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APPLICATION OF THE BIOPSYCHOSOCIAL-SPIRITUAL MODEL IN IMPROVING THE QUALITY OF LIFE OF PATIENTS WITH SICKLE CELL DISEASE

MILLICENT OBODAI

2021

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APPLICATION OF THE BIOPSYCHOSOCIAL-SPIRITUAL MODEL IN IMPROVING THE QUALITY OF LIFE OF PATIENTS WITH SICKLE CELL DISEASE

BY

MILLICENT OBODAI

Thesis Submitted to the Department of Education and Psychology of the Faculty of Educational Foundations, College of Education Studies, University of Cape Coast, in partial fulfilment of the requirement for the award of Master of Philosophy degree in Clinical Health Psychology

SEPTEMBER, 2021

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DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature: …………………………… Date: …………..……….

Name: ……………………………………………………………………………..

Supervisors' Declaration

I hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Supervisor's Signature: …………………………….. Date: …………..………

Name: ……………………………………….……………………………………

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ABSTRACT

Literature on the application of the biopsychosocial model for the management and explanation for chronic pain in sickle cell disease (SCD) and other chronic disease abound. However, there is limited research on the use of the biopsychosocial model, together with a spiritual component (biopsychosocial-spiritual model). The study investigated the extent to which health-care providers utilised the biopsychosocial-spiritual model in the management of chronic pain to improve the quality of life (QoL) of patients with SCD. This study employed descriptive survey design involving a consecutive sampling of 261 patients with SCD. A researcher developed instrument for the biopsychosocial-spiritual model, the World Health Organisation Quality of Life BREF and the spirituality rating scale were used for the data collection. Data were analysed using descriptive statistics (means, standard deviations, frequencies and percentages) and partial least square structural equation modelling. The study found that health-care providers utilised the biological domain of the biopsychosocial-spiritual model more than other domains. The study also found that the level of QoL as well as spirituality of patients with SCD was quite high. A significant negative impact of spirituality on QoL was also found. Finally, biosocial domain of the biopsychosocial-spiritual model was the most significant predictor of QoL. It was recommended that policy-makers should train health-care providers to integrate the psychosocial-spiritual component as well as health practitioners should consider utilising this components in their treatment regime. It also recommended that authorities should intensify sickle cell education in other to strengthen awareness.

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KEYWORDS

Biopsychosocial-spiritual model

Heamoglobin

Heamoglobinopathy

Quality of life

Sickle cell disease

Spirituality

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DEDICATION

To my Grandmother; Ruby Obodai

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LIST OF ACRONYMS

BPS- Biopsychosocial

BPSS- Biopsychosocial-Spiritual

CFA- Confirmatory Factor Analysis

EFA-Exploratory Factor Analysis

GICG-Ghana Institute of Clinical Genetics

KBTH-Korle Bu Teaching Hospital

QoL-Quality of Life

SCD-Sickle Cell Disease

SEM-Structural Equation Modeling

WHO-World Health Organisation

WHOQOL-BREF- World Health Organisation Quality of Life- Bref

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CHAPTER ONE

INTRODUCTION

Certain factors have shown to interact with our biological processes to cause disease over time, and these factors include biological, psychological, social, and spiritual components, which are all combined to form the biopsychosocial-spiritual model of health (Engel, 1981; Taylor et al., 2013). The integration of the Biopsychosocial-spiritual model into treatment processes by healthcare providers is critical to comprehending an individual holistically. When healthcare providers are able to utilize this model in the management of chronic pain among sickle cell patients, they will be able to report good quality of life (Taylor et al., 2013). The purpose of this study was to explore how the biopsychosocial-spiritual model can help patients with sickle cell disease improve their quality of life.

Background to the Study

Congenital genetic disorders are varied genetic diseases passed on to babies by their parents. Model and Darlinson (2008) indicated that an estimated 7 million newborn babies worldwide are born with one genetic disorder or another every year.

Many congenital genetic disorders affect the function of the main blood protein haemoglobin and are called haemoglobinopathies. Sickle cell disease (SCD) is one of the commonest haemoglobinopathy (Model & Darlinson, 2008). It is a disorder that affects blood cells and their related function. A person inherits SCD when their parents pass on faulty genes for

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making haemoglobin which leads to a lifelong condition of producing defective haemoglobin. This reduces the ability of the blood to circulate oxygen throughout the body and help clear out carbon dioxide from the body (Creary et al., 2007).

When a person has SCD, they usually inherit defective genes from both parents. This means that instead of producing two copies of the normal adult haemoglobin (HbAA), they inherit genes that rather produce some other variant. The usual variant passed on is the homozygous variant (HbSS) which is also the most common variant. Other variants that form a heterozygous SCD are SC, SD, SB+, SB0 and O-Arab, with each variant coding for differentforms of defective haemoglobin (Rees et al., 2010).

SCD is more common among people of Sub-Saharan Africa including African Americans, many of whom trace their ancestry to Sub-Saharan Africa, but SCD affects many more people across Central and South America, the Middle East and the Mediterranean (Aliyu et al., 2008; Creary et al., 2007; National Association of Health Authorities and Trusts [NAHAT], 1991). In America alone, about 100,000 people are affected by SCD (Hassel, 2010). In every 12 Black-American, one person is heterozygous for SCD and annually, about one in 500 Black-American babies are diagnosed with SCD (Boyd et al., 2005). SCD is also one of the most common Haemoglobinopathies in northern Europe (World Health Organisation [WHO], 1985).

In Africa, about 200,000 newborns are each year born with SCD (Diallo & Tchernia, 2002) and an estimated 80% of all SCD new-borns are born in Sub-Saharan Africa (Piel et al., 2013). Historic accounts points that SCD existed long time before modern medicine identified it and many local

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accounts exist of the condition including its naming and related conditions (Reid & Rodgers, 2007). In Ghana about 15,000 (an estimated 2%) of all new-borns have SCD and more than half (about 55%) are the homozygous HbSS variant (Ohene-Frimpong et al., 2008).

Before the 1960s, life expectancy of SCD was very low, with very few patients reaching to adulthood (Platt et al., 1994). This changed in the 1970s when increased media attention in the United States and more research led to the passing of Sickle Cell Anaemia Control Act in the year 1972 (Cerami, 1974). The then Nixon administration became the first to make Sickle cell disease a national concern, even basing the 1971 presidential address to congress on SCD. Described by many scholars as controversial (Treadwell et al., 2006), the 1972 Sickle Cell Anaemia Control act sought to strengthen and establish interventional strategies for SCD including increased testing, counselling and national desensitisation and educational programs. (Phan, 2020). Subsequently, many research organisations dedicated to SCD were established including the Sickle Cell Disease Association of America (SCDAA), founded in 1972 by Charles Whitten. The SCDAA is dedicated to enhancing the quality of life (QoL) of SCD individuals and their relations (Reid & Rodgers, 2007). Accordingly, the life expectancy at birth of babies born with SCD has increased with over 90% of new-borns reaching adulthood (Quinn et al., 2010).

SCD patients experience episodes of pains especially along the extremities and muscles, referred to as “sickle cell crises”. This is caused by the defective blood cells (due to the defective haemoglobin that make up the cells) blocking small blood vessels and preventing the free flowing of blood.

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HbS, HbA and other variants generally refer to specific codes for making the haemoglobin proteins. Amino acids are the foundational elements of proteins. The specific genetic disorder that leads to HbS occurs when there is an exchange of valine that makes up the beta-globulin chain of the haemoglobin. This occurs at the sixth point within the chain and valine is exchanged with glutamic acid. Others occur in similar fashion leading to haemoglobin proteins that are less than optimal for the specific function for which they are made, leading to them being fragile. When there is less oxygen (referred to as hypoxic states), the red blood cells become sickle shaped, making them more fragile (leading to more haemolysis or breakdown) and causing them to block small blood vessels (Ballas, 2002; Marengo-Rowe, 2006). The extreme "painful crises" or "painful events" that usually follow necessitates a hospital visit, without which the patients may become worse (Ballas, 2005). Unfortunately, many people living with SCD stay at home and manage their pain through alternative means (Ballas, 2005; Booker et al., 2006; Smith et al., 2008).

SCD patients also suffer organ damage from the blocking of blood vessels and acute chronic pains in the bones and joints leading to disability and reduced QoL (Benjamin et al., 1999; Charache et al., 1989).

Chronic pain is said to be the kind that remains above a usual amount of time necessary for healing and/ or the kind that persists between three and six months or beyond (Merskey & Bogduk, 1994). It is a significant epidemiological issue (O'Brien et al., 2017) and has a prevalence rate between 17% and 27% globally (Blyth et al., 2001; Breivik et al., 2006; Leadley et al., 2012). In the United States, prevalence rates for chronic pain exceeds that of other disease conditions including the combined prevalence of cancer, heart diseases and diabetes (Inzucchi, 2012; Roger et al., 2011; Smith, 2014). Chronic pain is connected with costly medical care, reduced workplace productivity, economic burden and subsequently a huge impact in the QoL of the sufferers (Bekkering et al., 2011; Breivik et al., 2006)

People with SCD also have a generally reduced life expectancy; women standing at 46 years and 42 years for men (Platt et al., 1994). Aside these disadvantages, SCD has its associated stigma, since it has been shown to disproportionately affect African-Americans and minority racial groups. (Gil et al., 1992). Understandably, many African-Americans were sceptical of the methods puts in place to address SCD, including screening and counselling, due to concerns of discrimination and profiling (Treadwell et al., 2006). For instance, the 1972 Sickle Cell Anaemia Control act and related legislation required tests for SCD in premarital and preschool. This led to the U.S. Air Force implementing policies to refuse SCD patients as pilots or co-pilot and insurance companies increasing premiums for SCD patients. Ultimately, the policies were viewed as discriminatory and were reversed (Reid & Rodgers, 2007). In the case of Ghana, health sector reforms began in the 1990s with a goal of transforming Ghana to a middle-income country by 2020. The legislative changes focused on lowering children-mother mortality, continuous expansion of health care in deprived areas and creating a system that will efficiently re-orient delivery of public health care. With the adoption of the Millenium Development Goals, emphasis has been placed on child-mother health and less emphasis on chronic and non-communicable illnesses (Koduah et al., 2015).

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Holistically, the QoL of individuals refer to the biophysical, psychological, socio-cultural and spiritual aspects that exist in equilibrium. Goddard (1995; 2000) pointed out that culture has divided individuality into three distinct biophysical, psychological and social components and therefore neglected the spiritual aspect to relative obscurity. In treating and managing SCD, it appears that the role of spirituality has been overlooked and "holistic treatment" has focused on other aspects leaving SCD patients with decreased spiritual coping ability (Cooper-Effa et al., 2001). However, to enhance the QoL of SCD sufferers, there should be acceptance and application of all the factors of QoL that affect them.

Statement of the Problem

Building on Engel's biopsychosocial (BPS) model of health, Turk and Gatchel (2002) developed a multidimensional approach to understanding chronic pain commonly used to address pain associated with SCD. The model however critically ignores the person's spirituality, a failure that ignores to treat the individual holistically. Research establishes spirituality as an important element of personality and has some use in helping many chronic pain sufferers, including SCD patients with chronic pain (Taylor et al., 2013). Subsequently, Taylor et al. (2013) suggests adding a spiritual dimension to any model when addressing chronic pain for SCD.

Harrison et al. (2005) reports an association between decreased pain intensity and spirituality. In practice however, it does seem that doctors and health-care providers do not discuss spirituality with their patients in the case of serious illness even though about 85% of patients would want that discussion to occur (McCord et al., 2004). Increasingly, scholarly research has

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identified the use of spiritual coping mechanisms including meditation, worship, clerical consultations, reading scripture and listening to spiritual music as important to the management of chronic pain (Cooper-Effa et al., 2001; Dunn, 2004; Glover-Graft et al., 2007; Harrison et al., 2005; Rashiq & Dick, 2009; Rippentrop et al., 2005). Again, Anim (2015) reported that patients with sickle cell disease use specific spiritual variables such as prayer, faith/belief, consciousness of life after death, religious meeting attendance and scripture reading to cope with their disease state. Also, Dennis-Antwi (2018) also found that prayer, relying on miracle and accepting God-controlled destiny helped patients with sickle cell. Rashiq and Dick (2009) reported a correlation between the presence of spirituality or faith and decreased risk of chronic non-cancer pain. Glover-Graf et al. (2007) also stated meditation as the second most used method of handling chronic pain. This adds to the importance of spirituality in addressing chronic pain and furthers the argument on the need to incorporate spirituality in chronic pain treatment models.

Chronic pain associated with SCD can be conceptualised as a multidimensional phenomenon with varied causes having biological, psychological, social and spiritual (biopsychosocial-spiritual) roots (Anie et al., 2002; Benjamin, 2008; Cooper-Effa et al., 2001; Gil et al., 2004; Harrison et al., 2005). Indeed, the root cause of a condition ought to be a critical component and consideration in the management of the condition. The burden of living with SCD can place enormous mental and physical strain on individuals in their daily activities of living. These burdens could include social stigma which can in turn affect their psychological state and cause anger, resentment and other negative emotions. Knowing that the cause of

SCD is not only genetic but can include other factors (psychological, social), there is a need to consider the cause of a patient’s problem holistically and inculcate the elements within treatment. The biopsychosocial model has been used to explain chronic pain and how it impacts quality of life. However, it is difficult to firmly understand whether this understanding has translated into the actual treatment of chronic pain and the subsequent improvement in quality of life of patients with SCD. In furtherance of that problem, research exist regarding the utilisation of the biopsychosocial model (that is biological and psychosocial factors alone) for management of chronic pain in SCD. Subsequently, various explanations have been offered for the utilisation of the BPS model for the management of chronic pain in SCD or with a different disease (Andrasik et al., 2005; Bevers et al., 2016; Gatchel, 2004, 2007, 2013; Marcus et al., 2000).

However, research about the use of the BPS model together with a spiritual component for SCD with chronic pain is limited. For instance, Alsalman et al. (2013) researched into the effect of pain on the biopsychosocial-spiritual (BPSS) function in SCD patients. Again, Taylor et al. (2013) explored the BPSS model of chronic pain in adult SCD patients. The above study did not investigate the extent of utilisation of the BPSS model but rather described adapting the BPSS model of chronic pain in adult SCD patients and summarised results from other studies. The closest study by Nadir et al. (2018) explored the use of the biopsychosocial model in doctor-patient interaction in public hospitals within developing countries, with the aim to understand how much prominence the biopsychosocial model was given in routine consulting room interactions. This study ignored the spiritual

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dimension. Therefore, there is a need to look at the utilisation of the biopsychosocial-spiritual model as a whole.

A few QoL studies that have been done among SCD patients (Anie et al., 2002; Adzika et al., 2017; Mann-Jiles & Morris, 2009; McClish et al., 2005; Smith et al., 2005; Thomas & Taylor, 2002) reported low QoL among SCD patients. However, Meyiwa (2019) reported that patients with SCD receiving treatment at the Ghana institute of Clinical Genetics had high quality of life. Some research exists on the use of the biopsychosocial model with many diseases. Irtelli and Durbano (2020) investigate more broadly on the narrative review of the concept of the biopsychosocial paradigm and QoL. Another study investigated the biopsychosocial model and QoL among people with active epilepsy (Elliot & Richardson, 2014). Lasker et al. (2011) also examined the QoL and biopsychosocial dimensions of women suffering from primary biliary cirrhosis for those waiting for transplant and those who had received a liver transplant.

However, studies outlining the utilisation of the biopsychosocial-spiritual model in the management of challenges associated with SCD to improve the QoL among SCD patients is absent from literature. The present study therefore, investigated the utilisation of the BPSS model in improving the QoL among SCD patients.

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Purpose of the Study

The purpose of the study was to investigate the extent to which the biopsychosocial-spiritual model is applied in improving the quality of life of patients with sickle cell disease.

Research Objectives

The specific research objectives of the study were to investigate:

1. The dominant domains of the biopsychosocial-spiritual model health-care providers utilise most in the management of patients with sickle cell disease.
2. The quality of life of patients with sickle cell disease.
3. The level of spirituality of patients with sickle cell disease
4. The effect of spirituality on their quality of life.
5. The effect of the utilisation of the dimension of the biopsychosocial-spiritual model on the quality of life of patients with sickle cell disease.

Research Questions

1. What are the dominant domains of the biopsychosocial-spiritual model that health-care providers utilise most in the management of patients with sickle cell disease?
2. What is the quality of life of patients with sickle cell disease?
3. What is the level of spirituality of patients with sickle cell disease?

Research Hypotheses

1. H_1: Spirituality of patients with sickle cell disease will significantly predict their quality of life
2. H_1: Utilisation of the biopsychosocial-spiritual model will significantly relate positively with the quality of life of patients with sickle cell disease

Significance of the Study

The findings of this study will inform policymakers of clinicians' training by incorporating the spiritual aspect into the biopsychosocial model of

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health for a holistic understanding of the individual. A significant aspect of human functioning is spirituality. If incorporated into treatment it will allow both the physician and the patient to understand disease and know how to tackle the problem. This would encourage people to have a more optimistic outlook and a better QoL.

The findings of this research will give relevant knowledge to practitioners and inform hospital policy about the usefulness of incorporating the biopsychosocial-spiritual model in managing chronic pain among individuals with SCD. All potential variables influencing overall health habits are looked at in the biopsychosocial-spiritual model. Doctors will recognise that these components serve a role in a wide range of problems associated with health and disease to personal growth.

Researchers as well as clinicians will also benefit by knowing the implications of the biopsychosocial-spiritual model on the QoL among individuals with SCD. This will expand awareness across multiple jurisdictions, even beyond the field of study and outside the country of study's territorial boundaries. This will contribute to the literature on the utilisation of the biopsychosocial-spiritual model on QoL.

The findings of the study will enlighten patients with sickle cell about the need to view their disease from a broader perspective. That is, to understand their disease and its management from the biopsychosocial-spiritual perspective. Because the disease is caused by the interplay of the biopsychosocial-spiritual factors, this will enable patients to be active members of their treatment. This in turn will enhance their QoL.

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The findings of this study will inform stakeholders such as clinical health psychologists and the psychiatrist look for efficient strategies to support these people in coping with their disease state and how it can impact one's QoL positively.

The research will be relevant in providing information as to how the biopsychosocial-spiritual model can efficiently enhance the QoL of these patients. If all the aspects under the biopsychosocial-spiritual model are addressed, it is hoped that it will affect an individuals' health thereby improving an individuals' quality of life.

Delimitation

This study focused on the utilisation of the biopsychosocial-spiritual model in improving the QoL of individuals with SCD. It was restricted to SCD patients at the Ghana Institute of Clinical Genetics (GICG), Korle-Bu Teaching Hospital in Greater Accra. It was also confined to individuals with SCD from age 18 and above. It centred on investigating the extent to which the biopsychosocial-spiritual model is applied, the QoL of individuals with SCD, the level of spirituality among individuals with SCD, the impact the model has on the QoL of individuals with SCD and finally the effect spirituality has on the QoL of individuals with SCD.

