns and to provide information.

Medium Risk: This builds on the assessment from the low risk package. The main aims are to restore function (including work), minimize disability even if pain is unchanged and to support appropriate self-management coupled with specific exercises e.g. Back stabilization exercises

High Risk: This builds on the low and medium risk packages. The aims are to reduce pain, reduce disability and improve psychological functioning. It also emphasize on providing adequate combined physical & cognitive- behavioral approach.

STOPS Approach:

Participants in this group were further classified into sub-groups using decision rule algorithm (Appendix I) coupled with physical examination. The Decision rule contain characteristics that qualifies patients to be in one of the five pre-defined subgroups, and there exist, a specific treatment package for each of the five subgroups as seen in Appendix G. However, in this study, patients were only available for 3 of the 5 sub-groups namely; i) Reducible discogenic pain ii) Multifactorial persistent pain and iii) Non-Reducible discogenic pain .This is probably because only patients with NSLBP were considered in the study, as such they might have not presented additional characteristics that would qualify them to be in the other sub-groups. Treatment received is further explained below;

- i. **Reducible discogenic pain:** Treatment in this subgroup involves McKenzie method comprising up of; identification of direction of repeated movements or sustained positions that leads to improvement or centralization of patients pain, Advice on postural strategies and exercise to promote movements and positions corresponding with the directional preference.

- ii. **Non-reducible discogenic pain:** Treatment for this subgroup involves a graded functional exercise program that focus on specific motor control training targeting the local stabilizing muscles (Transverse abdominis, lumbar multifidus and pelvic floor muscles), with initial exercise taught in non-weight bearing positions and then progressed to functional exercises, Postural self- management and education regarding realistic recovery time frames

- iii. **Multifactorial persistent pain:** Treatment in this subgroup involves graded functional exercise to restore patients normal functional levels of activity with more emphasis on; Cognitive restructuring and behavioral strategies targeting key psychosocial barriers to recovery, Detailed education in relation to the neurophysiology of pain and central sensitization identified via Orebro musculoskeletal Questionnaire.

3.6 DATA ANALYSIS

Descriptive statistic of frequency and percentage were used to describe clinical and anthropometric variables of the participants in both groups as seen in Table 1. Inferential statistics of paired and independent t-test were used to determine statistical differences in clinical variables within and between groups as seen in table 3, 4 and 5 respectively. All statistical analysis were performed with alpha levels set at 0.05, using Statistical Package for Social Sciences (SPSS) version 16.0 software (SPSS Inc. Chicago, Illinois, USA)