Limitations

It is difficult to obtain a representative sample using convenience sampling because it is a non-probabilistic sampling technique. Hence, findings could not therefore be applied to the wider populace.

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Definition of Terms

Quality of Life: It is a measurable complex of people’s overall fitness, mental wellbeing, social interaction, personal values as well as how they relate with their environment. It is an understanding of an individual’s role within their community, ideologies and their own motivating factors including all they aspire to be, what they value, and what they hold most dear.

Biopsychosocial-Spiritual Model: This is a dynamic structure outlining the interaction between biological, psychological, social and spiritual factors and how they should impact disease conceptualisation and ultimately treatment of the disease

Spirituality: This is an intrinsic sense of relationship or interaction of people with a power greater than them or described as a feeling of being imbued with a sense of meaning in life.

Social Support: The help an individual gets from family and friends

Chronic Pain: Pain that stays outside its expected healing and has assumed a longstanding presence.

Haemoglobin: A red blood protein with a lot of iron contained in the red blood cells that is responsible for transporting oxygen in the lungs to other body parts and transporting carbon dioxide to the lungs to be breathed out.

Sickle Cell Disease (SCD): A hereditary disorder of the blood where an individual has at least one abnormal haemoglobin variant for sickle haemoglobin (S) and the other gene is for haemoglobin variants S, C or Thalassemia.

Organisation of the Study

The first chapter which is the introduction, involves the background to the study, statement of the problem, purpose of the study, research questions and hypotheses, the significance of the study, delimitations, limitations, definitions of terms and organisation of the study.

Chapter two was made up of the theoretical framework, conceptual framework as well as empirical review.

Chapter three encompassed the research methods which includes the research design, study area, population, sampling procedure, data collection instruments, data collection procedure and data processing and analysis.

The fourth chapter dealt with the results and discussions.

Finally, chapter five summarised key findings, conclusion, recommendations and areas for further research.

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CHAPTER TWO

LITERATURE REVIEW

Introduction

The chapter consist of three sections; theoretical framework, conceptual framework and review and empirical review. This chapter supports the research's theoretical underpinnings to give it a perspective from which it could examine and explain its literature and findings. The theoretical basis on which the biopsychosocial-spiritual (BPSS) model, spirituality and quality of life (QoL) associated with SCD was discussed. The conceptual structure on which the study was based was discussed in this chapter. This is to give a summarised idea of the research. In order to clarify ideas arising under the study, the conceptual review followed. In order to agree or disagree with previous findings, a comparison of earlier related works and this study was done.

Theoretical Framework

The Biopsychosocial-Spiritual Model of Chronic Pain (Taylor et al., 2013)

A well-known model for addressing chronic pain is the biopsychosocial (BPS) multidimensional model by Turk and Gatchel (2002). The BPS model was influenced by the disease and health theories (Engel, 1977; Gatchel 2004). The model was developed to provide a more holistic treatment than the reductionist model. Engel's own theories developed as a response to the heavy reliance of medical practitioners and health-care workers on the biomedical model of disease with little focus on a more holistic approach.

Engel posited the inclusion of a patient’s psychological and social factors together with the biological factors in treating illnesses. This is particularly useful for chronic pain as it helps patients to develop an understanding of their pain and give them a deeper appreciation of their pain as well as a way of coping with the support of others. The model sought to fundamentally challenge the dehumanisation of medicine and the prevalence of medical paternalism, which focused less on the patient’s own needs and could interfere with treatment success as patient’s could feel left out of their own health seeking. The result of that was a more empathic and compassionate medical fraternity with a focus on patient’s needs, wants and psychological state of mind. It was also incredibly empowering for patients as they could be aided to be at the centre and participate in managing their own chronic pain in ways that were not disruptive to their personal values and social ties (Turk & Gatchel, 2002)

The main components of the biopsychosocial (BPS) model however were restricted to the biological, psychological as well as the social factors (Gatchel, 2004; Turk & Gatchel, 2002). This meant that for all its good intentions, the BPS model had also ignored a crucial aspect of the holistic individual, their spirituality. The spiritual component was proposed by Taylor et al. (2013) to be added to the BPS model to make it even more useful for managing chronic pain. If the medical fraternity needed to expand their conceptualisation of disease treatment models to include holistic elements like

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social and psychological factors, then the spiritual domain which was very fundamental to individuals should also be included to perfect the model.

In considering chronic pain from a biological viewpoint, the mechanisms of the central and peripheral nervous systems were central to understanding and treating chronic pain. These mechanisms also partly explained the psychological components. Pain feedback interactions between the body and mind are influenced by the central and peripheral nervous system which is also closely linked to immune responses or triggers (Patel, 2013). An individual’s interpersonal milieu may influence his body and mind through interactions like environmental stressors, cultural factors, societal norms, worry and anxiety, economic distress, past trauma, unemployment, family support or alienation and activities of daily living (ADLs) (Patel, 2013). The belief that individuals are a combination of mind, body and a spirit are the foundation of spirituality and hence spirituality impacts the individual fundamentally (Astin, 1998; Holt & McClure, 2006; Sulmasy, 2002).

Increasingly, the usefulness of spirituality of individuals in their treatment has become recognised in western thinking through scholarly research (Balboni et al., 2007; Cooper-Effa et al., 2001; Grant et al., 2004; Harrison et al., 2005; Koenig, 2004; McCord et al., 2004). This includes an acknowledgement and recognition that many spiritual coping techniques are very useful in managing chronic pain. This includes meditation, worship, reading scripture, listening to religious music, religious rituals and practices like fasting, quiet time and praying (Cooper-Effa et al., 2001; Dunn, 2004; Glover-Graf et al., 2007; Harrison et al., 2005; Rashiq & Dick, 2009; Rippentrop et al., 2005). All of these spiritual techniques are components of the spiritual factors critical to conceptualising and treating individuals with chronic pain holistically. According to Senah (2004), most Ghanaians have some religious foundations. Subsequently, the practices of healing by faith is widespread within the populace. This is evident in individuals resorting to praying or relying on other demonstrations of faith for their health problems as well as an elaborate network of organizations who specialize in fostering faith healing as a practice among Ghanaians. The cure for most diseases is usually augmented by faith healing, however faith healing is often the popular resort when the etiology of the disease is assumed to be of a spiritual nature. Thus, when people feel spiritual factors predominate in the cause and even in the progression of an illness, Ghanaians tend to resort to faith healing (Nuhu, 2018). According to Osafo et al. (2015), there is a particular focus on religious rituals involving the use of special fluids, prayer and fasting among Pentecostals in Ghana as a form of faith healing without a particular emphasis on other treatments. This observation is buttressed by White (2015), who found that other forms of rituals are employed by Ghanaians of different religious persuasions to foster faith healing. These include exorcism, appeals to supernatural forces, offering of sacrifices and ceremonial cleansing.

The BPS model therefore posits that biological, cognitive, affective, social factor (Gatchel, 2004; Turk and Gatchel, 2002) and spiritual factors (Taylor et al., 2013) work together to describe an individual’s unique experience and provide a roadmap from which effective treatment can be established.

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For SCD patients, pain is an ever present and worrying phenomenon. In order to treat the individual successfully, the holistic biopsychosocial-spiritual components as well as their interactions must be explored. Solving the problem from one single factor would not be very beneficial to the patient. The main basis of the BPS model is to present a BPSS paradigm that is useful for considering the most important components of an individual that affect them and if tapped into could form the basis of enhancing the individual's QoL.

The "Gate Control" Pain Theory (Melzack and Wall, 1965)

The main proponents of this theory are Ronald Melzack and Patrick Wall who present their new hypothesis in a 1965 article titled "Pain Mechanism". It became one of the very first theories to diverge from a linear model of pain to one modulated by the spinal cord. Instead of a direct transmission of pain perception that originates in the peripheral nervous system to the central nervous system for interpretation into the sensation of pain, the theory posited the intervention of the spinal cord as an intermediary pain gateway and modulation centre prior to its travelling to the central nervous system (Melzack & Wall, 1965). The theory further posits that past experiences, affective status and cognitive process could play a role in pain modulation as part of the gate function. The theory provides a solid physiological mechanism but also inculcates a solid psychological framework, effectively setting the foundation for the explanation of the experience of pain through psychological mechanisms. For example, the gate control theory of pain explains the experience of physical pain not as only the direct consequence of physical stimulation of pain receptors but rather formed after a

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complex interaction between neurons in the spinal cord and brain stem, modulating the intensity and determining how the pain would be felt or experienced. Such structures may modulate pain to either increase the pain or decrease the feeling of the pain and since they act as a gate, opening to increase neural transmission or shutting to reduce neural transmission will lead to the interpretation of the pain. Sometimes, signals are reduced to an extent that they do not make appreciable impact on the brain due to the gate closing, and hence little to no pain is felt at all.

The nerve fibres included in the gate theory are, A-fibres, interneurons or relay neurons of the gate and C-fibres. A-fibres (A-beta fibres) are the largest with the largest diameters and most myelin, leading to faster transmission rates than C-fibres, which have smaller diameters and are unmyelinated leading to slower transmission (Nan, 2018; Uria, 2012). A-delta fibres and C-fibres all travel via the substantia gelatinosa and interact with the interneurons located within the substantia gelatinosa itself. Activation of the interneurons by larger A-beta fibres lead to an inhibitory response and a closing of the gate, meaning no pain impulses travel to the brain (Melzack & Hall, 1965). However, when small A-delta fibres and C-fibres stimulate the neurons or if the interneurons are not activated at all, there is the opening of the gate and the transmission of pain to the brain. Thus, the smaller neurons transmit impulses that lead to the opening of the gate and the experience of pain whilst the larger neurons lead to a closing of the gate and the absence of pain.

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The interplay of transmission of the large A-beta fibres and the smaller A-delta and C-fibres lead to how the gate responds. When the gate opens, pain signals travel towards the brain. If it remains closed, pain impulses are prevented from entering the brain and no pain is experienced. This physiological arrangement mechanism provides the foundation for the pain modulation at the gate. However, feedback signals from the brain may also modulate the pain responses. Melzack and Wall (1965) further posit that cognitive processes, like previous experiences of pain affect pain transmission and experience. Accordingly, in the gate control theory, motivational as well as emotional elements modulate pain through practice and learning. Therefore, the effect of pain or its experience are affected by whether an individual has experienced the pain before and how the individual’s behaviour or reaction to the pain feeling has been since then. Thus, triggers like worry, anxiety, depression and stress may manage to accentuate pain by opening the gates to allow the sensation of pain while relaxation exercises, distraction and positive feelings could help reduce the sensation of pain by closing the gate. The theory does not explain exactly how these mechanisms affect pain but help to describe how they can increase or reduce the sensation of pain. This also helps explains how individuals are able to endure significantly painful sensations through sheer willpower and offered fresh perspectives on conceptualisation of pain and how pain can be treated, paving the way for more modern concepts of pain formed, including definitions of pain.

It is now widely agreed that there is association between psychosocial and physiological processes in conceptualisation of pain (Gatchel, 2005) and

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the gate theory of pain has helped to advance the understanding of how those factors interplay theoretically in pain perception.

Gatchel (2005) posits that psychosocial factors rooted in the gate theory of pain play an influential role in pain conceptualisation in clinical settings. Helplessness, hopelessness, frustration and other negative states increase the sensation of pain through feedback signal amplification and more positive endeavours like relaxation, help to reduce the sensation of pain and "close the gate". Therefore, it does seem that a good way to address pain would be to adopt more positive coping mechanisms and healthier psychosocial states.

Before developing the theory of gate control, the sensation of pain was considered a direct reaction to the causative stimuli of pain. The gate theory became the first to indicate that psychosocial factors could have an effect on pain experiences and that led to an advancement in research and therapeutic interventions that centred on the role of the spinal cord and the brain in pain perception. Effectively, the theory brought the brain into the forefront of pain modulation as the active modulator, filter and interpreter of pain sensations. This has led to many therapeutic procedures like transcutaneous nerve stimulation (TENS), which artificially stimulates the large pain fibres to modulate pain. The gate control was a significant improvement on the very simple explanatory theories that existed and introduces a physiological and psychosocial mechanism to establish a multidimensional theory of pain.

The theory however does not describe how people feel the same pain stimuli in a plethora of ways or provide explanation as to obscure phenomena like the phantom limb pain, where there was the sensation of pain associated

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to a previously amputated or missing limb. Another criticism of the theory is that the location of the gate itself is unclear, even though the other modulatory mechanisms have been well established. The theory also assumes an organic origin of pain, even though it incorporates psychosocial mechanisms for explaining pain modulation. This makes it difficult to fully explain the phenomena of phantom limb pain. Even though psychosocial reasons can explain why a person feels pain, the absence of the limb leaves a gap in the theory which is built on a shaky stimulus-response process model. Perhaps a more mundane critic is the setting of the gate control theory in mind-body dualism, which even though progressive – has not caught on in mainstream medical thinking and the mind and the body are still considered as distinct states amidst various attempts at integration. The gate theory model however, is still a dominant pain theory and the main foundation for the BPS model of pain, performing creditably for a theory that attempted to shed new light on a misunderstood health issue.

In patients suffering from SCD, pain can start as early as childhood, leading to multiple hospital visits and a reduction in quality of life (Brandow et al., 2011; Chaturvedi & DeBaun, 2016). Aside chronic pain, patients suffering from SCD frequently go through repeated and random acute pain experiences due at least in part to some new blood vessels been blocked, known as vaso-occlusive crises (VOC). For patients with SCD, pain can lead to permanent effect in cognition and psychopathic states of depression and anxiety which can also strengthen the pain sensation through feedback mechanisms and modulations. Poor sleeping habits, smoking, drinking and a

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sedentary lifestyle might also contribute to the intensification of the feeling of pain.

The BPS theory of SCD management is closely related to the gate theory of pain. The gate theory emphasises the role of the brain in pain management and modulation and also the brain's significance in the subjective experience of pain, in modulating the emotional and cognitive states that intensify or decrease pain as well as the effect social support has on pain modulation. Theoretically, biological therapies like pharmacotherapy or drugs that interfere with pain transmission or reception of pain and surgery that aims at relieving chronic pain are all influenced by the gate control theory. Psychologically, the gate control theory is used to manage pain. The theory is seen in cognitive behavioural therapies that seek to correct the cognitive processes and behavioural mechanisms built around the gate control theory for alleviating chronic pain. These include mindfulness-based therapies, relaxation therapies and acceptance and commitment therapies. Through a reconfiguration of cognitive processes, attitudes and reaction to past feelings of pain, the sensation or experience of pain could be moulded to give less pain and hence lead to a good QoL (Iles et al., 2008).

Support system (emotional and social) are also crucial in managing chronic pain and many researchers report the need for including it in pain management (Gatchel et al., 2014; Penninx et al., 1998; Zaza & Baine, 2002). This does not only help manage chronic pain but also build up individuals cognitively and giving them a positive outlook towards life, effectively inducing better quality of life. Through psychoeducation rooted in cognitive behavioural therapies and social outreaches, the members of a society are

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taught to reduce stigmatising patients and rather accept them even as the individuals learn to accept themselves. This ultimately helps patients with SCD to effectively manage their conditions, improve communal support and integration that promotes their wellbeing and quality of life. The application of the gate theory therefore provides a framework for research into pain management and holistically considers pain conceptualisation and management as well as explaining why pain persists.

Other pain theories lay more emphasis on biological factors and posit biological explanations for causes of pain. The gate control model however inculcates biological as well as psychosocial components to explain pain in more detail and hence become a better theory for research. The gate control theory also provides support for the BPS chronic pain paradigm and posits that pain must be interpreted as an interplay of the psychosocial and biological factors.

The Integrated Theory of Quality of Life (Ventegodt et al., 2003)

The integrated theory of QoL assumes a holistic approach to understanding individuals and their wellbeing, rather than as separate biological, psychological or social elements. In this approach, subjective, objective and existential perspectives are invaluable to understanding and interacting with an individual in a clinical setting for optimum outcomes.

Subjectively, an individual assesses how good their own life is in an introspective examination of feelings and outlooks in relation to their environment (Ventegodt et al., 2003). In that estimation, extent of life satisfaction and how happy an individual is, both very subjective determinations are key to how the person may rate themselves or interpret their QoL. Objectively, an individual's QoL is rooted in other individual's expectation. This is estimated by how well an individual has lived up to societal values and norms and literally how a person fairs in other people's estimation. The ability and willingness of the person to assume these values and norms and live up to them is a key determinate of his or her QoL. An individual has good QoL if he has been able to accumulate an appreciable level of any of the indicators of wealth, success or status as defined by that particular society. For example, an American may be said to have a good objective QoL if he is living "the American dream". Existentially, humans are expected to exist peacefully with other elements in nature and also be spiritual, that is, do something intrinsically meaningful and beyond themselves. This is calibrated by how much attention an individual pays towards the spiritual or divine and how much the individual is aware of and coexists with nature. In effect, to lead a good QoL, an individual must satisfy biological as well as personal needs, live in a societal framework successfully and have a strong meaningful connection to some pursuit above themselves.

In this study, the quality of life is calculated subjectively, since the experience of chronic pain in SCD is more subjective as well as differ from individuals both in incidence and intensity. Physical, psychological as well as social factors, are the fields of QoL that would be examined. Understanding the QoL of individual's with SCD is critical as these variables can collectively impact their wellbeing and disease outcomes.

The integrative concept of quality of life is useful for health-care providers since it helps to treat patients holistically and maintain good satisfaction with life. It offers different theoretical perspectives on the individual that together provide a very informed framework upon which patient care may be based. These include concepts of well-being, life satisfaction, happiness, purpose in life, self-actualisation, fulfilment of needs and some objective factors (Ventegodt et al., 2003). Well-being touches on self-development, subjective feelings and an advancement in life as compared to others. How an individual assesses their emotional states, depression, anxiety, sleep, coping and somatic symptoms reflect their well-being. For patients with SCD, a comprehensive well-being assessment is important to understanding their general wellbeing and also their treatment outcomes. This is equally important in assessing chronic pain associated with patients with SCD. Happiness is another element in the integrative concept of QoL. Satisfaction in life is a state of mind and a cognitive entity (Ventegodt et al., 2003). This is reflected in how an individual's hopes and aspirations manifest. This is a reflection of the collective decisions a person has made and how their capabilities, life goals and plans have come together to create their current state. It is usually a good balance between how one expects or understands life to be and how it really is or has been for them.

With a proper foundation in happiness in life, clinicians can focus on helping patients with SCD to set and achieve practical targets and find a good balance between their condition and the realities of life. For example, they cannot be expected to be as physically active as everyone else but can be happy that they are living with less pain day by day. This is achieved through constant feedback mechanisms of reassurance, reward and praise at the attainment of good milestones since the crises they undergo can be a torturing experience. Aside simply finding a way to be content, other concepts such as purpose in life, satisfaction and biological perspectives are crucial to assessing an individual’s QoL. Individuals need not only to be pleased or cheerful to be happy but to have a deep-rooted desire to pursue the intrinsically meaningful. It includes the closeness to nature and factors beyond the individual but at its core, lie the fulfilment of fundamental needs of belongingness and love without necessarily involving wealth status or some more objective determinations. This state of happiness transcends the biological and psychosocial and reaches the spiritual. It is a fundamental pursuit of many religions as a state of accomplishment and essentially focuses on what is meaningful in life. In Christianity, the essence of life is to love God whilst for Hindus, that is the pursuit of oneness with the world. However, the Buddhist seek a truly meaningful state of emptiness and unity with the world.

The biological aspect is however very important in the case of SCD. After all, human beings are collection of cells that interact and exchange information to create a distinct individual in a profound sense. The code for humanity is intrinsically woven into the framework of our cells, in our very own DNA. Understandably, life from a biological perspective is a careful balance of order in said information and the way it transmits. Proper functioning is achieved by how efficiently this system runs and quality of life lying in how well the system is balanced to operate in an optimal manner. Many of our interpretation even of the transcendent are rooted in this system. A classic example is consciousness, which is possible because the cells of the body have assembled to communicate to create the possibility of an awakening and the endless possibilities afterwards. That means that when there is a defect in either how the cells assemble or communicate, their ability

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to assemble or produce collective states of consciousness is heavily compromised. It is possible therefore to draw a correlation between the existential core of a person and their quality of life and situate that connection deep within the human being and not on superficial feelings. Towards that end, purpose in life and the biological perspective seem to align (Ventegodt, 1994; Ventegodt & Merrick, 2013). Individuals who live without any meaning in life is one who gradually loses that connection and become vulnerable, seemingly idiopathically, to the influence of diseases that pertain to their wellbeing and QoL. The connection that exist between QoL and disease therefore seem to be best demonstrated by inculcating an individual’s theory as an interconnected biological system of knowledge.

SCD is comorbid with many disease states like anxiety, depression, suicidal ideation and chronic pain. It seems therefore that by viewing quality of life through an eclectic perspective, research becomes more meaningful and holistic.

Conceptual Review

The Concept of Sickle Cell Disease

SCD can be defined as a cluster of closely related disorders of the blood, referred to as haemoglobinopathies or disorders affecting haemoglobin-a major blood protein, and SCD is one of the many. In SCD, there is the presence of haemoglobin S protein which is a defective protein variant of the main protein located within red blood cells, which carry oxygen throughout the body (Gold et al., 2008). In low oxygen states, the red blood cells assume the shape of a sickle like a (“C”) and become inflexible. This causes them to cluster together and block tiny blood vessels which can cause severe pain especially in the extremities. These “sickle cell crises” event usually require immediate hospitalisation and affect the patient socially. For example, school children have to be absent from school for long durations (Helps et al., 2003; Wagner et al., 2004). This leads to an estimated absence of six to eight school weeks annually. They may have to repeat school years more than once as a consequence (Shapiro et al., 1995). For adults, chronic pain in SCD affect job performance and productivity leading to financial difficulties (Idowu et al., 2013). Also, patients suffering from SCD are at risk of bone underdevelopment and injury due to the prolonged blocking of blood flow (Ahmed, 2011). Other health related challenges include chronic organ failure or damage, stunted growth, neurological damage, strokes and cognitive impairments. Even children with less serious SCD types are about three to four times more likely than children without SCD to suffer neurological problems (Ballas et al., 2010). SCD can lead to increased risk of pneumococcal infection, life-threatening anaemia, delayed puberty and damages to the spleen (Nickel & Hsu, 2016). Priapism is another serious complication of SCD (Chinegwundoh et al., 2020). Priapism happens in SCD when occlusion occurs in the veins. This blockage causes venostasis or the cessation of blood circulation in the penis and subsequently leads to lower oxygen supply with attendant pain. Repeated occurrence or prolonged occurrence may lead to more pain and permanent injury which could affect erection (Chinegwundoh et al., 2020). Priapism is more severe among SCD patient because of the impaired biological correction of erections. With venostasis and pressure on the sickle cells, they burst and release free haemoglobin which tends to affect nitric oxide levels, reducing them. With low nitric oxide levels, the muscles responsible for stopping erections are not able to function properly (Retzler, 2019). Hence those with priapism face unwanted erections. Usually, it is very painful and the pain may be found at other places (Ballas et al., 2012). Priapism may typically last for 1 or 2 hours. Some people experience it less frequently, sometimes just once whilst others experience it more frequently like every week (Ogu et al., 2021).

SCD is transferred from parents to children. A child can inherit the sickle cell trait if at least one parent is a carrier (Derebail et al., 2017). In that way, a person may inherit a normal "A" gene from one parent and a SCD gene from the other. Those with the trait may live a relatively easier life than those with SCD. However, their children may inherit their abnormal "S" genes. If both parents are carriers, then a child may inherent abnormal genes from both parents and hence develop SCD. The commonest phenotypes of SCD are HbSS, HbSC, HbS beta thalassemia (Derebail et al., 2017).

Those with HbSS inherit an abnormal "S" gene from both parents. Those with HbSC inherit an abnormal "S" gene from one parent and another type of abnormal "C" gene from the other parent. Those with HbS beta thalassemia tend to have, in addition to the abnormal "S" gene an abnormal beta thalassemia trait. Those with HbSC usually do not have as severe disease as those with HbSS. The beta thalassemia traits are further differentiated into "o" and "+" and those with HbS beta thalassemia tend to also have milder forms of the disease. Other types of SCD include HbSD, HbSE and HbSO (Derebail et al., 2017). These are inherited when abnormal "S" genes are inherited together with "D", "E" or "O" genes with differing severity of SCD.

The Concept of Chronic Pain

According to Koestler and Myers (2002), chronic pain refers to pain that lasts more at least six months. This pain usually has not been responsive to conventional treatment options available or has been deemed idiopathic. Also, pain that exceeds one month above the normal cause for an acute illness or within a reasonable period for the healing of an injury is deemed as chronic pain. Koestler and Myers further posit that chronic pain may be a result of a chronic pathological process that leads to constant pain or may be the result of recurrent pain that lasts for many months or years at a time. Since such pain can seriously impact daily living, the therapeutic intervention of choice is not to diagnose or treat it but to recover or minimise the negative impacts of the conditions and enhance a person's QoL. This is because as opposed to acute pain, which may be helpful in warning an individual of an injury or some other damage, chronic pain is no more a symptom but the problem itself. Even though much research has gone into understanding the underlying mechanisms of chronic pain including neurophysiological, anatomical and chemical causes of chronic pain, it is the opinion of Koestler and Myers that much remains to be known about chronic pain as there exists many cases of chronic pain for which the cause is unknown making it a separate pathology of concern unresponsive to the treatment of other recognised pathologies.

Chronic pain may originate or be situated in the body and does not easily respond to treatment. According to epidemiological studies, 8 - 11.2% of people across the globe suffer from chronic generalised pain (Andrew et al., 2018). A person's genetics, their body weight, type of work done, presence of stressful environment and other modifiable risk factors are important risk factors for chronic pain. Chronic pain however, has not been proven to be preventable, in general. However, many non-opioid medications are first prescribed to treat chronic pain (Tauben, 2015; Welsch, 2015). Opioid medications are used to treat chronic pain but come with their own issues (Chou et al., 2015). Psychotherapies like cognitive behavioural therapy (CBT) and acceptance and commitment therapy (ACT) are useful in enhancing the QoL of sufferers of chronic pain. Chronic pain may be reduced by modifying some lifestyle habits and inculcating better habits like sleeping well, eating well and doing physical exercises (Arranz et al., 2014; Malfliet et al., 2019). Stress, which can have a great influence on the development and severity of chronic pain can be managed through stress reduction activities like meditation (Ramasubrammanian, 2017; Woods-Giscombe & Gaylord, 2014).

A good night's sleep is invaluable for general quality health. Poor sleep may cause exacerbation in the feeling of chronic pain (Magee & Hale, 2012). Within the first decade of experiencing chronic pain, the dangers to one's health largely increase due to cardiovascular and respiratory disease. The sensation of pain and its intensity are impacted by whether sufferers have sufficient support from people around them (Tauben, 2015; Welsch et al., 2015).

Chronic pain can be conceptualised as nociceptive or neuropathic pain. Nociceptive pain can be defined as one occasioned by the activation of pain receptors when a tissue is damaged. Neuropathic pain is as a result of a nervous system malfunction rather than the presence of an actual external physical pain stimulus. When pain receptors on the skin or other superficial tissues like mucous membranes are stimulated, it leads to a superficial, nociceptive pain feeling. Nociceptive pain is classified into deep (somatic and visceral) and superficial pain. Deep somatic pain occurs when pain receptors associated with bones, tendons, ligaments, blood vessels and muscles are stimulated. Visceral deep pain occurs when pain receptors associated with internal organs are stimulated. For example, pain in the abdomen due to damage to the appendix. Visceral pain can be difficult to localise, as some organs produce "referred" pain when they are damaged and the pain sensation is felt in another region other than where the pain is originating. Neuropathic pain can either be peripheral referring to pain originating in neurons of the peripheral nervous system and central referring to pain coming from neurons of the brain and spinal cord. "Pins and needles", "stabbing pains", tingling and burning pain are usually associated with peripheral neuropathic pain (Paice, 2003).

When managed effectively rather than left alone, chronic pain can reduce. Different strategies are effective for different people. The complications associated with chronic pain may include psychogenic issues like depression and anxiety and other negative emotional states.

The Concept of Quality of Life

The concept of Quality of life (QoL) is one that has existed in medical terminology for a while, right from the times the World Health Organisation's (WHO) in 1949 included it in the definition of health to the 1970s when it was more conceptualized in medical literature. QoL has been defined as the way individuals experience their life with regards to what they goal they set and their metrics for life (WHO, 1996). Associated with that conceptualization is

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the idea that QoL is affected by physical, psychological and social factors including the person's inner make as well as the environment.

Many researchers in different areas approach the concept of QoL differently (Tsakiri, 2010). In psychology, it is used both objectively and subjectively (Sores & Peto, 2015). Objectively, QoL is measured by using quantitative measures and patients can subjectively score themselves (Rutt, 2006; Sores & Peto, 2015). In the long run, how much a person earns monthly can be scored objectively, but how much happier the person is, is more of a subjective evaluation (Rutt, 2006). A person's subjective judgement comes from how they score their own experiences overall in relation to what is relevant to them (Amao, 2014; Tsakiri, 2010). A person's QoL is the degree to which a person considers how well they have satisfied their needs and wants both mentally and physically. Hence quality of life is a reflection of how happy or unhappy a person is, which are driven by both external and internal factors (Salvador Carulla et al., 2014). The external factors are provided by socially mandated institutions (Sores & Peto, 2015; Tesch-Roemer, 2012) and they include education, healthcare, transportation and financial services (Salvador Carulla et al., 2014). That means that when an individual earns a high income, is healthy, has good social support services, has access to great transportation and education, they can objectively be deemed as having a high QoL (Tesch-Roemer, 2012). The internal factors come from within the individual including meaning, power and resilience (Rutt, 2006; Salvador Carulla et al., 2014). In that context, individuals may have positive or negative QoL (Salvador-Carulla et al., 2014). For example, individuals with optimistic

QoL have positive QoL and stronger attitudes that help them to meet the difficulties of existence (Rutt, 2006; Sores & Peto, 2015).

According to Peto (2015), QoL is made up of the difference between the real state of a person and what the person desires. That is, QoL is related to the personal satisfaction a person feels which he is able to attach to the physical, psychosocial and spiritual aspects of the person. Disabilities in activities of daily living are caused by reduction in quality of health and reduced mobility which generally leads to poor QoL. The wider the difference between the expected life situation and what is actually experienced, the worse the QoL.

In literature, QoL can be viewed from four separate areas: the physical aspects, the psychological components, societal factors and the external context of the individual (WHOQOL Group, 1995). QoL physical health is defined as how individuals perceive their motor skill capacities (WHOQOL Group, 1995). QoL social relations refer to the feeling of joy individuals attain from social interactions (WHOQOL Group, 1998). QoL environmental health is viewed as a person's perception of their contribution to protection of environmental resources (WHOQOL Group, 1995). Psychological wellbeing QoL is seen as how a person feels about their life, whether good or bad (WHOQOL Group, 1995). Perceived QoL refers to how individuals conceive themselves and others in the context of culture (WHOQOL Group, 1995).

The Concept of the Biopsychosocial-Spiritual Model

Building on the BPS model, the biopsychosocial-spiritual (BPSS) model is a more holistic approach, integrating even broader aspects of the individual into disease conceptualisation and treatment. It reiterates existing theoretical knowledge about the importance of spirituality to an individual, and successfully integrates it into a sound theoretical framework. In essence, the model accurately conveys the WHO’s definition of health in its totality. This approach helps to diagnose, understand, manage and even treat chronic pain that has lifestyle origins (SAMHSA, 2013).

Engel’s BPS paradigm proposed in 1977 (Engel, 1977) firstly tackled the expansion of the reductionist biomedical disease model available for much of modern history. The inculcation of the biopsychosocial aspects of disease conceptualisation as well as treatment was useful in harmonising important concepts in psychology, philosophy and sociology to aid the individual and health-care providers alike. The model’s clinical applications were proven three years afterwards (Engel, 1981) and it quickly became mainstay in understanding and treating a range of disease conditions like cerebral palsy, depression and inflammatory bowel syndrome (Campbell et al., 2003; Halpert & Drossman, 2005). The validity of the model is not in doubt, according to Brody (1990), who confirms their strong track record. Family physicians for example have been trained based on this model.

Biological factors that are inclusive in the biological dimension include disorders that represent changes in the body physiologically. Organ damage like brain damage, kidney and liver failure and motor system failure are examples of these changes. Psychological factors that are imbedded in the psychological dimension include feelings, behaviours and cognition. They deal with how those factors influence disease prognosis and treatment outcomes. Specifically, a person’s personality or temperament, their motivational framework and their coping ability are significant factors that aid in disease conceptualisation and treatment.

The social dimension includes societal factors that have an impact on understanding of underlying conditions. These include social support factors like presence of family, peer group influence, cultural and economic factors.

The spiritual dimension also includes religious affiliation, attachment to objects of worship, search for deeper meaning in life, spiritual support services, rituals, meditation and reading scriptures. These are all related to the SCD condition. The biopsychosocial-spiritual model would evaluate the disease, the person's state of mind, emotions, cognitive and behavioural factors, social support, cultural norms and values and finally the person's intrinsic spiritual and religious resources. In SCD, long-term pain management is an ever-present issue. If the person's social support or condition encourages excessive use of opioid drugs as a solution, then addiction become a possible side effect that is not ideal for the patient. However, with a reassuring and supportive family that helps the patient to monitor their opioid use, the patient can have their pain relieved without developing addiction. The same applies for their psychological state of mind. When each of the dimensions are weighted properly, they can become of great help to the patient.

There is increasing evidence for the revision of the BPS model to include spirituality (Doolittle & Farrell, 2004). The impact of religion and spirituality cannot be overstated since it impacts heavily on health seeking and health promoting behaviour, personal mind-set and ultimately their QoL (Flannelly et al., 2004; Koeing, 2012). Brady et al. (2000) concluded that spirituality was correlated with QoL in cancer patients to a similar level as

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their physical wellbeing. The European Academy of Teaching in General Practice (EURACT), a key stakeholder in healthcare issues preaches holism which is conceptually consistent with the BPSS model (Freeman, 2005). Again, recently, the Diagnostic and Statistical Manual of Mental Disorders (DSM) has required "religious impairment" to be included as a key criterion for the diagnosis of "clinically important impairment". This criterion is important to the diagnosis of well-known psychopathological disorders even including an inability to attain certain spiritual states (Hathaway, 2003).

Empirical Review

Utilisation of the Biopsychosocial-spiritual Model in the Management of SCD Patients

Nadir et al.'s (2018) investigation of the use of the BPS model in health-giving relationships of doctors with patients in public hospitals within developing countries, with the aim to understand how much prominence the biopsychosocial model was given in routine consulting room interaction ignored the spiritual dimension. The findings of the study identified that the BPS was not regarded or given much significance in normal history taking processes of a physician consultation process. It was rather physician centred and paternalistic. Patients also did not mind whether they got a holistic treatment conceptualisation if they got better. The researchers suggested further scientific enquiry into whether treatment outcomes and medical compliance were significantly influenced by the lack of use of the BPS model and whether the BPS was a feasible model for use in third world health systems.

Similarly, Kusnanto et al. (2018) found that the biomedical model was the dominant model used even though research about the BPS model had successfully proven its usefulness in chronic disease and disorders. Even though they contended that the model was a very significant model for primary care physicians, they suggested that it is seen as being impractical or difficult to implement. The findings of the review identified a slow rate of research about the BPS, and how the application in clinical settings was not widespread. Much workload and a lack of experience were further factors that were identified to impede on the application of the BPS. If applied though, the research concluded that the BPS model allowed primary physicians to inculcate the holistic make-up of a person in the treatment and conceptualisation of diseases in order to better promote the wellbeing of the patient.

Currently, holistic treatment like the BPSS has been stated as useful for health care delivery. However, the above studies ignored the spiritual dimension of the biopsychosocial-spiritual model. This study seeks to address the spiritual model in addition to the three components. Majority of scholarly attention has focused on the western world and parts of the east however no known literature of this phenomenon with regards to Africa, specifically Ghana. This exposes a research gap

The Quality of Life of Patient with Sickle Cell Disease.

Hadi et al.'s (2019) comparative mixed method research, investigated the effect of chronic pain on individuals' QoL. The participants reported significantly lower QoL as compared to the general population and patients with long term medical conditions. The study concluded that the impact of chronic pain on the patients led to poorer QoL as compared to the general population and even other individuals with long term conditions. Similarly, Freitas et al. (2018) found that a reduced QoL and poor treatment adherence were the consequence of the repeated events of pain in patients with SCD. The study reported lower QoL scores for SCD patients suffering from chronic pain than the general population.

In the same vain, Andong (2017) found out that age and chronic complications were autonomously correlated to lower quality of life scores in individuals with chronic pain in SCD. The research concluded that chronic complications in patients with SCD are common and subsequently they report very low QoL scores. The study recommended national SCD management strategies including screening of new-borns to identify and manage complications. Again, Pereira et al. (2013) in his study found that, chronic pain crises, hospitalisations, blood transfusions and comorbidities had significant impact on the QoL of patients. A major impediment to finding a job was having SCD with associated low income and unemployment as a result. The study concluded that the evaluation of QoL in clinical setting was a major deciding factor for health. Moreover, Menezes et al. (2013) found that the patient's PedsQoL scores were substantially lower in the control group than in the test group. The study concluded that the QoL of adolescents as well as their relatives are affected by SCD and patients face significant challenges in mental, social, family and physical constraints. Also, Mann-Jiles and Morris (2009) found out in their study that, patients with SCD had low QoL. The study recommended further enquiry to understand the effect of QoL in adults with SCD.