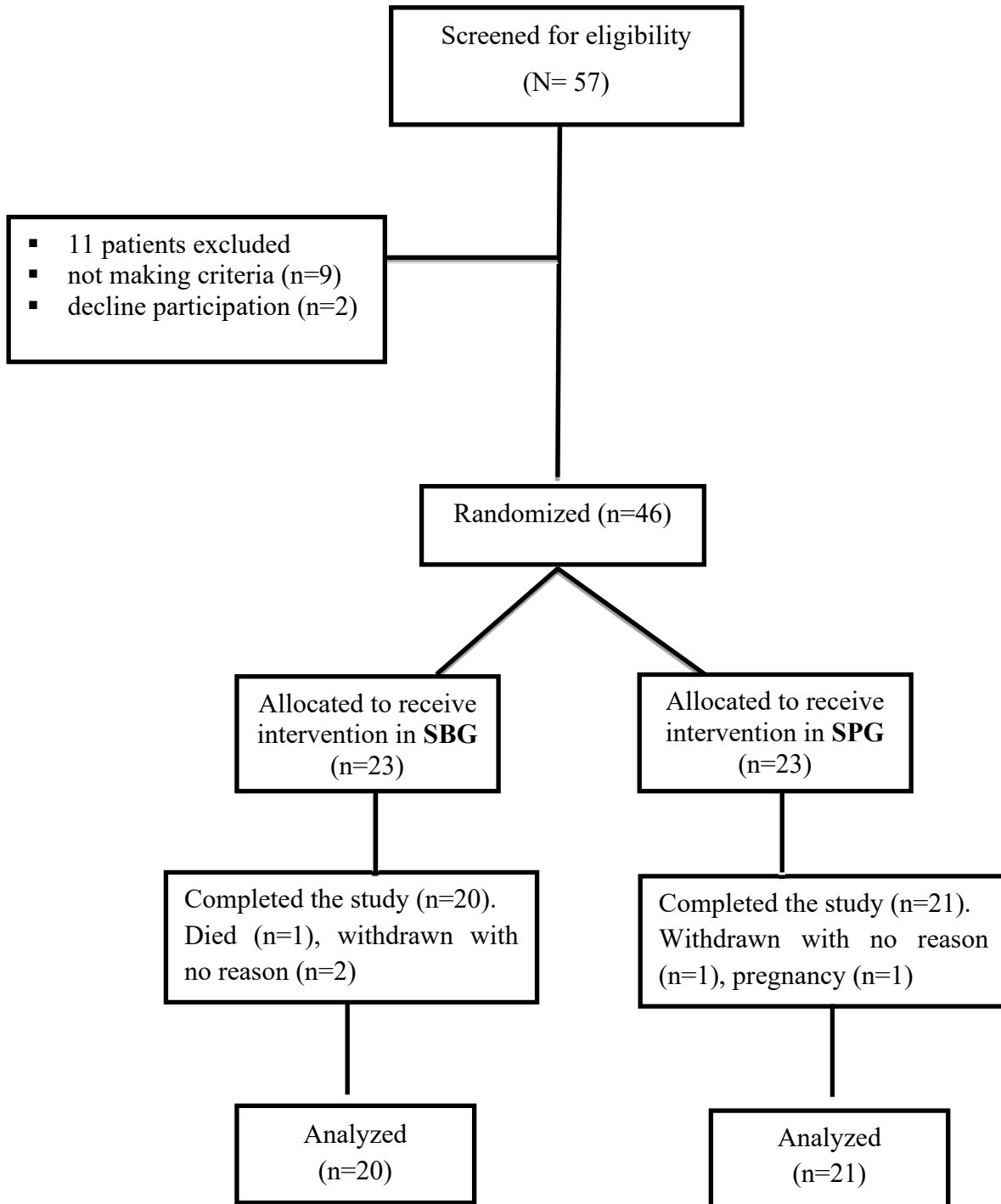


Figure 2: Flow chart of participant's recruitment

CHAPTER FOUR

RESULT AND DISCUSSION

A total of 46 subjects participated in the study however, only 41 participants completed the study, with (SBG; n=20) and (SPG; n=21). Descriptive statistics of participants' demographic, clinical and anthropometric variables at baseline is presented in Table 1. The result indicated no significant difference between the groups at baseline. The mean age of participants in the SBG is 43.57 ± 9.64 years while the mean age of participants in the SPG is 40.57 ± 10.01 years. The mean height of participants in the SBG is 1.64 ± 0.08 m while the mean height of participants in the SPG is 1.64 ± 0.08 m. The mean weight of participants in the SBG is 66.88 ± 10.80 kg while the mean weight of participants in the SPG is 69.08 ± 11.65 kg. The mean BMI of participants in the SBG is 24.39 ± 3.73 kg/m² while the mean BMI of participants in the SPG is 24.39 ± 3.73 kg/m². At baseline, the mean pain intensity and functional disability scores of both groups are also shown in table 1 and no significant difference was observed between the groups. The mean pain intensity and functional disability score of SBG were 5.95 ± 1.80 and 38.29 ± 11.95 respectively while that of SPG was 6.19 ± 1.81 and 40.95 ± 11.96 respectively. No significant difference was observed in pain intensity and functional disability scores of both groups at baseline.

With regards to occupation of the participants, 16(34.78%) were civil servants, 11(23.91%) were farmers while house wives constituted the remaining percentage 16(41.30%). Generally, duration of symptoms of the participants ranges from 0-16 weeks. However, most participants (63.04%) fall within 0-8 weeks category while (36.96%) of the participants had a duration of 8 week and above. Also, 14(30.43%) had a previous history of low back pain while 32(69.57%) had no previous history.

Table 1: Clinical and Anthropometric characteristics of the participants at Baseline

Variables	STarT B. Group	STOPS Group	p-value	t
	Mean±SD	Mean±SD		
	n =23	n =23		
	df=22	df=22		
Age (years)	43.57±9.64	40.57±10.01	0.31	1.04
Height (m)	1.64±0.08	1.61±0.09	0.930	0.09
Weight (kg)	66.88±10.80	69.08±11.65	0.509	-0.67
BMI	24.39±3.73	25.62±4.12	0.295	-0.11
PI	5.95±1.80	6.19±1.81	0.60	0.072
FD	38.29±11.95	40.95±11.96	0.41	0.985

SD= standard deviation; BMI= Basal metabolic index; PI= pain intensity; FD= functional disability; df= degree of freedom; n= number of participants in each group

Table 2: Risk level and percentage of participants in Both Groups

Groups/subgroups	n (%)
STarT Back Group	
Mild Risk	09(39.13)
Moderate Risk	11(47.82)
High Risk	03(13.04)
Total	23(100%)
STOPS Group	
RDP	04(17.39)
NRDP	14(60.87)
MPP	05(21.74)
DHR	00(0.00)
ZJD	00(0.00)
Total	23(100%)

n = Number of patients in each subgroup; %= percentage; RDP=Reducible discogenic pain subgroup; MPP=Multifactorial persistent pain subgroup; NRDP= Non- Reducible discogenic pain subgroup; DHR=Disc herniation with associated radiculopathy; ZJD=Zygapophyseal joint dysfunction

Table 1 above presented the clinical and anthropometric characteristics of the participants at baseline. It shows that the two groups were comparable in Age, height, BMI and weight at baseline ($p > 0.05$), however the clinical variables (pain intensity and functional disability) between the groups were also comparable at baseline ($p > 0.05$). While table 2 presented the risk level of the participants in both groups.

Table 3: Mean changes in pain intensity and functional disability scores of participants in *STarT Back Group* at Baseline and at end of week 8

Variables	Pre-Mean±SD	Post- Mean±SD	t	df	p-value
PI	5.95±1.80	3.14±1.15	9.51	19	* 0.001
FD	38.29±11.95	29.33±8.68	10.72	19	* 0.001

Key Note: SD = Standard deviation; PI = Pain intensity; FD= Functional disability;
*Significance difference, STarT=subgrouping for Targeted Treatment

Table 3 above shows a baseline and 8-week post treatment outcome scores within STarT Back group. The result shows significant difference in pain intensity ($p=0.001$; $t=9.51$). Similarly, there was significant difference in functional disability within the group ($p=0.001$; $t=10.72$), indicating reduced mean in pain intensity and functional disability 8-week post intervention.

Table 4: Comparison of baseline and post treatment mean scores in pain intensity and functional disability within *STOPS* group

Variables	Pre-Mean±SD	Post- Mean±SD	t	df	p-value
PI	6.19±1.81	4.38±1.56	8.09	20	* 0.001
FD	40.95±11.96	31.43±9.62	9.53	20	* 0.001

Key Note: SD = Standard deviation; PI = Pain intensity; FD = Functional disability;
*Significance difference, STOPS= Specific Treatment of the problems of the Spine

The comparison of pre and post treatment outcome scores within STOPS group is presented in Table 4 above. The result indicated significant difference in pain intensity between pre and post treatment scores ($p=0.001$; $t=8.09$). However, there was a significant difference in functional disability ($p= 0.001$; $t=9.53$), with marked reduction in mean scores of pain intensity and functional disability post treatment