From the above studies, patient’s recording low QoL could be due to lack of social support, chronic pain crises, clinical setting, unemployment and comorbid disease. If an individual’s life is enhanced, their quality of life can improve. Majority of research interest has centred on the west and some parts of the east exposing a geographical gap with respect to studies in Africa. Hence, a gap to be filled.

The Level of Spirituality among Patients with Sickle Cell Disease.

Fradelos (2021) explored spiritual well-being and its associated conditions of patients experiencing the progressed stages of kidney diseases. Results showed that patients had a satisfactory spiritual well-being. They concluded that patients with end-stage renal disease reported moderate to high spirituality. Similarly, a study by Harrison et al. (2005) explored spirituality and pain in SCD patients. They used fifty SCD patients and discovered that church attendance was linked to pain and the lowest pain scores were seen in people who went to church once or more each week. The study further showed that rituals involving prayer, bible study and religiosity intrinsic to individuals were not shown to be substantially associated to pain. They concluded that patients with sickle cell reported that high religious participation is likely to have a substantial impact in reducing pain. In the same vain, Cooper-Effa et al. (2001) examined the role of spirituality in individuals with SCD. The study found spirituality and religiosity to be high in the study population but the impact of these sentiments on dealing with SCD was mixed. Patients recording high spirituality mean that, patients understood the true concept of what spirituality really is and saw the essence of spirituality as significant in their day-to-day activity.

The definition of spirituality and religiosity have been a problem were researchers do not give a clear distinction as to what religiosity or spirituality is. Studies reviewed under this research question explain religiosity as spirituality and vice versa. These conflict do not give clarity about what the researcher seeks to measure. As a result, one cannot say spirituality or religiosity was measured. This study seek to give the true definition and measure of spirituality. Again, these studies were in the context of America and Asia. There is a need to look at the level of spirituality in the African context.

Spirituality and Quality of Life

Abou et al. (2018) found an association between patients with higher overall FACIT scores and improved cognitive and emotional states. In patients with improved global health status and QoL, the FACIT scores were also found to be high. Anxiety and depression were found to significantly correlate with the spiritual variables. The conclusion of the study was that spirituality of cancer patients could significantly improve their QoL and reduce anxiety and depression levels. The finding of the study point to the need to inculcate spirituality in disease treatment and conceptualisation. Correspondingly, Clayton-Jones and Haglund (2016) examined how religiosity and spirituality impacted on the lives of SCD sufferers. Analysis of the paper identified four themes: Spirituality/ religiosity as a coping mechanism, as a means of pain control, as a factor affecting health seeking/ use of health-care resources and as a factor that improves QoL. The conclusion of the study was that spirituality/ religiosity may be invaluable in the coping of patients living with SCD, help reduce hospitalisations and improve patients’ QoL. Also, Wang et

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al. (2008) in their study found both mental health and physical health to be positively correlated to spirituality with a greater correlation between general mental health and spirituality than physical health. Spirituality was also found to correlate with vision-specific HRQoL. The findings indicate that multiple HRQoL domains significantly correlated with spirituality. Furthermore, spirituality may have a significant role to play adapting to senile vision loss among elderly Chinese adults with vision impairments. In addition, other studies have reported positive effect on quality of life (Canada et al., 2015; Currier et al., 2016; Krause et al., 2015; Krumrei et al., 2013; Lee et al., 2014; Moon & Kim, 2013; Nolan et al., 2012; Puchalski, 2012).

However, Yun et al. (2013) showed that individuals who utilised prayers, meditation, yoga and music therapy had a significant decrease in their QoL as compared to those who did not utilise them. Similarly a study by Levin (2012) reported an inverse relationship between prayers and QoL. This means that prayers negatively impacted QoL.

Even though most of the research works done concluded that there is a positive impact of spirituality on QoL, contrary to the above, some researchers also argue that there is an inverse relationship. These conflicting results make it difficult to conclude that spirituality has an effect on QoL. Most of the research was done in other continents with little to no knowledge about the effect of spirituality on the QoL of individuals in Africa as well as Ghana specifically.

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Effect of the Biopsychosocial-spiritual Model Utilisation on Quality of Life.

LaRocca and Scogin (2015) found that the influence of therapy on QoL was moderated by pre-treatment satisfaction with social support and subsequent improvement in satisfaction. The findings point out to the influence of CBT on QoL. Similarly, other studies have shown that psychotherapy have effect on QoL (Anderson & Ozakinci, 2018; Anie, 2005; de la Torre-Luque et al., 2016). These studies reported improved quality of life among individuals.

Costa et al. (2012) investigated the impact of social care on the QoL of multiple sclerosis victims. The study showed that social support significantly predicts the health-related QoL among persons with multiple sclerosis. Again, Sehlo and Kamfar (2015) revealed that higher parental support leads to good QoL. Contrary to the above studies, Pallant and Himmel (2018) found a negative impact of social support on the QoL of participants.

LeBlanc et al. (2015) investigated the effect of biological interventions on the health-related QoL of patients with ulcerative colitis. The findings of the study indicate that biologics have the ability to enhance health-related quality of life. Also, a systematic review of literature by Vis et al. (2020) investigated how medication impacted QoL and fatigue of people with sarcoidosis. The study suggests that there is potential for improvement in health-related QoL and fatigue among individuals treated but not yet stable. Similarly, (de Azevedo Cardoso et al., 2014; de Lyra et al., 2007; Katz, 2002) conducted a systematic review and concluded that pharmacological treatment improved QoL. Nevertheless, Barre et al. (2015) indicated that even though medical intervention helped in stress management among cancer patients, it was not effective in reducing stress to a manageable level and providing optimal QoL improvement. They concluded that there is a need to incorporate psychological interventions in the treatment of stress as well as optimise the QoL of cancer individuals.

Ahmadi and Noormohammadi, (2017) sought to find out how spiritual practice impacts on the QoL of cancer patients. The results showed that the effect of spiritual teaching on QoL was not significant. This means that spiritual teachings did not enhance the cancer patients’ QoL. However, some studies have shown the significance of spirituality in dealing with general health. According to Ghezeiseflo and Esbati (2013) spirituality may not only affect mental health and temperaments but can also affect physical conditions. Again, spirituality promotes the ability to deal with disease and speed up recovery. A study by (Allahbakhshian et al., 2010; Hamid et al., 2011; Saffari et al., 2013) also demonstrated the correlation between spiritual health as well as QoL among different population. The findings indicated that spiritual health is significantly correlated with QoL.

Studies under this research hypothesis looked at each component on the QoL of individuals and they report either an inverse, positive or non-significant correlation with each component on QoL. This becomes difficult to draw a conclusion that the biopsychosocial-spiritual model either affect or do not affect patient’s QoL. To conclude on how effective the biopsychosocial-spiritual model is, there is a need to combine the model and find out its effectiveness on individual’s QoL. Hence this research hypothesis seeks to address that.

Conceptual Framework

The conceptual framework simply describes how latent variables are related. In this study, there are five exogenous (independent) variables and an endogenous (dependent) variable. The exogenous variables are the biological (genetics and medical information), psychological (depression, anxiety and stress), social (social support, patient-provider relation and activity of daily living), spiritual (relationship with God and sense of purpose) and spirituality. The endogenous factor is QoL. In this study, the researcher sought to explore the role the biopsychosocial-spiritual model has with regards to QoL, as well as how spirituality affects the patient's quality of life. Below is a diagrammatic representation of the study's conceptual framework (figure 1).

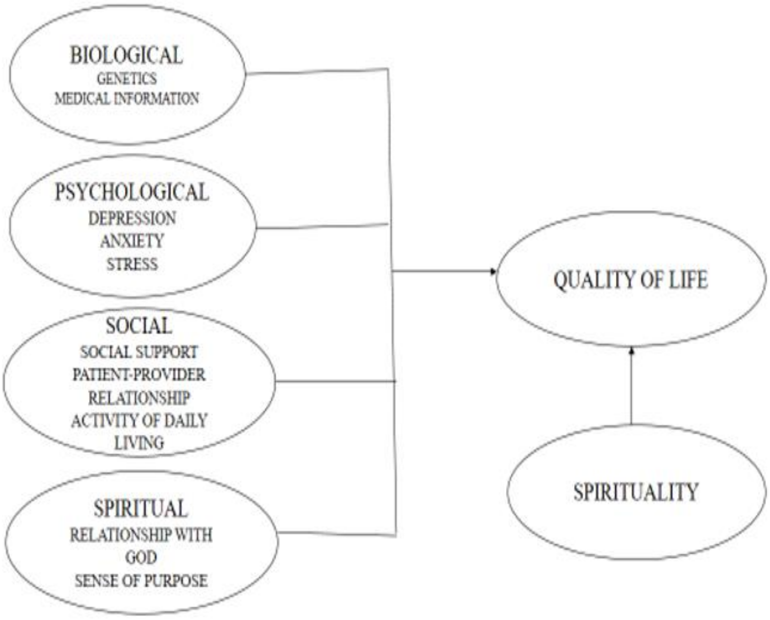

Figure 1: Conceptual Framework

Summary of Literature Review

This chapter reviewed three theories; the biopsychosocial-spiritual model, the gate control theory of pain as well as the integrated model of quality of life. It further discussed the concepts into details and presented a framework to support the study. Lastly, previous research under the utilisation of the biopsychosocial-spiritual model on QoL was reviewed. Studies supporting the utilisation of the biopsychosocial-spiritual model, level of quality of life, level of spirituality, spirituality on QoL and biopsychosocial-spiritual on QoL was also reviewed. Studies reviewed showed that the most dominant component utilised was the biological domain and that individual's reported low quality of life. Again, researchers explain religiosity to mean spirituality and vice versa making it difficult to understand what is truly measured. Furthermore, most studies showed that spirituality had influence on patient's QoL. Most of these studies were done in Asia, America and Europe leaving little to know information about the situation in Africa, specifically, Ghana. Moreover, studies available found the impact of each component under the BPSS model on the QoL without taking the whole model into consideration. Results and implications of the findings will be used to inform policy-makers and practitioners about the importance and incorporation of the biopsychosocial-spiritual model in health practice. It will also help significant authorities to train health-care providers using the biopsychosocial-spiritual model.

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CHAPTER THREE

RESEARCH METHODS

Introduction

This current study is about the utilisation of the biopsychosocial-spiritual model in improving the QoL of individuals with SCD. This chapter describes the study's appropriate research design and also the study field, population, sampling procedures, data collection instruments, data collection procedures, data processing and analysis, and the summary of the chapter.

Research Paradigm

Park et al. (2020) explains research paradigm as employing scientific principles to guide the discovery of scientific knowledge. The quality of results of such enquiry is supported by the basic assumptions embedded in the specific research paradigm used (Park et al., 2020). This would help the researchers identify and better situate results in their appropriate place among gaps in literature and knowledge. In line with this understanding, this study employed the hypothetico-deductive method. It is a circular process utilised from theories in literature. It firstly creates a testable hypothesis. Then by operationalisation of variable, a research experiment is designed. Next, the experiment is done and the results of the study used to better understand the theory and contribute to existing literature (Duberley et al., 2012; Holmes, 2018). These processes, from extraction of existing theory to an expansion of the theories fulfils the circular process (Duberley et al., 2012). The findings from the empirical research may enrich a theory, either refining it or

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expanding it (for example, a hypothesis that supports the effectiveness of a biopsychosocial-spiritual model can help inform and refine theory). Usually, the results of the testing of the hypothesis is quantitatively reported and exploration is done on functional relationships between causal and explanatory factors called independent variable and the results of such manipulations, the dependent variables. It is not always the case though, as positivist analysis do not always utilise quantitative experimentation. De Villiers et al. (2019) explain how experimental research involving the effects of an intervention by qualitative examination, is well within the limits of the positivist model. Primarily, the positivist investigation is supposed to explore possible explanatory correlational or causal relationships that can lead to the prediction or regulation of the particular phenomenon (Gergen, 2014).

Research Approach

The study adopted a quantitative research methodology. This involves defining a particular phenomenon across a population, giving the researcher the ability to generalise findings. Usually, deductive reasoning is utilised in quantitative research. Here, a researcher would start with a hypothesis, gather data and then analyse it to understand if the hypotheses can be supported (Ponterotto, 2005).

With quantitative analysis, numbers in variable form are required. Variables are a way of estimating a feature that has more than one value (Ponterotto, 2005). Many features are variable as well as numbers by their nature (age or height). The numbers are representative of the sum total of the features that they represent. Other non-numerical features are also important to researchers such as gender, spirituality and educational status. However, in

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quantitative analysis, numerical values are used to represent these for analysis even though unlike the "true numerical data", they do not represent the summation of the features under review. For example, if a variable, say gender is coded as female = 1 and male = 2, it does not mean that twice of female characteristic make males. Therefore, variables may be grouped into numerical and categorical variables.

Quantitative data can be obtained in several forms (Ponterotto, 2005). They can be obtained objectively such as in a laboratory setting or be obtained subjectively from participants through means such as self-reporting. Quantitative data gathering utilise questionnaire to gather data from participants including socio demographic variables, perceptions and many others.

Research Design

The study used the descriptive survey design, which involves gathering specific and correct data on the status of variables and to aid the inference of generalisations from the data (Mugenda & Mugenda, 1999). According to De Vos et al. (2012), the descriptive survey research is usually employed as precursor for designs of quantitative research. This method entails collecting data to explain current events by examining the type and degree of the concept (Lokesh, 1997). This present research elaborates on the utilisation of the BPSS model and how the application of the model affects the QoL of SCD individuals, using a set of standardised questionnaires to obtain information from the selected respondents.

Gay (1992) opined that descriptive research design investigates the way things are and reports them. This study did not manipulate any variable

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but reported directly the application of the BPSS model and how it impacts the quality of life. The descriptive survey will be used since it involves the investigation of the relationships that exist (Best & Khan, 1995) without manipulating any of the variables. Descriptive survey allows data to be gathered cheaply and quickly from a large group of people (Ary et al., 2002). Again, since the study intended to examine the utilisation of the BPSS model on QoL, the design selected is appropriate.

The design allows variables to be operationalised very accurately to enable the results to be replicated. It also allows researchers the chance to sample a population and make generalisations (Ary et al., 1990; Gay, 1992). Some limitations of the design include the requirement of variable operationalisation prior to the development of measurement criteria. The descriptive survey also requires a certain number of responses before meaningful analysis and inferences can be made (Fraenkel & Wallen, 2000). Regardless of the challenges associated with using the descriptive survey, its enormous strengths in generalisation and the myriad of way it allows data to be collected and examined makes it advantageous for the researcher to select for this study. The researcher adopted various interventions to help mitigate these challenges.

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Study Area

The study was conducted in Greater Accra and has a total land area of 87.13 sq. mi. Accra is Africa’s 13th largest metropolitan area. The city is divided into 12 districts, including the Accra metropolitan district itself and 11 municipal districts. Typically, “Accra” refers generally to the Accra Metropolitan Area, while the district controlled by the Accra Metropolitan

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Assembly is known as the “City of Accra”. However, “Accra” and “capital of Accra” are usually used to refer to the same place. The north of the city is bordered by the University of Ghana’s Great Hall, its southern border by the Gulf of Guinea, its eastern border by the Nautical College and its western border by the Mallam junction and Lafa Stream collectively (Assembly, 2021).

Various health facilities serve the myriad of people in the metropolis. These include the Korle-Bu Teaching Hospital (KBTH), La General Hospital, LEKMA Hospital, Accra Psychiatry Hospital and many more. The KBTH is a research and referral hospital. It is also the only teaching hospital in Accra.

The KBTH has about 2,000 bed capacity with 17 clinical and diagnostic departments and units. About 1,500 people attend the hospital on the average and averagely 250 people are admitted every day (Agyei-Nkansah, 2019). The clinical departments include Internal Medicine, Polyclinic, Anaesthesia, Accident Centre, Child Health, Haematology, Radiology, Surgical and Medical Emergency, Pharmacy, Obstetrics and Gynaecology, just to mention a few. Banking, engineering and general administration are other departments in the hospital. The department of haematology houses the Ghana Institute of Clinical Genetics. It was founded in 1974 and offers comprehensive outpatient support and treatment to adult and adolescent individuals with SCD together with the provision of community education and research (Dennis et al., 2008; Sackey, 2016).

Population

A total collection of individuals under consideration that fulfil a particular set of characteristics is known as a population (Polit & Hunger,

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1999). McMillan and Schumacher (2001) also describe a population as the total group of cases either objects, individuals or events that conform to certain criteria set. The entire population to which a study's findings apply is referred to as target population (Ary et al., 2006; Gravetter & Forzano, 2009). Therefore, patients with SCD in Accra, male and female, young and old, literate and illiterate, married and non-married, Christians and non-Christians fall under this category while the accessible population was made up of patients with the disease that visit the Ghana Institute of Clinical Genetics (GICG), at the KBTH. The total registered population was 29,760 as of 2020 representing the target population of which 8,545 attended clinics as of 2020 representing the accessible population (Personal Communication with the administrator, 4th June, 2021).

Sampling Procedure

A smaller group of the population selected for research purposes is known as a sample. The sample size should be the minimum number that is chosen for accurate data to be obtained by the respondents. This means that a decrease in the collected data could invalidate conclusions drawn from the data.

The sample size was selected with G power. G power is used to acquire sample size, the effect size and other elements like the statistical power for many test (Serdar et al., 2021). G power helps researchers to compute the smallest sample size necessary for studying a population (Faul et al., 2009). Following the acquisition of the minimum sample size, a researcher may decide to use more.

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Using G power, the minimum sample size for the study consisted of 63 patients with SCD sampled from an accessible population of 8,545 (Faul et al., 2009).

Sampling is the process of selecting a portion of an entire-population to represent a target group to make it easier to collect data (Sarantakos, 2005).The sampling method used was convenience sampling specifically the consecutive sampling technique to select participants. This technique involves conveniently including people who satisfy the study's eligibility requirement. As individuals visited the hospital, they were conveniently recruited to partake in the research. Background data such as gender, age, educational qualification, religious affiliation, marital status as well as the genotype of patients were gathered. Because over population is better than under population, 261 participants were finally sampled for the study. The table below presents the mean, standard deviation, minimum and maximum age, frequency and percentages for the demographic data.

Table 1: *Demographic Data of the Respondents*

	Mean	Std. Deviation	Minimum	Maximum
Age	29.0	11.22	18	79
Gender	Frequency	Percentage		
Male	115	44.1%		
Female	146	55.9%		
Educational qualification	Frequency	Percentage		
Tertiary	116	44.4%		
SHS	91	34.9%		
JHS	46	17.6%		
Primary	2	.8%		
No school	6	2.3%		
Marital Status	Frequency	Percentage		
Single	209	80.1%		
Married	42	16.1		
Divorce	6	2.3		
Window	1	.4		
Religion	Frequency	Percentage		
Christian	236	90.4%		
Islam	23	8.8%		
Other	2	.8%		
Genotype	Frequency	Percentage		
SS	194	74.3%		
SC	51	19.5%		
SF	16	6.1%		

Source: field data, 2021

Inclusion Criteria

Sickle cell patients from age 18 and above were recruited for the study. This is because individuals from age 18 and above are seen as adults in Ghana and the scale used to assess the participant's quality of life was to be administered to adults based on the cultural context of the definition of an adult.

Exclusion Criteria

Severely ill patients with sickle cell who have been admitted and cannot fill the questionnaire or communicate was excluded. This is because, these individuals may not take time to read and understand the content of the questionnaire as they may be in pain.

Ethical Consideration

Ethical clearance was sought from the Institutional Review Board of the University of Cape Coast. An introductory letter was also sought from the Department of Education and Psychology.

Confidentiality, anonymity, right to withdraw as well as the right to decline were guaranteed. To ensure confidentiality, respondents were guaranteed that information from them would be kept safe and secured by the researcher and hard copies of the information would be destroyed after three years while soft copies would be saved on the researcher's icloud account with a password. In order to fulfil anonymity, any form of identification of the participant was avoided. To do this, participants were asked not to provide their names, contact address, phone number and any other information which would aid in tracing them. Participants were made to understand that the research was not compulsory and that they had the right to decline when approached to take part in the study. Participants who volunteered to partake were made to understand that, they could withdraw at any given time during the study and that they would not be held responsible for not completing the study. In order to ensure privacy, data was collected at an enclosed setting in the hospital. Participants were made to sign informed consent forms and the aim of the research was made clear to them.

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Data Collection Instruments

The utilisation of a questionnaire for data collection can be useful for self-report by participants of a study (Johnson & Onwuegbuzie, 2004). The characteristics of a questionnaire determines its choice as a research instrument. Kothari (2004) posits that questionnaires give respondents enough time to provide reasoned responses. Unlike interviews, issues of "no-contract" do not affect questionnaires (Ary et al., 2006). Questionnaires however have a low response rate and therefore it is possible that bias would occur in the responses (Creswell, 2012). Since it saves time, enables the creation of a vast geographical sample and can cover a broad sample size, it was utilised (Amedahe, 2002; Osuola, 2001).

Using the semi-guided method by Nadir et al. (2018), the biopsychosocial-spiritual inventory by Katerndahl and Oyiriaru (2007) and items from literature, the researcher developed a questionnaire to measure the biopsychosocial-spiritual model. The World Health Organisation Quality of Life (WHOQOL-BREF) questionnaire by the World Health Organisation was also used to elicit information from participants on their QoL as well as the spirituality scale by Galanter et al. (2007) was also adopted.

World Health Organisation Quality of Life (WHOQOL-BREF)

The WHOQOL-BREF was adopted to measure the quality of life of patients with sickle cell disease. It was developed from the WHOQOL-100. It has 4 dimensions in total including physical health, psychological, social relationships and environment. The scale was developed by the WHOQOL group. WHOQOL-100 makes it possible for individual facets to be assessed as they relate to QoL. In some instances, it is too long for practical use. The

WHOQOL-BREF Field Trial Version was developed to provide a more practical, short QoL assessment that assesses domain level profiles using data from the WHOQOL pilot tool and the WHOQOL-100 Field Trial Version. A total of 20 field centres located in 18 countries were used for these purposes. The WHOQOL-BREF has a total of 26 items. This includes one item form each of the 24 facets of the WHOQOL-100 instruments. Two items form the Overall Quality of Life and General Health facet have been included. The Cronbach alpha range of the scale is .84 - .92 (Whoqol, 1998).

Spirituality Rating Scale

Galanter et al. (2007) developed this scale to assess spirituality and its significance to addiction treatment. The scale was designed to reflect the world view measure of spiritual orientation to life and its reliability in non-substance and substance abusers. The scale was applied in three different treatment settings and findings were later compared to the general population. The Cronbach's alpha for the scale ranged from .82 to .91 (Galanter et al., 2007).

Development of the Biopsychosocial-Spiritual Scale

The biopsychosocial-spiritual scale was developed for this study because there was no evidence of any biopsychosocial-spiritual scale that assessed the utilisation of the model in literature. The scale was developed using items from literature as well as items from the BPSS inventory by Katerndahl and Oyiriaru (2007) and a qualitative study by Nadir et al. (2018).

In all 59 items were initially generated. The biological consisted of 12 items; one from Ballas (2002) and two items from Dampier et al. (2004) respectively and nine from the qualitative study by Nadir et al. (2018). The psychological dimension consisted of 17 items which were adapted from the depression, anxiety and stress scale (DASS 21). Sixteen of the items were adapted from the DASS and one general question from personal experience (how often does your health care provider ask you to see a therapist?). The social dimension entailed 21 items. Seven items coming from the qualitative study by Nadir et al (2018) and fourteen from literature (Anie et al., 2002; Bodhise et al., 2004; Haque & Telfair, 2000; Raphael et al., 2002; Smith et al., 2005). Finally, the spiritual dimension had nine items obtained from (Cooper-Effa et al., 2001; Dunn 2004; Glover-Graf et al., 2005; Katerndahl & Oyiriaru, 2007; Rashiq & Dick, 2009; Rippentrop et al., 2005).

Participants were asked to report how often their health-care providers used any of the items in the model during their interaction. The responses were rated on a five-point Likert-type scale, from 1 (never) to 5 (always).

The newly developed scale was piloted together with the WHOQOL and spirituality rating scale since all the scales were relevant in completing the study at hand. Exploratory factor analysis (EFA) and confirmatory factor analyses (CFA) were done to ascertain the factorial structure as well as the psychometric properties.

Pilot-Test Results

Three instruments were pilot tested on 100 SCD individuals from a private Clinic in Accra. This particular clinic was chosen because it is one of the few clinics that specialised in treating patients with sickle cell disease. Again, participants shared the same characteristics with the studied population.

Before the pilot test was conducted, the researcher sent an introductory letter to Adwoa Boatemaa Memorial Clinic to ask for permission for data collection. After the letter was approved, the researcher was given a call to begin with the data collection. Before data collection begun, the nurse in-charge introduced the team and explained the relevance of the researcher's presence in the facility. Two graduate students (''research assistants'') helped to engage respondents between 20 to 30 minutes. Individuals who participated in the study were those who were not on admission, in any obvious pain and could communicate. The pilot test took a period of three weeks.

To ascertain the reliability of an instrument, the Cronbach's alpha must be greater than or equal to .70 (Nunnally, 1994). Going by this criterion, the results showed that the instrument could be used for the main study. The Cronbach alpha for the Whoqol was .91 and spirituality rating scale was .79.

Exploratory Factor Analysis of the Biopsychosocial-Spiritual Model

Responses to the 59 items were analysed using principal component factor analysis with varimax rotation. Factor loadings of .30 were considered significant on the rotated matrix (Swisher et al., 2004). All items were above .30 therefore the 59 items were maintained. Also, Child (2006) indicated that items with communalities less than .20 must be taken out. According to Costello and Osborne (2005), individual items which have low communality are an indication that other factors may be investigated in later studies to measure other items. From the analysis, all items had communalities above .20

Most of the items adequately loaded under their respective factors while a few loaded under others. Based on literature, those items were maintained under their various theoretically appropriate factors. Biological

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had two subscale (genetics and medical information), psychological had three (depression, anxiety and stress), social had three sub scales (social support, patient- provider relationship and activity of daily living) and spiritual had two sub scales (relationship with God and sense of purpose) (see appendix D).

Reliability was assessed for the entire scale. The Cronbach's alpha was used. Main constructs had Cronbach alpha between .73 and .91 while subscales had Cronbach alpha between .61 and .92. A Cronbach alpha of .50 as well as .60 are adequate for a newly developed scale (Nunnally, 1994). Based on this, the whole scale was adopted for the study. The bivariate correlation matrix and VIF can be used to check for multicollinearity. The Variance inflation factors (VIF) was used to check for the severity of multicollinearity. Items had VIF below 5.0 which means there was no multicollinearity. High values (above 5.0) are an indication of multicollinearity. Result for the exploratory factor analysis can be seen in appendix D.

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Table 2: *Summary of Psychometric Properties of Research Instruments*

Scale	Number of items	Reliability
Biological	12	.72
-Genetics	5	.60
-Medical information	7	.70
Psychological	17	.88
-Depression	6	.92
-Anxiety	6	.56
-Stress	5	.88
Social	21	.91
-Social support	8	.89
-Patient-provider relationship	7	.71
-Activity of daily living	6	.80
Spiritual	9	.90
-Relationship with God	6	.86
-Sense of purpose	3	.82
Quality of life	26	.91
-Physical	7	.80
-Psychological	6	.51
-Social	3	.68
-Environment	8	.81
Spirituality rating scale	6	.79

Source: field data, 2021

Confirmatory Factor Analysis for the Biopsychosoical-Spiritual Model

Confirmatory factor analysis (CFA) is a statistical tool for assessing the relationship among latent variables also known as factors or constructs. Unlike exploratory analysis where statistical procedures are used in the analysis without any theory driven hypothesis, confirmatory analysis uses statistical analysis where hypotheses that were deducted from a theory are tested. According to Brown (2015) CFA is a technique used in developing

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and modifying instruments and forms part of a family method known as structural equation modelling (SEM). SEM entails two testing models known as the measurement (outer) and structural (inner) model (Wong, 2013).

In SEM, the measurement model tests the correlation between indicators and its constructs (Wong, 2013). The measurement model also indicates the internal consistency of a measure as well as goodness of fit. This model is sensitive to factor loadings. The smaller the factor loadings, the weaker and more unreliable the model will be and vice versa. The model also takes into consideration errors before the structural model is done (Hair et al., 2006).

The measurement model is made up of two sub models, namely; reflective and formative model. In reflective model, constructs causes the indicators. This means that any changes to the construct will result in changes to the indicators. With formative model, it is believed that a change in indicators will cause the construct. This means that if indicators are deleted from this measure, it will change the meaning of the construct. Formative model assesses the unique contribution of an indicator to the construct using outer weights while the reflective model makes use of the outer loadings. For a reflective model to be deemed fit in confirmatory analysis, it must have an indicator path loading above .70 (Henseler et al., 2012) and .80 (Daskalakis & Mantas, 2008).

The next step is to assess the inner model. The structural model tests the correlation between exogenous as well as endogenous factors (Wong, 2013). The path coefficients were tested for its significance through t-values obtained from the bootstrapping method. The coefficient of determination (R^2)

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was also assessed. According to Garson (2016) the R^2 represents the amount of variance in the endogenous variable that can be explained by the exogenous variable. The effect size (f^2) and predictive relevance (Q^2) are also important when analysing the structural model. Therefore, they were also assessed. A predictive relevance of .35 is considered high, .15 moderate and .02 small effect size (Cohen, 1988).

The study comprised six latent variables; five independent (exogenous) and one dependent (endogenous). The independent variable is made up of the biological which entails two sub domains with twelve items, the psychological which is made up of three dimensions with seventeen items, the social constitute three sub domains with twenty-one items, the spiritual which consist of two dimensions with nine items and spirituality which is a uni-dimensional scale involving six items. The dependent variable which is the quality of life is made up of four dimensions with twenty-six items in all. In sum, the study involved six multidimensional constructs with fifteen sub dimensions and 91 indicators, with six demographic variables.

Reliability and Validity of the Measurement Model

Internal consistency was established using the Cronbach's alpha and composite reliability. According to Hair et al. (2014) measures for internal consistency must be above .70 in order to be considered acceptable. In order to establish discriminant validity, reflective construct should not be related. According to Henseler (2015), discriminant validity will only be established if the heterotrait-monotrait (HTMT) value is less than .90 between two reflective constructs. Discriminant validity was established for the constructs using the HTMT in Smart PLS.

Convergent and divergent validity is established using the average variance extracted (AVE). Hock and Ringle (2006) stated that AVE of .50 is adequate for confirmatory purposes. .50 means 50% of variance of a factor should be explained by its indicators. AVE less than .50 means that the error variance is more than explained variance.

Results of the Measurement (outer) Model

Internal consistency was measured using the Cronbach alpha and composite reliability while AVE was used to determine convergent and divergent validity. The HTMT was used to assess discriminant validity. Cronbach alpha and composite reliability of .70 and above showed good internal consistency while AVE greater than .50 indicated good construct validity. HTMT below .90 indicated that discriminant validity was established. An indicator loading of .70 was considered for the structural model while those below .70 were deleted (Ringle et al., 2015).

Evaluation of the Biological Dimension

This construct was made up of twelve items with two dimension, namely; genetics and medical information. Genetic comprised five items while medical information entailed seven items. The first measurement model showed loadings below .70 on both genetics and medical information. These items were deleted. The final model is made up of three genetic and three medical information items for the structural model. The Cronbach alpha and composite reliability for genetics was .82 and .89 and medical information was .75 and .86 respectively. Genetics had an AVE of .74 while medical information had an AVE of .66. Discriminant validity was also achieved.

Evaluation of the Psychological Dimension

This construct was made up of seventeen items with three dimensions, namely; depression, anxiety and stress. Depression and anxiety comprised six items each while stress entailed five items. The first measurement model showed loadings below .70 on depression, anxiety and stress. These items were deleted. The final model is made up of five indicators measuring depression, four indicators each measuring anxiety and stress for the structural model. The Cronbach alpha and composite reliabilities were .82 and .88 for depression, .80 and .87 for anxiety and .80 and .87 for stress. The AVE were .58, .62 and .62 for depression, anxiety and stress respectively. Discriminant validity was also established.

Evaluation of the Social Dimension

This dimension was made up of twenty-one items with three dimensions, namely; social support, patient provider relationship and activity of daily living. Social support had eight indicator, patient-provider had seven indicators and activity of daily living had six indicators. The first measurement model showed loadings below .70 on the three sub dimensions. These items were deleted. The final model is made up of seven indicators measuring social support, three indicators measuring patient-provider relationship and six indicators measuring activity of daily living for the structural model. The Cronbach alpha and composite reliabilities were .91 and .93 for social support, .85 and .91 for patient-provider relationship and .86 and .90 for activity of daily living. The AVE were .65, .77 and .60 for social support, patient-provider relationship and activity of daily living respectively. Discriminant validity was also established.

Evaluation of the Spiritual Dimension

This construct was made up of nine items with two dimensions, namely; relationship with God and sense of purpose in life. Relationship with God comprised six items while sense of purpose entailed three items. The first measurement model showed loadings below .70 on the sense of purpose scale. The item was deleted. The final model is made up of six indicators representing relationship with God and two items representing sense of purpose in life for the structural model. The Cronbach alpha and composite reliability for relationship with God and sense of purpose were .90 and .83 and .92 and .92 respectively. Relationship with God had an AVE of .66 while sense of purpose had an AVE of .85. Discriminant validity was also established for the spiritual dimension.

Table 3: *Heterotrait-Monotrait Ratio of Correlation (HTMT) for the Biopsychosocial-Spiritual Dimension*

Dimension	Bio	Psych	Soc	Spiri
Bio				
Psych	.26			
Soc	.25	.80		
Spiri	.26	.77	.88	

Source: field data, 2021

*Bio= Biological, Psych= Psychological, Soc=Social, Spiri= Spiritual

Evaluation of Spirituality

This construct is a uni-dimensional scale consisting of six indicators. The first measurement model showed three loadings below .70. These indicators were still maintained due to theoretical and practical bases. The final model is made up of six indicators for the structural model. The construct had a Cronbach alpha of .86, composite reliability of .86 and AVE of .51.

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AVE of .51 shows that the indicators explained 51% of variation in the definition of the latent variable.

Evaluation of Quality of Life (QoL) Measure

The QoL construct is made up of four sub dimensions, namely; physical, psychological, social relationship and environmental. The initial model showed that some of the items had unacceptable loadings which needed to be deleted. Due to theoretical and practical bases these items were maintained. Indicators had acceptable Cronbach's alpha of .58 for physical, .69 for psychological, .71 for social and .85 for environment. Again, indicators had a composite reliability of .71 for physical, .80 for psychological, .84 for social and .89 for environmental. Again, indicators had AVE of .35 for physical, .45 for psychological, .63 for social and .50 for environmental. Discriminant validity was established for this scale.

Table 4: *Heterotrait-Monotrait Ratio of Correlation (HTMT) for all Constructs*

Dimension	Bio	Psych	Soc	Spiri	QoL	Spirit
Bio						
Psych	.26					
Soc	.25	.80				
Spiri	.26	.77	.88			
QoL	.37	.20	.26	.17		
Spirit	.27	.16	.15	.11	.22	

Source: field data, 2021

*Bio= Biological, Psych= Psychological, Soc=Social, Spiri= Spiritual, Spirit= Spirituality, QoL= Quality of Life.

From the above, it is evident the constructs demonstrated good psychometric properties with regards to reliability and construct validity. Table 4 which represents the HTMT table for all constructs showed that the newly developed scale (biopsychosocial-spiritual) discriminated against the two standardized scale (WHOQOL-BREF and spirituality rating scale). Therefore, all psychometric properties were met.

Table 5: *Evaluation of the Loadings of Sub- Scales on their Latent Constructs*

Paths	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Biological	CA=.82	CR=.87	AVE=.525		
Bio -> Gen	.91	.91	.01	77.76	.000
Bio -> Med	.82	.82	.03	27.70	.000
Psychological	CA=.92	CR=.93	AVE=.51		
Psych -> Anx	.92	.92	.02	61.70	.000
Psych -> Dep	.93	.93	.02	62.33	.000
Psych -> Stre	.92	.92	.01	74.27	.000
Social	CA=.93	CR=.94	AVE=.51		
Soc-> Adl	.93	.93	.01	79.95	.000
Soc -> Pat-pro	.63	.63	.05	13.73	.000
Soc -> Soc sup	.96	.96	.01	156.64	.000
Spiritual	CA=.92	CR=.94	AVE=.65		
Spir-> Relat	.98	.98	.00	231.18	.000
Spir -> Sen pur	.90	.90	.02	46.56	.000
Quality of life	CA=.92	CR=.93	AVE=.38		
QoL -> Env	.92	.92	.02	58.83	.000
QoL -> Phy	.88	.89	.02	37.52	.000
QoL -> Psych	.93	.93	.02	50.35	.000
QoL -> Soc	.83	.83	.04	21.69	.000
Spirituality	CA=.86	CR=.86	AVE=.51		

Source: field data, 2021

*Bio= Biological; Gen= Genetics; Med= Medical Information; Psych= Psychological; Anx= Anxiety; Dep= Depression; Stre= Stress; Soc= Social; Adl= Activity of Daily Living; Pat-pro= Patient provider relationship; Soc-sup= Social support; Spiri= Spiritual; Relat= Relationship with God; Sen-Pur= Sense of purpose; QoL= Quality of life; Env= Environment; Phy= Physical; CA= Cronbach's Alpha; CR= Composite Reliability; AVE= Average Variance Extracted

Data Collection Procedure

Researchers are supposed to seek permission from authorities of a place prior to conducting research (Creswell, 2017). In line with instructions by Creswell, permission was sought (see appendix A). Upon approval, the research committee of Korle Bu teaching hospital gave a letter to be sent to the

Ghana Institute of Clinical Genetics for data collection to proceed. The institute also gave their approval (see appendix A) and data collection began.