Table 5: Comparison of 8-week post- intervention clinical outcome scores between *STarT Back* and *STOPS* group

Variables	SBG	SPG	T	p-value
	Mean±SD	Mean±SD		
	N=20	N =21		
	df= 19	df=20		
PI	3.14±1.15	4.38±1.56	6.01	* 0.04
FD	29.33±8.68	31.43±9.62	0.49	0.25

Key Note: SBG= STarT Back group; SPG= STOPS group; Mean±SD = Mean±Standard deviation; PI = Pain intensity; FD = Functional disability; *Significance difference

Table 5 above presented the result of independent t-test between the two groups (STarT and STOPS). The Results showed a significant difference in pain intensity between the two groups ($p < 0.05$) with no significant difference in functional disability between the groups ($p = 0.25$).

4.2 HYPOTHESES TESTING

HYPOTHESIS 1

Statement: There would be no significant difference in pain intensity (PI) before and after 8 weeks of intervention using STarT Back tool among individuals with NSLBP.

Result findings: The findings violated the above hypothesis because the mean difference in PI was (2.81, $p < 0.05$). As such, hypothesis (1) was rejected (See Table 3).

HYPOTHESIS 2

Statement: There would be no significant difference in Functional Disability (FD) before and after 8 weeks of intervention using STarT Back tool among individuals with NSLBP.

Result findings: The findings violated the above hypothesis because the mean difference in FD was (8.96, $p < 0.05$). As such, hypothesis (2) was rejected (See Table 3).

HYPOTHESIS 3

Statement: There would be no significant difference in pain intensity (PI) before and after 8 weeks intervention using STOPS tool among individuals with NSLBP.

Result findings: The findings violated the above hypothesis because the mean difference in PI was (1.81, $p < 0.05$). As such, hypothesis (3) was rejected (See Table 4).

HYPOTHESIS 4

Statement: There would be no significant difference in Functional Disability (FD) before and after 8 weeks intervention using STOPS tool among individuals with NSLBP.

Result findings: The findings violated the above hypothesis because the mean difference in FD was (9.52, $p < 0.05$). As such, the hypothesis (4) was rejected (See Table 4).

HYPOTHESIS 5

Statement: There would be no significant difference in Pain intensity (PI) between STarT Back and STOPS tools among individuals with NLBP after 8 weeks of intervention.

Result findings: The findings violated the above hypothesis because the mean difference in PI was (1.24, $p < 0.05$). As such, hypothesis (5) was rejected (See Table 5).

HYPOTHESIS 6

Statement: There would be no significant difference in Functional Disability (FD) between STarT Back and STOPS tools among individuals with NSLBP after 8 weeks of intervention.

Result findings: The findings support the above hypothesis because the mean difference in FD was (2.10, $p > 0.05$). As such, the hypothesis (6) was accepted (see Table 5).

4.2 DISCUSSION

This study investigated the effects of Stratified Back care approaches [Sub-grouping for targeted treatment (STarT) & Specific treatment of the problems of the spine (STOPS)] in patients with NSLBP, attending Physiotherapy clinics of Aminu Kano Teaching Hospital and Dawakin Tofa General Hospital, Kano State. Back pain intensity and functional disability were the clinical outcomes accessed. Also, the baseline comparison of the clinical and anthropometric variables of the participants between the two groups was not statistically significant ($p>0.05$), indicating that the two groups did not differ at baseline (Table 1). Thus, any effect/change produced may not be by chance.

The main findings of this study was that, STarT Back approach which involves sub-grouping and targeting treatment to patients into low, medium and high risk sub-groups was found to be more effective in reducing pain intensity among individuals with non-specific low back pain when compared to STOPS approach. However, there was no significant difference in functional disability scores between the groups when the approaches were compared at 8 weeks post intervention (Table 5), signifying that STarT Back approach is not superior to STOPS in terms of reducing functional disability and vice versa. Although this current finding slightly differ from that of Keller, et al. (2007) and a review by Chou, et al., (2009) who reported that no existing evidence suggest that a particular stratified care approach is superior to the other in terms of reducing pain intensity or functional disability, in this study STarT Back treatment approach was shown to be more effective in reducing back pain intensity.

Generally, majority of the study participants (54.34%) were of moderate risk level followed by mild risk (28.26%), and patients at high risk constituted the lowest percentage (17.39%). In comparison, there were more patient with mild risk in STarT Back group when

compared to those in STOPS group, (39.13%) versus (17.39%) and relatively more patients with moderate and high risk level in STOPS group as seen in (Table 2). As such, this could be a potential reason why STarT Back approach was more responsive to change in pain intensity than with STOPS approach, and showed no difference for functional disability between groups as depicted in the above paragraph. This is simply because patients at mild risk treated with just an advice on postures, positioning and back care, are likely to respond more/faster than those at moderate or high risk level. Additionally, participants in STOPS group were only available to 3 of the 5 sub-groups namely i) Reducible discogenic pain ii) Multifactorial persistent pain and iii) Non-Reducible discogenic pain .This is probably because only patients with NSLBP were considered in the study, as such they might have not presented additional characteristics that would qualify them to be in the other sub-groups.

Furthermore, within group comparison of the clinical outcomes (pain intensity and functional disability) between the baseline and 8 weeks scores in both groups showed a statistically significance difference $p < 0.05$ (Table 3 & 4) implying that both approaches are equally effective in reducing pain and functional disability at 8 weeks of treatment, This was equally reported by Hill, Whitehurst and Lewis et al., (2011); Hill, David, Whitehurst, Martyn, Lewis and Stirling, (2014) that stratified Back care is effective in improving patient's condition. However, the quicker response observed in both groups as seen in Table 5 could be explained by the fact that both stratified Back care approaches specify a particular treatment to the patients at baseline, with initial treatment being guided by a valid and reliable tool(s) which helps reduce the variability of treatment and time waste with try and error interventions typical with usual care in which the initial treatment is guided by clinician's personal interest/decision.

With regards to anthropometric variables of the participants, the mean age of the study participants is 42.07 years, with majority 15(32.60%) being within the range of 30-39 years followed by 40-49, 50-59 20-29 age groups with 30.40%, 26.10% and 10.90% respectively. Also, the study participants had a mean BMI of 20.95, most of whom are of within normal range 25(54.30%). This was followed by overweight group which amounted 16(34.80%) while the obese group was the least i.e. 5(10.90%). Although studies linked high BMI with incidence of LBP, this study rather suggest poor ergonomic as a risk factor of NSLBP considering the fact that most study participants had a normal BMI. It was also observed that female presented more with LBP, i.e. 28(60.98%) more than their male counterpart 18(39.02%), this was equally reported in an epidemiological study by Hoy, Bain and Williams (2012) that; females suffer NSLBP most, although was attributed to pregnancy and menstruation. Furthermore, 16(34.78%) of the participants were civil servants, 11(23.91%) were farmers while house wives constituted the remaining percentage 19(41.30%), this indicates that women suffer NSLBP more, this is probably because they perform most of the house work which involves a lot of bending, lifting and assuming non ergonomic positions.

It is worth noting that; both approaches were shown to improve the clinical outcomes studied, but few differences between the tools used in screening the patients were noted; STarT Back tool which is a 9-items questionnaire was more user friendly, simpler and easier to administer within short period of time as oppose to STOPS which uses subjective complaint questionnaire/Decision rule algorism with relatively more questions making it little bit more complex and time consuming when compared to STarT Back tool.