The researcher recruited two research assistants for participant selection and data collection. The assistants were individuals who have had an experience in data collection. Research assistants were trained by the researcher for one week on the procedures for data to be collected and the ethical issues to be considered. Clinical heads were contacted to allow the collection of data during clinical hours.

The respondents were selected by convenience, as and when they visited the hospital for treatment. Upon visitation, nurses on duty were engaged to explain the purpose of the researcher's presence at the unit. Patients were then approached for rapport establishment. Afterwards, patients were exposed to the purpose and relevance of the study and asked if they were interested to partake. Participants who were interested in the study were made to wash and sanitize their hands before the questionnaire was given to them. Before the questionnaire was given, they were made to sign a consent form. They were also assured of confidentiality, the right to decline and withdraw at any given point in time without any cost. Participants were taken through the questions before answering. To ensure not recruiting twice, respondents were asked if they had already taken part in the research so the researcher does not recruit them again. Data was collected for a period of six weeks. This was done every day in the week from 7:30 am to 12:00 pm.

Data Processing and Analysis

According to Polit and Hungler (1999), data analysis involves systematically organising data as well as synthesising the data together with

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the testing of research hypothesis using such data. Data analysis helps data to be summarised, minimised and reviewed in terms of essential trends which gives a framework upon which the data can be interpreted and shown (Patton, 1999). Data collected were screened to exclude incomplete questionnaires and unnecessary answers. The questionnaires were then numbered for easy identification in case an error occurred during data entry. Data were entered and coded for easy analysis directed towards the study's research questions. The data was later cleaned to ensure there were no errors before analysis were conducted. Research questions one to three employed the frequencies, percentages, means and standard deviations in its analysis while hypotheses one and two employed the PLS-SEM in its data analysis. The analysis included five predictors and one outcome. According to Garson (2016) PLS-SEM has the capacity to manage multicollinearity among predictor variables. The PLS-SEM was shown to be advantageous than the CB-SEM in this study because, it assessed the predictive relevance of the exogenous variables in a case where the dimensions were expected to be collinearly linked. Again, PLS-SEM does not make predictions about distribution of data (Lowry & Gaskin, 2014) and is seen to be a superior option to the CB-SEM when prediction accuracy is critical and accurate model description is not possible (Sarstedt et al., 2016). Descriptive and structural equation modelling (SEM) were utilised during data analysis. SEM is a multivariate data analytic technique that evaluate theoretically validated linear and additive causal model (Wong, 2013) that connects two or more latent complex variables evaluated by a variety of manifest indicators (Sarstedt et al., 2014). All predictor variable paths are connected to outcome variables in the same model using SEM and all paths can be analysed at the same time instead of one at a time (Gefen et al., 2000). The study's multidimensional latent variables necessitated the application of SEM. The demographics of the respondents was analysed using mean, standard deviation, percentages and frequencies. Research question one sought to investigate which dominant domain of the biopsychosocial-spiritual model was utilised. Question two and three sought to investigate the level of quality of life and spirituality among patients with SCD respectively. Descriptive statistics like means, standard deviations, frequencies and percentages were used to analyse data on these research question. Hypotheses one and two sought to investigate the effect of spirituality on the quality of life of patient's with SCD and the effect the utilisation of the biopsychosocial-spiritual model has on the quality of life of patient's with SCD respectively. These hypotheses were done using the structural equation modelling. A sample of 5000 was used for bootstrapping in order to maintain a stable significance.

Chapter Summary

This chapter describes the study's appropriate research methods and also the study area, population, sampling procedures, data collection instruments, data collection procedures and data processing and analysis. The study utilised the descriptive survey design. The sample entailed 261 patients with SCD sampled from an accessible population of 8,545. The convenience sampling technique, specifically the consecutive sampling procedure was used. Because convenience sampling is a non-probabilistic sampling technique, it becomes difficult to get a representative sample. As a result, it led to the inability to generalise the results of the study to the population.

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Participants' details were elicited using a questionnaire. Exploratory as well as confirmatory factor analysis was run for the newly developed scale (biopsychosocial-spiritual model). Data were analysed using means, standard deviations, percentages and frequencies. Further analysis utilised the structural equation modelling.

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CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

The study aimed to find the extent of the utilisation and dominant domain of the biopsychosocial-spiritual model in managing conditions of SCD patients. The study also investigated how the utilisation of the model and the level of spirituality of the patients with sickle cell influences their quality of life. The previous chapter was on the research methods that influenced the study. The results and discussion of the outcome of the research are presented in this chapter.

The initial sample drawn from G power was 63. Because over population is better than under-population, the researcher administered 300 questionnaires of which 261 were completed and returned making 87% response rate. This response rate according to Saunders and Thornhill (2007) is enough for analysis with this study. Results were presented based on the research questions and hypothesis formulated.

Main Results

To find out if the model is utilised or not, the study made use of the range. The range was divided into three (Frequently utilised, moderately utilised and rarely utilised).

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Table 6: *Range for the Biopsychosocial-Spiritual Model*

Variable	Frequently utilised	Moderately utilised	Rarely utilised
Biological	6-14	15-22	23-30
Psychological	13-30	21-47	48-65
Social	16-37	38-58	59-80
Spiritual	8-18	19-29	30-40

Source: field data, 2021

Research Question 1: What are the Dominant Domains of the Biopsychosocial-Spiritual Model that Health-Care Providers Utilise Most in the Management of Patients with Sickle Cell Disease?

This research question was used to address the dominant domain of the biopsychosocial-spiritual model that health-care providers utilise most in the management of patients with sickle cell disease. Scoring of this portion of the questionnaire ranged from 1 to 5. Data on the research question were analysed using means and standard deviations as well as frequencies and percentages. Tables 7, 8, 9 and 10 shows the extent of utilisation of the biopsychosocial-spiritual model.

Table 7: *The Extent of Utilisation of the Biological Domain*

Utilisation	Frequency	Percentage
Frequently utilised	160	61.3
Moderately utilised	79	30.3
Rarely utilised	22	8.4
Total	261	100.0

Source: field data, 2021

The responses for how the respondents rated the biological part of the model recorded a mean of 11.97 and standard deviation of 5.78. Referring to table 6, the mean score for the biological ranged between 6 and 14 which represents frequently utilised. This indicates that the biological domain is

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dominantly used. This implies that health-care providers frequently incorporate the biological domain in patient's treatment process. This was further confirmed in the frequency and percentage analysis as shown in table 7 above.

Table 8: *The Extent of Utilisation of the Psychological Domain*

Utilisation	Frequency	Percentage
Frequently utilised	10	3.8
Moderately utilised	51	19.5
Rarely utilised	200	76.6
Total	261	100.0

Source: field data, 2021

The responses for how the respondents rated the psychological part recorded a mean of 54.69 and standard deviation of 10.90. From table 6, the mean score for the psychological domain ranged between 48 and 65. This indicates that the psychological domain is rarely utilised. This implies that health-care providers neglect the psychological domain in the treatment process of sickle cell patients. This was further confirmed in the frequency and percentage analysis as shown in table 8 above.

Table 9: *The Extent of Utilisation of the Social Domain*

Utilisation	Frequency	Percentage
Frequently utilised	14	5.4
Moderately utilised	51	19.5
Rarely utilised	196	75.1
Total	261	100.0

Source: field data, 2021

The responses for how the respondents rated the social part recorded a mean of 66.15 and standard deviation of 14.21. It can be seen from table 6 that the mean score for the social domain ranged between 59 and 80. This indicates

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that the social domain is rarely utilised. This implies that health-care providers neglect the social domain when treating patients. This was further confirmed in the frequency and percentage analysis as shown in table 9.

Table 10: *The Extent of Utilisation of the Spiritual Domain*

Utilisation	Frequency	Percentage
Frequently utilised	13	5.0
Moderately utilised	37	14.2
Rarely utilised	211	80.8
Total	261	100.0

Source: field data, 2021

The responses for how the respondents rated the spiritual part recorded a mean of 34.86 and standard deviation of 7.37. It can be seen from table 6 that the mean score for the spiritual domain ranged between 30 and 40. This indicates that the spiritual domain is rarely utilised. This implies that health-care providers neglect the spiritual domain. This was further confirmed in the frequency and percentages analysis as shown in table 10.

Research Question 2: What is the Level of QoL of Patients with SCD?

This part of the research question sought to address the level of QoL of individuals with SCD. Data was analysed using the standard deviations and mean as well as frequency and percentages. The scoring of this portion of the questionnaire has ranges of 1 to 5. The means as well as standard deviations of responses in the QoL of the respondents are shown in table 11 while the frequency and percentage of the overall QoL of the respondents are shown in table 12 below.

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Table 11: *The Means with the Standard Deviation Distribution of the QoL*

Construct	Mean	Std. Deviation
Physical	23.46	7.12
Psychological	20.61	5.10
Social	10.25	2.98
Environmental	26.62	7.67
Total QoL	80.95	19.85

Source: field data, 2021

From table 11, it can be seen that the social domain of the QoL scale had the lowest mean while the environmental domain of the QoL scale had the highest mean.

Table 12: *Overall Quality of Life Respondent*

Rating.	Frequency	Percentage
Very poor	29	11.1
Poor	25	9.6
Neither Poor nor Good	53	20.3
Good	87	33.3
Very good	67	25.7
Total	261	100

Source: field data, 2021

The frequency and percentage further explain the level of QoL among individuals with SCD. It can be seen from table 12 above that majority of the respondents 59.0% (those falling within good and very good) rated their QoL as high while only 54 respondents representing (20.7%) viewed their QoL as low. However, 53 respondents representing (20.3%) viewed their QoL as neither good nor poor.

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Research Question 3: What is the Level of Spirituality of Patients Living with Sickle Cell Disease?

This part of the research question addressed the level of spirituality of patients with sickle cell disease. The scoring of this portion of the questionnaire ranged from 1 to 5. The range was used to determine the ratings of respondents. A score between 6 and 14 indicated low spirituality. A score between 15 and 22 indicated moderate spirituality whilst a score between 23 and 30 indicated high spirituality. Data on the research question was analysed using means and standard deviations as well as frequency and percentages. The mean for spirituality was 22.35 while the standard deviation was 6.29. Table 13 shows the frequency and percentage distribution of spirituality of the respondents.

Table 13: *Frequency and Percentages of Spirituality*

Rating	Frequency	Percentage
Low	44	16.9
Moderate	79	30.3
High	138	52.9
Total	261	100

Source: field data, 2021

From table 13, it is evident that the patients rated their spirituality as high. This was confirmed in the frequency and percentage analysis of the ratings of the respondents concerning their spirituality.

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Hypotheses Testing

Table 14: *Correlation among the Constructs and their Respective Means*

Construct	Means	SD	1	2	3	4	5	6
Biological	22.11	8.35	1					
Psychological	68.96	14.08	-.124*	1				
Social	85.94	18.01	-.273**	.733**	1			
Spiritual	39.222	9.10	-.287**	.604**	.738**	1		
Quality of life	87.26	21.20	.274**	-.035	-.252**	-.122*	1	
Spirituality	14.65	6.29	-.202**	.054	.119	.065	.076	1

Source: field data, 2021
*p< .05 level, **p<.01 level

Results of Evaluation of Structural (Inner) Model

A structural model was used to show the relationship between the exogenous and endogenous variable. It employed the use of both PLS algorithm and bootstrapping to test for the hypotheses and significance respectively. The model tested the effect of the biopsychosocial-spiritual and spirituality (exogenous) on the QoL (endogenous) of patients with SCD. The coefficient of determination, effect size as well as the predictive value were assessed. The significance was tested through t-values obtained from the bootstrapping method. The standardised coefficient and standard deviations were also examined. Figure 2 and 3 are the graphical presentation of the PLS algorithm and Bootstrap respectively.

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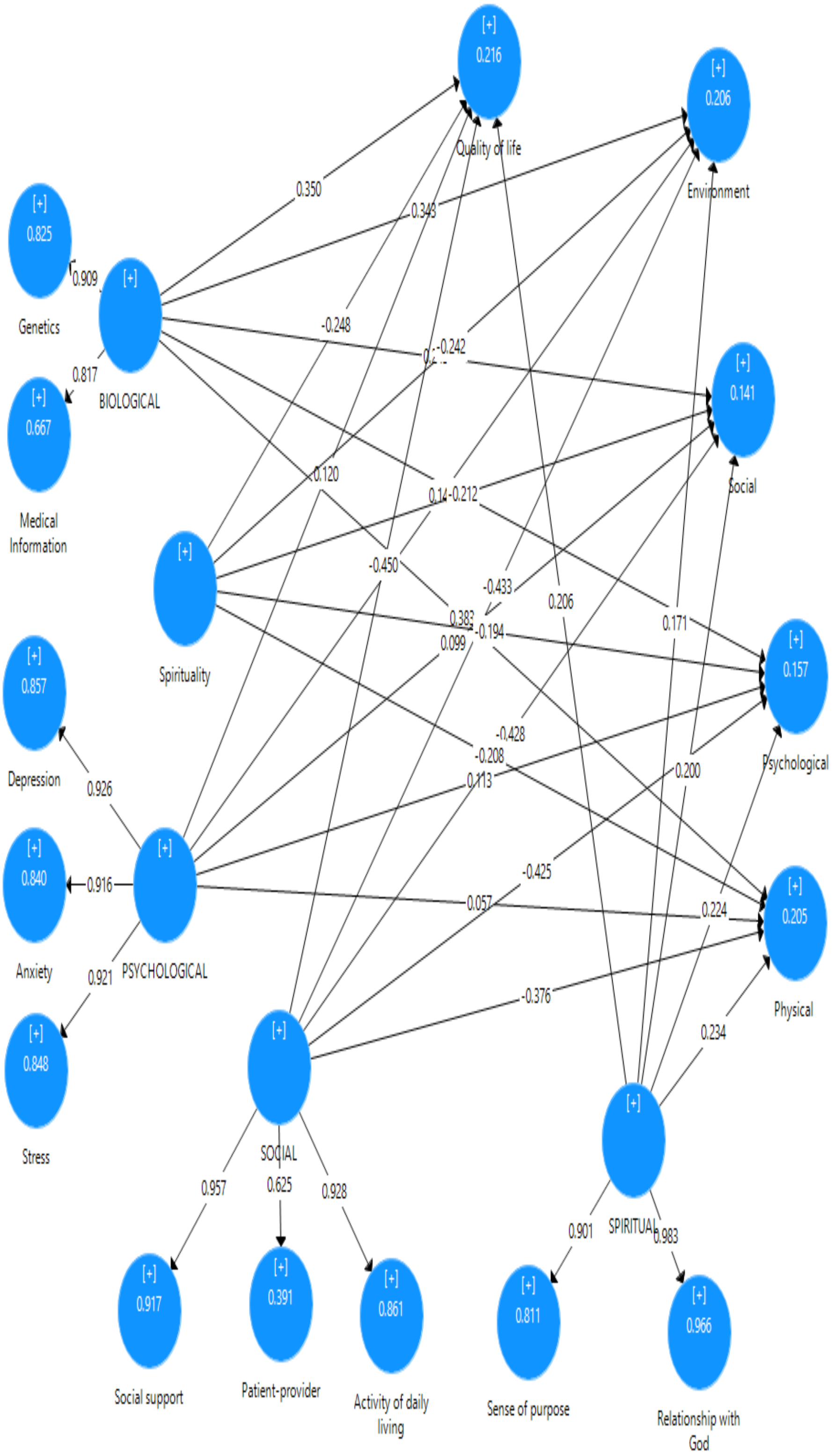

Figure 2: Graphical presentation of the structural model

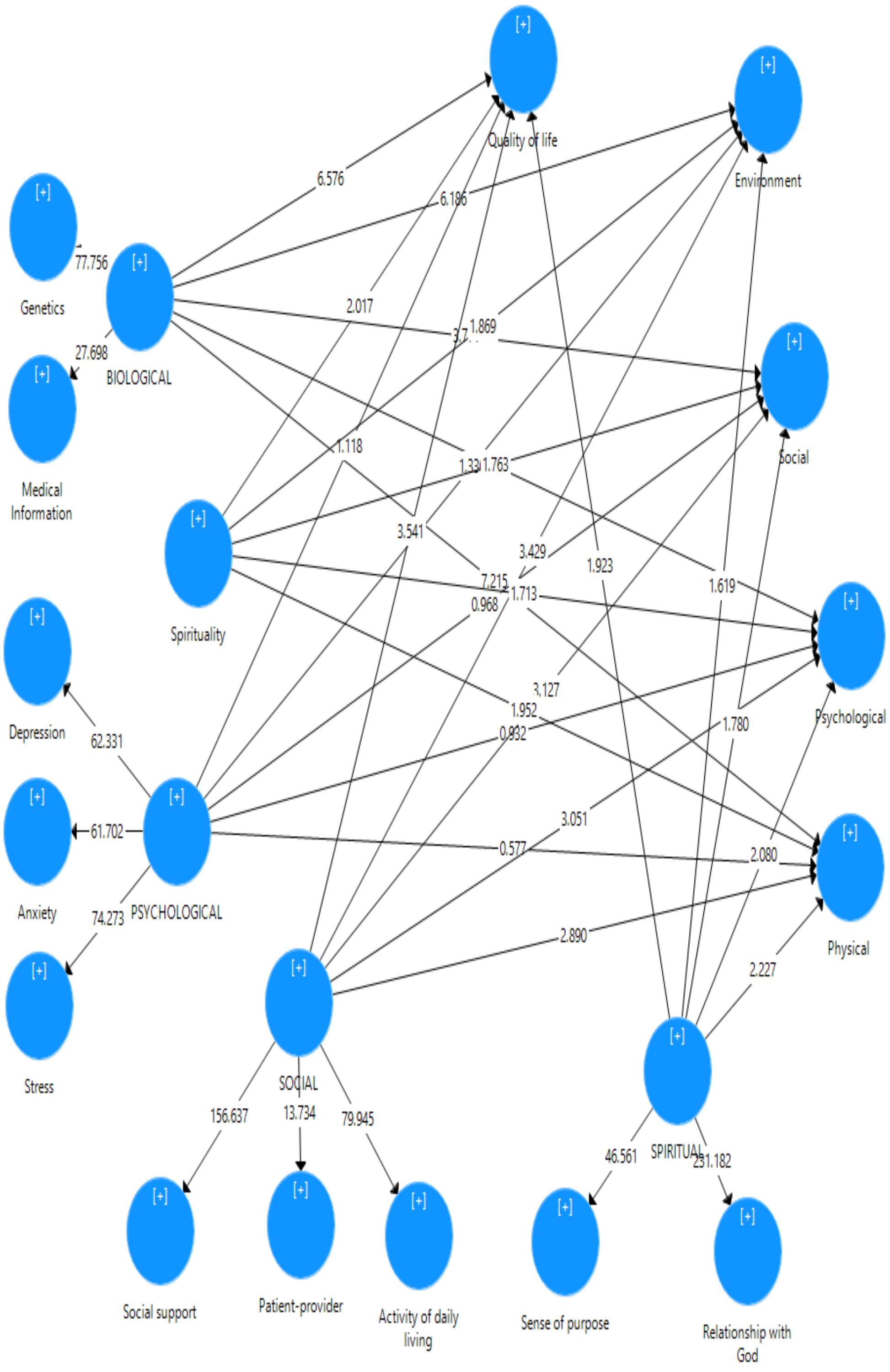

Figure 3: Graphical presentation of inner model after the bootstrapping procedure (n=5000 Bootstrapped Samples)

Table 15: *Results of the Structural Model*

Paths	Standardised Coefficient (β)	Effect Size f^2	Quality R^2	Criteria Q^2
BIO-> Phy	.383***	.171	.205	.062
PSYCH-> Phy	.057	.001		
SOC -> Phy	-.376**	.040		
SPIR-> Phy	.234*	.022		
Spirituality-> Phy	-.208	.052		
BIO-> Psych	.301***	.100	.157	.055
PSYCH-> Psych	.113	.005		
SOC-> Psych	-.425**	.048		
SPIR-> Psych	.224*	.019		
Spirituality-> Psych	-.194	.043		
BIO-> Soc	.243***	.064	.141	.069
PSYCH-> Soc	.099	.004		
SOC -> Soc	-.428**	.048		
SPIR-> Soc	.200	.015		
Spirituality -> Soc	-.212	.050		
BIO-> Env	.343***	.138	.206	.093
PSYCH-> Env	.143	.009		
SOC-> Env	-.433***	.053		
SPIR-> Env	.171	.012		
Spirituality-> Env	-.242	.071		
BIO->QoL	.350***	.145	.216	.074
PSYCH-> QoL	.120	.006		
SOC -> QoL	-.450***	.058		
SPIR->QoL	.206	.017		
Spirituality->QoL	-.248*	.075		

Source: field data, 2021

*p<.05, **p< .01, ***p<.001

*Bio= Biological; Psych= Psychological; Soc= Social; Spiri= Spiritual; QoL= Quality of life; Env= Environment; Phy= Physical

Hypothesis 1: ***Spirituality will predict the Quality of Life of Patients with Sickle Cell.***

The results indicated that spirituality showed a negative significant relationship on overall quality of life scale with (*B* = -.248, *p* = .044). However, individual domains (physical, psychological, social and environmental) showed a non-significant negative impact on QoL. From the above, the model is significant and since spirituality can significantly predict QoL, the hypothesis is supported.

Hypothesis 2: ***The Dimensions of the Biopsychosocial-Spiritual Model will predict the Quality of Life of Patients with Sickle Cell.***

The biological domain showed a significant effect on QoL with (*B* = .035, *p* < .001). This suggest that the biological domain is supported. Again, while psychological showed a positive non-significant effect on quality of life with (*B* = .120, *p* = .264), social showed a negative significant effect on quality of life with (*B* = -.405, p< .001). This means that the social domain was supported while the psychological was not.

Moreover, spiritual showed a positive non-significant effect on quality of life with (*B* = .206, p = .055). This suggest that the spiritual domain was not supported.

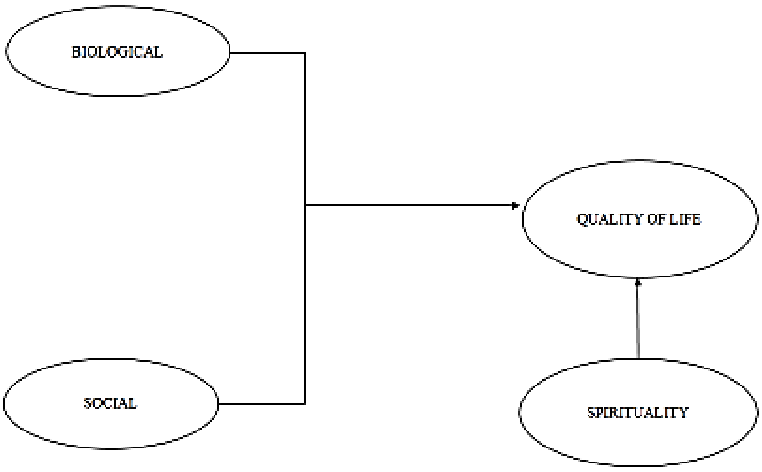

Figure 4: Framework developed from the findings of the study

Discussion of Findings

The section discusses the key findings in relation to the research questions, hypothesis and the theoretical framework.

Research Questions

1. What are the dominant domains of the biopsychosocial-spiritual model that health-care providers utilise most in the management of patients with sickle cell disease?
2. What is the quality of life of patients with sickle cell disease?
3. What is the level of spirituality of patients with sickle cell disease?

Research Hypotheses

1. H_1: Spirituality of patients with sickle cell disease will significantly predict their quality of life
2. H_1: Utilisation of the biopsychosocial-spiritual model will significantly relate positively with the quality of life of patients with sickle cell disease

Health-Care Providers' Utilisation of the Biopsychosocial-Spiritual Model in the Management of Patients with Sickle Cell Disease

The first research question was formulated to find out the extent of utilisation of the biopsychosocial-spiritual model among health care providers. From the result, it is evident that the biological (biomedical) model is utilised among health care providers.

This result is congruent with a study by Nadir et al. (2018) who explored the extent to which doctors utilised the biopsychosocial model for their health-giving relationship with their patients in public hospital within developing countries. In their study, they wanted to understand the

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significance given to the biopsychosocial model during doctor and patient health-giving relationships. The study made use of the qualitative approach and involved 44 patients. From the study findings, there was lack of doctor-patient relationship, a paternalistic technique was employed during treatment, patients' treatment approach was based on the biomedical model rather than the biopsychosocial model and that the biopsychosocial model was ignored totally.

The study is also consistent with Kusnanto et al. (2018) who conducted a review on the biopsychosocial model of disease in primary care. They found that, the biopsychosocial model has not proceeded in a desirable speed and that physicians do not adopt the model in their treatment process. According to them, the biological (biomedical) approach to disease was the dominant model used in treatment. The study further reported that, there are no incentives for physicians to adopt the model in their practice. The study concluded that the biopsychosocial model allows clinicians to explore the correlation between biological and psychosocial components of disease in order to strengthen their relationship with their patients.

According to Engel (1978), the first three domains must be taken into account in all health-care task. Taylor et al. (2013) also added that the spiritual aspect is an important part of personhood which needs attention. Katerndahl (2008) also reported the relevance of spiritual symptoms and its interaction in comprehending health outcomes. The study result is consistent with others because it is possible health-care providers in developing countries do not understand the significance of the model and that incorporating it into treatment may not yield any results. Again, it is possible health-care providers

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in developing countries are not trained to use the biopsychosocial-spiritual model in their treatment process. As such, they may not see the need to include that in their practice. It is possible the application of the model could be obstructed by lack of experience and work load in developing countries. Research (Kusnanto et al., 2018) has shown that incorporating the biopsychosocial model in treatment takes time and needs experience. If physicians are to see many patients in a day as accessibility of health care in Ghana is shown by the troubling statistic of 1 doctor to 20,000 patients (Opoku, 2018), it becomes difficult to incorporate a psychosocial-spiritual approach to treatment. This current study used a quantitative research approach whereas studies by Nadir et al. (2018) and Kusnanto et al. (2018) used a qualitative approach. The consistency of the results may be because these studies focused on the patients rather than including the health-care providers.

To sum up, the biopsychosocial-spiritual model suggest that health-care providers give equal attention to each component in treatment, however in this study, health-care providers utilised the biological domain more in treatment. This could be problematic for an individual with sickle cell disease as the gate theory of pain suggest that pain occurs as a result of the interaction between the biological process and psychosocial factors (Melzack & Wall, 1965). It further explains that psychological or social factors can cause the gate to open for an individual to perceive pain. If these factors are not addressed by health care providers, it will mean that no amount of biomedical intervention will relief an individual of his or her pain as the pain is not caused by a biological process. The psychosocial-spiritual domains of the biopsychosocial-spiritual model includes an individual in the treatment process. It is believed that an organism understands itself better and it is that organism who can better explain the causes of their distresses (Engel, 1977; Taylor et al., 2013). When the psychosocial-spiritual aspect is included, the individual feels part of the treatment process and helps facilitates the process. As such when treating an individual with sickle cell disease, all these factors must be put into account in order to understand the individual and treat them holistically.

The QoL of Patients with SCD

This research question sought to find out the level of QoL of patients with SCD. From the analysis, the study revealed that people with sickle cell disease had good quality of life. This study is inconsistent with (Andong, 2017; Menezes et al., 2013; Freitas et al., 2018; Hadi et al., 2019; Mann-Jiles & Morris, 2009; Pereira et al., 2013).

Mann-Jiles (2009) sought to explore the quality of life of patients with sickle cell anaemia. They employed 62 participants in their study and used convenient sampling in getting participants to participate in the study. The study revealed that sickle cell patients have low quality of life compared to the normal population. Menezes et al. (2013) assessed the quality of life of children and adolescence with sickle cell. They used a cross sectional study with 100 participants. They also found that the quality of life of patients with sickle cell is compromised. Again, Andong (2017) examined the QoL and the complication of people with SCD who are receiving care. The study made use of the cross-sectional study and questionnaires were administered to all qualified participants. The study concluded that chronic complications are very common among patients living with sickle cell disease and their quality of life is consequently low.

The results above are contrary to what the present study found. Disparity in the study may be due to patients receiving quality treatment from their health-care facilities. It is also possible that these individuals have good social, psychological and spiritual support hence the reason they reported high quality of life. Again, high quality of life reported by this population may be due to the level of education they may have received as participant explained to the researcher how they are educated on the disease. Again, from the descriptive statistics, majority of the respondents had tertiary education. This means that, they understand their health and do well to take proper care of themselves.

The integrated quality of life encompasses the biological and psychological wellbeing of an individual as well as the social support systems and spiritual wellbeing of an individual (Ventegodt et al., 2003). It suggests that an individual can have good quality of life when they are able to address their biopsychosocial-spiritual aspects. It further explains that quality of life can either be objective or subjective. Objective quality of life is what society terms as quality of life while subjective quality of life is what an individual sees as quality of life. In this study, quality of life was measured subjectively. That is to say, one’s definition of quality of life will be different from another’s definition of quality of life. It is also believed that pain among patients with sickle cell disease varies in terms of their intensity and duration. It is this pain in patients with SCD that can cause other factors to be affected and vice versa. From the results, it is possible that these individuals understand

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their disease state (biopsychosocial-spiritual domain) and address all these aspects to enhance their quality of life, hence these individuals reporting high quality of life.

Level of Spirituality of Patients with Sickle Cell Disease

This hypothesis was formulated to explore the level of spirituality among sickle cell patients. The study found a higher level of spirituality among SCD sufferers. This is congruent with a study by Harrison et al. (2005) who explored spirituality and pain in patients with sickle cell disease and found that patients with sickle cell disease have high spirituality. Similarly, Cooper-Effa et al. (2001) studied what role spirituality played in SCD sufferers. The study assessed what role spirituality played in the people living with SCD trying to cope with their pain. They included 71 patients who completed a questionnaire on the ability to cope with pain and their degree of spirituality. A descriptive cross-sectional design was used. The analysis employed included correlation analysis and multiple regression analysis. The results from the analysis showed that among people suffering from SCD, there was a high degree of spirituality. In the same vein, Fradelos (2021) conducted a study on spiritual well-being and associated factors in end-stage renal disease. The aim of the study was to assess patients' spiritual well-being undergoing haemodialysis treatment and to identify factors associated with the spiritual well-being of the patients. A cross-sectional study was conducted where 367 patients were recruited for the study. Results showed that patients had a satisfactory spiritual well-being. They concluded that patients with end-stage renal disease reported moderate to high spirituality.

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This present study is consistent with other findings because, it is possible individuals in Ghana value spirituality in their health. In Ghana, the spirituality of a person is so important that it is considered as a way of life that contributes to their well-being and most people believe that it is inseparable from medical care. Ghanaians believe that they could get healing through practices centred around spirituality or with spiritual connotations including supplication, fasting, the use of spiritually fortified concoctions and objects of healing and the use of material imbued with spiritual power like talismans, holy oils, holy water just to name a few. It is therefore, not surprising that participants reported high level of spirituality in this population.

Spirituality and Quality of Life of Patients with Sickle Cell Disease

This hypothesis sought to explore the effect spirituality has on the quality of life among SCD sufferers. The study found a non-significant negative effect on all the domains of quality of life (physical, psychological, social and environmental). However, spirituality showed a negative significant relationship on quality of life as a whole. This means that a patient who has high spirituality has low quality of life and vice versa. This result contradicts most of the empirical data which suggest that spirituality had a positive significant relationship on quality of life. This means that patients who have high spirituality have high quality of life and vice versa.

In literature, spirituality has been extensively reported as having positive effect on the quality of life (Abou et al., 2018; Canada et al., 2015; Clayton-Jones & Haglund, 2016; Currier et al., 2016; Krause et al., 2015; Krumrei et al., 2013; Lee et al., 2014; Moon & Kim, 2013; Nolan et al., 2012; Puchalski, 2012; Wang et al., 2008)

Logically, one would expect a positive significant relationship of spirituality on quality of life, but that was not the case in this study. However, this finding is congruent with a study by Yun et al. (2013) who, in a prospective cohort study analysed how alternative and complementary medicine impacted on the health-related QoL as well as the survival of terminally ill patients with cancer. The study showed that individuals who utilised prayers, meditation, yoga and music therapy had a significant decrease in their quality of life when compared to those who did not utilise the spiritual practices. Another study by Levin (2012) reported an inverse relationship between prayers and quality of life. This means that prayers negatively impacted quality of life.

This disparity may be due to different instruments, conceptualisation and operationalisation used in assessing the same construct. That is to say, the effect spirituality has on quality of life may be dependent on how rightly it is defined and measured. It is also possible that individual's understanding of spirituality is not actually what spirituality is. People have narrowed the concept of spirituality to religiosity where they think spirituality is religiosity and vice versa. This is confirmed in Anim (2015) study which found that individuals with sickle cell disease used spirituality and religiosity interchangeable. In Ghana, people attribute chronic diseases (SCD) to spiritual cause and require expect spiritual treatment (de-Graft Aikins et al., 2012). Knowing that SCD is not spiritual, individuals who seek spiritual intervention might end up complicating their illness hence poor quality of life.

The conclusion drawn from the finding is that spirituality was inversely related to quality of life as far as this study is concerned. In as much as the findings are inconsistent with the expectations from the existing literature in the western world about the relationship between spirituality and QoL, it does appear that the findings are similar with reported finding in Ghana (Aglozo et al., 2021). Thus, perhaps due to the presence of "over exuberance", superstitious beliefs and deep rooted spiritual practices that are diametrically opposed to health seeking practices, the spirituality or expressed spiritual practices of individuals may actually work in opposition to their quality of life, hence the negative impact observed.

However, the findings regarding spirituality and quality of life require further investigation. Further research will be needed to explore why spirituality was inversely related to quality of life.

Utilisation of the Biopsychosocial-Spiritual Model and Quality of Life of Patients with Sickle Cell Disease

This hypothesis was formulated to explore the effect the biopsychosocial-spiritual model has on the quality of life of patients with sickle cell. The biological domain showed a significant positive effect on QoL. This means that individuals who received treatment by medication, injection, biological therapy and many others had improved quality of life. A study by LeBlanc et al. (2015) sought to find out the impact biological intervention had on ulcerative colitis patients' quality of life. The study employed a randomised controlled trial that compared biologics with placebo and reported the quality of life of patients. Findings of the study indicated that patients with ulcerative colitis had improved quality of life. This study is also consistent with Vis et al. (2020) who explored how pharmacological treatment affects the QoL of patients with sarcoidosis. They conducted a systematic review and concluded that pharmacological treatment improved quality of life. Other studies by de Azevedo Cardoso et al. (2014), de Lyra et al. (2007) and Katz (2002) showed a significant impact of biological interventions on quality of life.

Despite the above findings that have shown that biological treatment improved quality of life, studies by Barre et al. (2015) showed that medical intervention helped in stress management among cancer patients. However, the study found out that medical intervention did not significantly reduce stress to a minimal level neither did it increase the QoL to the optimum. They concluded that there is a need to incorporate psychological interventions in the treatment of stress and enhance the QoL of cancer victims.

It is possible respondents used by the researchers might have had quality and adequate treatment from their physicians as far as improving their health condition was concerned. As long as this study is concerned, biological treatment enhances an individual’s quality of life.

However, psychological showed a positive non-significant effect on quality of life. This means that the psychological domain of the biopsychosocial-spiritual model did not impact the quality of life of patients with sickle cell disease. Studies have shown how psychological treatment impacts QoL of patients (Anderson & Ozakinci, 2018; Anie, 2005; de la Torre-Luque et al., 2016). These studies reported improved quality of life among individuals. Logically, it is expected that psychological domain will impact the quality of life of individuals. Contrary to expectation, the results

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showed otherwise. The disparity in the studies may be due to lack of expertise, understanding and utilisation of the biopsychosocial-spiritual model by the health-care provider to enhance the quality of life of SCD suffers.

Again, a negative significant effect on quality of life was shown by the social domain. This means that individuals who had high social support (friends, family members and many other) had low quality of life and vice versa. However, a study by Sehlo and Kamfar (2015) studied the effect of social support on depression and quality of life in children suffering from SCD. The study included 120 children and made use of questionnaires. Findings of the study revealed that higher parental support led to a better quality of life. Again, a study by LaRocca and Scogin (2015) studied the effect of social support on quality of life in older adults receiving cognitive behavioural therapy. The study employed 137 participants. Hierarchical regression showed a positive significant increase in the quality of life of patients. Findings of the study concluded that social support can improve the quality of life of patients. Another study by Costa et al. (2012) also explored the impact of social care on the quality of life of multiple sclerosis patients. The study revealed that social support significantly impacted the quality of life of patients with multiple sclerosis. Contrary to the above studies listed, a study by Pallant and Himmel (2018) found a negative effect of social support on the QoL of participants. This study is in line with the present research. Finding a negative result of social support may be due to methodological limitations of the studies. Especially, problems with respect to the research design and measurement of social support and quality of life could explain why negative results of social support were found. With the measurement of the social

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domain, participants were asked to answer a five-point likert type scale the amount of support they receive from people. This ‘global’ measurement may not necessarily be valid for measuring social support even though there are nuances specified in types of support and sources of support.