Conclusively, anecdotal evidence revealed that studies on stratified Back care are Limited in Nigeria, and the approach has not been adopted by most clinicians despite the fact that it was

reported to be clinically and cost effective method to treat Back pain (Dinnant et al., 2007). Besides, other countries have taken a step to develop stratified care for other conditions such as Headache and migraine (Rothrock, 2012). It is therefore high time we go by the recent updates on patient's management in order to improve the patients' wellbeing and Health care delivery.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.0 INTRODUCTION

This chapter contains the summary, conclusion and suggestions made based on the study findings. The chapter briefly highlighted the background of the study, the major findings and the inferences made from them. The chapter is as follows:

5.1 SUMMARY

5.1.1 Background

Low back pain is a major challenge to individuals and societies. It affects up to 84% of people at some point in their lives, creating high rate of activity limitation, work absence, impaired quality of life and increase need for medical care (Dagenais, Caro & Haldeman, 2008). Literature review on management of Back pain identified stratified Back care as clinically and cost effective method of treating patients suffering Back pain; stratified care involves use of a tool to identify the risk level of patients and target a specific treatment to them based on their key characteristics such as risk of poor prognosis or responsiveness to treatment. The two stratified approaches that have been suggested as appropriate for treating patients with acute and sub-acute non-specific low back pain are Subgrouping for Targeted Treatment (STarT) and Specific Treatment of the Problems of the spine (STOPS).

This study investigated the effects of STarT Back and STOPS approaches on pain and functional disability among individuals with non-specific LBP. Out of the 57 participants screened, a total of forty six (46) eligible participants were recruited using consecutive sampling technique and randomly allocated to one of the two groups, with 23 patients in each group.

However, only 41 patients completed the study. Participants received allocated treatments which was administered twice weekly for a period of eight weeks with each treatment session lasting 30 minutes. Outcomes assessed pre and post interventions were pain intensity (PI) using numeric pain rating scale (NPRS) and functional disability (FD) using Oswestry Disability Index (ODI), assessed at phases (Baseline, 4 weeks and 8 weeks) periods. However, independent assessors were blinded of the participants' group and treatments received, but participant could not be blinded due to nature of the study. Data gathered was analyzed using paired T-Test for within group difference; independent T-Test for between groups difference; one way ANOVA for differences across phases (baseline, 4 weeks and 8 weeks) and descriptive statistics of frequency and percentages was used to summarize the socio-demographic variables of the participant.

5.1.2 Summary of Findings

The findings of this study revealed that majority of the patients were female, with married women constituting the highest percentage. Baseline comparison of pain and functional disability between the two groups (SBG and SPG) was not statistically significant [(5.95±1.63) versus (6.19±1.81), (p=0.6)] and [(38.29±10.95) versus (40.95±11.96), (p=0.41)] respectively. Comparison of the treatment outcomes within STarT Back group was statistically significant; pain [(5.95±1.80) versus (3.14±1.15), (p= 0.001)] and functional disability [(38.29±11.95) versus (29.33±8.68), (p<0.001)]. Also, comparison of treatment outcomes within STOPS group was statistically significant; pain [(6.19±1.81) versus (4.38±1.56), (p <0.05)] and functional disability [(40.95±11.96) versus (31.43±9.62), (p <0.05)]. Between groups difference in pain intensity post intervention was statistically significant [(3.14±1.15) versus (4.38±1.56), (p=0.04)] while post intervention comparison of functional disability between the two groups was found to be statistically insignificant [(4.38±1.56) versus (29.33±8.68) versus (31.43±9.62), (p=0.25)].

5.2 CONCLUSION

STarT Back approach was more effective in reducing pain intensity only than STOPS approach in individuals with non-specific low back pain. Also, STarT Back tool was found to be easier to administer requiring shorter time when compared to STOPS tool. However, both approaches were shown to improve the clinical outcomes studied.

5.3 RECOMMENDATION

The following recommendations were made based on the study findings;

- i. Stratified Back care should be used/in cooperated in the management of patients with non-specific low back pain.
- ii. More studies should be conducted to investigate the effects of other types of stratified Back care, such as IMPacT Back which was not covered by this study.
- iii. Public enlightenment, awareness programs and education on ergonomic (proper posture/positioning) should be intensified, being it is the most common cause of NSLBP.

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