Lastly, spiritual showed a positive non-significant effect on quality of life. This means that the spiritual domain of the biopsychosocial-spiritual model did not impact the quality of life of patients with sickle cell disease. This study is in line with a study by Ahmadi and Noormohammadi (2017). In the study, they sought to find out how teachings of spirituality impacted on the QoL of cancer patients. The study employed the pretest posttest experimental design and included 200 patients with different cancer types. Questionnaires were used to gather information on life expectancy and quality of life. After the administration of the questionnaire, healthy lifestyle was taught by the psychologist as well as the clergy. After the completion of the teachings, participants were re-assessed and data was analysed using descriptive statistics. The results showed a non-significant effect on quality of life. This means that spiritual teachings did not improve the QoL of cancer patients. However, some studies have shown the significance of spirituality in dealing with general health. According to Ghezeiseflo and Esbati (2013) spirituality may not only affect mental health and temperaments but can also affect physical conditions. Again, spirituality promotes the ability to deal with disease and speed up recovery. Studies by Allahbakhshian et al. (2010), Hamid et al. (2011) and Saffari et al. (2013) also demonstrated the correlation between spiritual wellbeing and QoL among different population. The findings indicated that spiritual health significantly correlates with QoL. The inconsistency between this study and that of others in confirming the spiritual effect in promoting the quality of life of patients can be due to the differences in research approach, sample sizes or other population considerations and the extent of spirituality among different people.

From the above hypothesis, it is evident that the psycho-spiritual domain of the biopsychosocial-spiritual model did not impact SCD patients' QoL. The biopsychosocial-spiritual model and quality of life work hand in hand. It is believed that when the model is used holistically, it will improve the quality of life of patients. In this study, it was found that the biological model was utilised than other components, hence that was the only model that positively influenced quality of life. If the model was used holistically, it is possible it would have influenced the quality of life of patients. Therefore, the hypothesis did not support the theory. Research will be needed in this area to investigate the reason the psycho-spiritual domains did not impact QoL of patients with SCD.

Revisiting the Theoretical and Conceptual Framework

The theoretical framework suggested the incorporation of the biopsychosocial-spiritual model into practice in order to enhance the QoL of patients with SCD. In this present study, it was found that just the biological (biomedical) model was incorporated in treatment, hence patients did not have a holistic treatment. To see the efficacy of the model, it is essential to integrate it in practice.

The conceptual framework suggested that the biopsychosocial-spiritual model will influence the QoL of SCD patients. From the present study, it was found that only the biosocial influenced the quality of life of patients with sickle cell. This means that patients with sickle cell only benefited from biomedical intervention as well as social support available to them.

More so, the conceptual framework suggested the impact of spirituality on the quality of life of patients with sickle cell disease. The study found an impact on the quality of life of SCD sufferers; however, the impact was negatively significant.

Chapter Summary

This chapter presented the results and discussions on the application of the biopsychosocial-spiritual model in improving the quality of life of patients with sickle cell. The study revealed that the most dominant model of the biopsychosocial-spiritual model is the biological (biomedical) model. It also revealed that patients with SCD have both high quality of life and spirituality. Finally, the study found out that spirituality and the biosocial model impacted QoL of SCD sufferers. Summary, conclusions and recommendations follows in the next chapter.

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CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The results of the analysis of this study are summarised in the section. They are based on the study's objectives with regard to the biopsychosocial-spiritual model and its impact on QoL of SCD patients in the Greater Accra region of Ghana. The section also includes conclusions from which key recommendations were made.

Overview of the Study

The research focused on the utilisation of the BPSS model in the management of patients with SCD and their QoL. It employed the descriptive survey with convenience sampling. The total registered patients were 26,760 of which 8,545 attended clinics as of 2020. The study drew a total of 261 participants from the total attendance. A researcher- developed instrument on the biopsychosocial-spiritual model and the world health organisation quality of life as well as the spirituality rating scale were employed. 261 participants returned the questionnaire. The study employed the structural equation modelling as well as descriptive statistics such as means, standard deviation, percentages and frequencies in its analysis.

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Summary of Key Findings

Utilisation of the Biopsychosocial-Spiritual Model

Health-care providers adopt the biological (biomedical) model in their practice leaving the psychosocial-spiritual model to total abandonment

Level of Quality of Life

The study found that patients with sickle cell disease have high quality of life.

Level of Spirituality

The study revealed that patients with sickle cell disease have high level of spirituality

Spirituality Relating Significantly with Quality of Life

The study found a negative significant impact of spirituality on quality of life of patients with sickle cell. This means that individuals with high spirituality recorded poor quality of life and vice versa.

Utilisation of the Biopsychosocial-Spiritual Model Relating Significantly with Quality of Life

The study found that the biological domain positively impacted quality of life of patients with sickle cell. This means that individuals receiving treatment using the biomedical intervention reported high quality of life. However, the study found that the social domain negatively impacted quality of life of patients with sickle cell. This means that individuals who received social support from people reported low quality of life and vice versa.

The two domains (psychological and spiritual) were not supported by this hypothesis.

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Conclusions

This study was conducted based on the problem identified among patients with sickle cell disease. It was hinged on three theories; the biopsychosocial-spiritual model of chronic pain (Taylor et al., 2013) which gave insight into the adaptation of the biopsychosocial-spiritual model in treatment and its significance in improving the quality of life of patients with sickle cell. The gate control theory of pain (Melzack & Wall, 1965) gave insight on how pain is experienced by a patient with sickle cell and how it impacts their quality of life. Also, the integrated theory of quality of life (Ventegodt et al., 2003) gave insight on how quality of life should be viewed from a holistic perspective (physical health, psychological, social and environment).

The purpose of the study was to find out the extent to which the biopsychosocial-spiritual model was utilised and how it improved the quality of life of patients as well as how spirituality impacted the lives of individuals. The study found that only the biological domain was applied. It can therefore be concluded that the psychosocial-spiritual domains were not given importance when treating individuals with SCD. The study also found that patients with SCD at GICG had high quality of life. It can be concluded that these individuals understand their condition and take effective ways in managing their health. The study also reported high level of spirituality. This can be concluded that individuals place importance on their spirituality. Again, the study found that spirituality impacted the quality of life of individuals. This means that spirituality when utilised well can improve the quality of life of patients with SCD. Also, the study found that the biosocial

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domains impacted the quality of life of patients with SCD. Therefore, the biomedical intervention and good social support system can improve the quality of life of patients with sickle cell.

The concept of patient's QoL is central to the study due to the interaction between QoL and various variables such as spirituality, social support and biomedical interventions. Therefore, to ensure the quality of life of patients with sickle cell, there is a need to look at these variables.

Recommendations

1. The study showed that only the biological domain was utilised by health-care providers. It is recommended that policy-makers should train health-care workers to incorporate the psychosocial-spiritual model in health so that an individual can have a holistic care.
2. Since the biological domain was the only construct that positively impacted quality of life of patients, medical practitioners should continue the use of biomedical interventions as it improves the quality of life of patients with sickle cell disease.
3. In order to evaluate the biopsychosocial-spiritual model, health-care providers should learn to incorporate the biopsychosocial-spiritual model as a whole in practice to measure its effectiveness.
4. Even though the social domain negatively impacted quality of life, it meant that the social domain can as well impact quality of life positively if done well. Hence, friends and family should provide good social support for these people and refrain from stigmatising these people. If this is done well, it is hoped that the quality of life of patients will be improved.

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5. Since spirituality (the resource patients use in managing their disease) significantly impacted the quality of life of patients with sickle cell disease, patients should continue using spirituality in their day-to-day activity in order to enhance their quality of life.

Contributions to Knowledge

1. The research highlighted the importance of utilising the biopsychosocial-spiritual model.
2. Contribution to methodology-The study has brought forth a scale for measuring the utilisation of the biopsychosocial-spiritual model
3. Contribution to the medical fraternity- The study has added to the knowledge base in the medical field.
4. Contribution to religious bodies- It has shown that utilising spirituality can impact ones QoL. Hence, spirituality should be used with caution.

Suggestions for Future Research

The study explored the application of the biopsychosocial-spiritual model in improving the quality of life of patients with sickle cell disease. It employed the quantitative approach research design. Hence, subsequent research should focus on;

1. Developing a biopsychosocial-spiritual scale to suit the general population as there seem to be no instrument measuring the utilisation of the model.
2. Employing a mixed method where health-care providers and patients will express their opinion about the use of the model. This will help come out with concrete stand as to whether the model is utilised or not.
3. Determining children’s quality of life.

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4. The ethnic diversity of individuals with sickle cell disease

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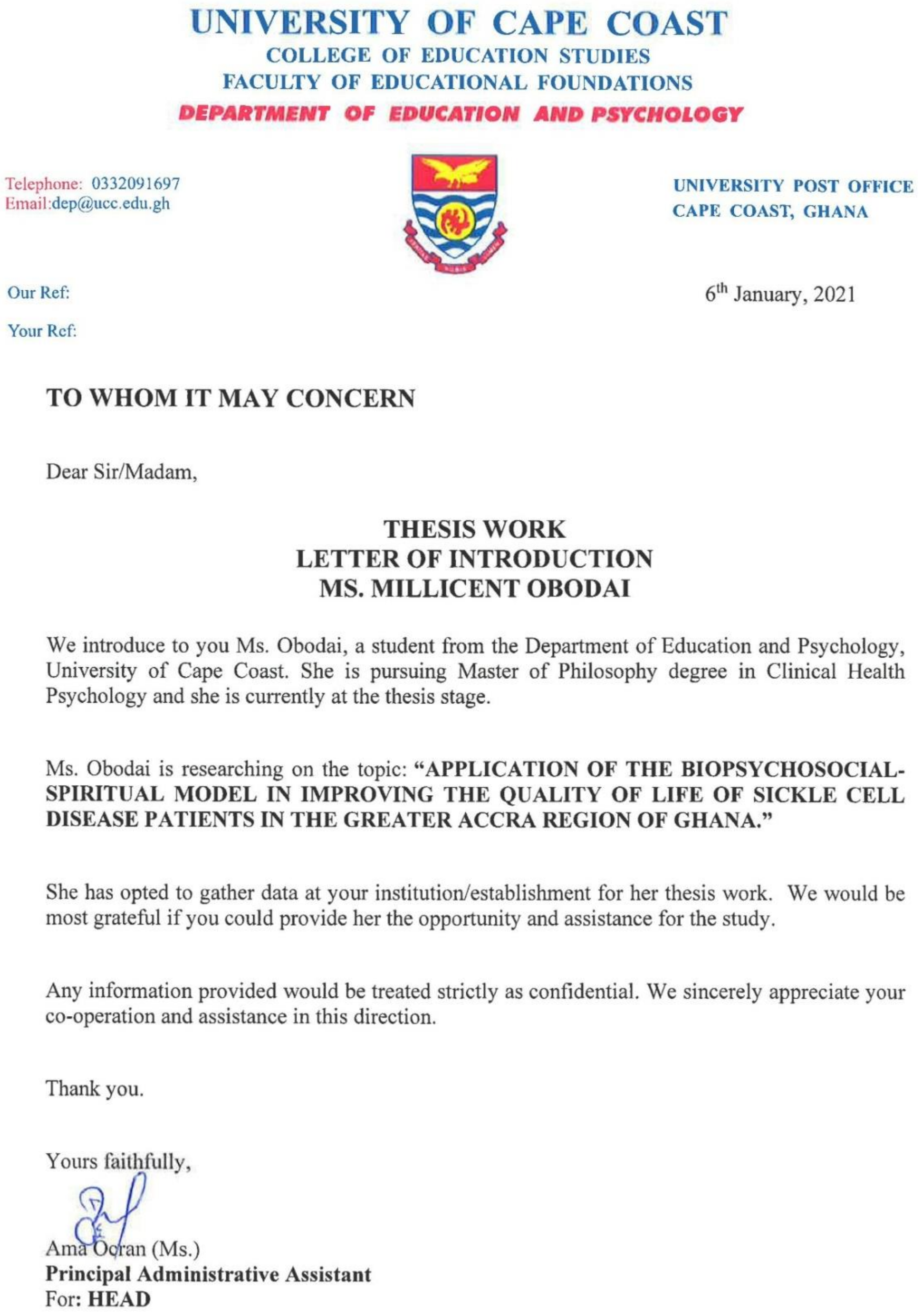
APPENDICES

APPENDIX A

INTRODUCTORY LETTER



UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
FACULTY OF EDUCATIONAL FOUNDATIONS
DEPARTMENT OF EDUCATION AND PSYCHOLOGY

Telephone: 0332091697
Email:dep@ucc.edu.gh

UNIVERSITY POST OFFICE
CAPE COAST, GHANA

Our Ref:

Your Ref:

6th January, 2021

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

THESIS WORK
LETTER OF INTRODUCTION
MS. MILLICENT OBODAI

We introduce to you Ms. Obodai, a student from the Department of Education and Psychology, University of Cape Coast. She is pursuing Master of Philosophy degree in Clinical Health Psychology and she is currently at the thesis stage.

Ms. Obodai is researching on the topic: **"APPLICATION OF THE BIOPSYCHOSOCIAL-SPIRITUAL MODEL IN IMPROVING THE QUALITY OF LIFE OF SICKLE CELL DISEASE PATIENTS IN THE GREATER ACCRA REGION OF GHANA."**

She has opted to gather data at your institution/establishment for her thesis work. We would be most grateful if you could provide her the opportunity and assistance for the study.

Any information provided would be treated strictly as confidential. We sincerely appreciate your co-operation and assistance in this direction.

Thank you.

Yours faithfully,

Ama Ocran (Ms.)
Principal Administrative Assistant
For: **HEAD**

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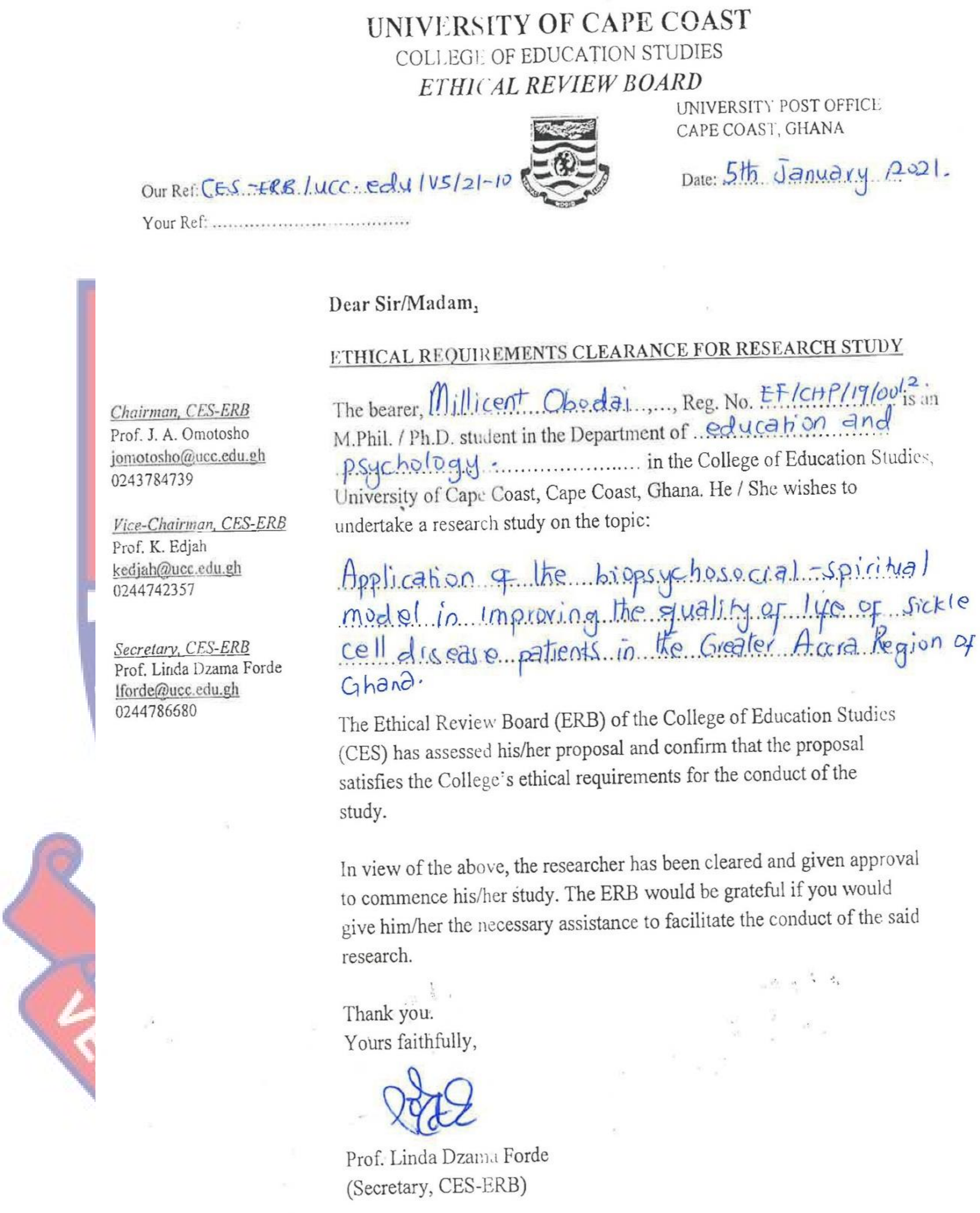

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
ETHICAL REVIEW BOARD

UNIVERSITY POST OFFICE
CAPE COAST, GHANA

Our Ref: CES-ERB/ucc.edu/V5/21-10

Your Ref: ………………………………

Date: 5th January 2021.

Chairman, CES-ERB
Prof. J. A. Omotosho
jomotosho@ucc.edu.gh
0243784739

Vice-Chairman, CES-ERB
Prof. K. Edjah
kedjah@ucc.edu.gh
0244742357

Secretary, CES-ERB
Prof. Linda Dzama Forde
lforde@ucc.edu.gh
0244786680

Dear Sir/Madam,

ETHICAL REQUIREMENTS CLEARANCE FOR RESEARCH STUDY

The bearer, Millicent Obodai, Reg. No. EF/CHP/19/0012 is an M.Phil. / Ph.D. student in the Department of education and psychology. in the College of Education Studies, University of Cape Coast, Cape Coast, Ghana. He / She wishes to undertake a research study on the topic:

Application of the biopsychosocial-spiritual model in improving the quality of life of sickle cell disease patients in the Greater Accra Region of Ghana.

The Ethical Review Board (ERB) of the College of Education Studies (CES) has assessed his/her proposal and confirm that the proposal satisfies the College's ethical requirements for the conduct of the study.

In view of the above, the researcher has been cleared and given approval to commence his/her study. The ERB would be grateful if you would give him/her the necessary assistance to facilitate the conduct of the said research.

Thank you.
Yours faithfully,

Prof. Linda Dzama Forde
(Secretary, CES-ERB)

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My Ref. No. KBTH/MD/98/21
Your Ref. No...........................

KORLE BU TEACHING HOS
P. O. BOX KB 77,
KORLE BU, ACCRA.

Tel: +233 302 667759/673034-
Fax: +233 302 667759
Email: Info@kbth.gov.gh
pr@kbth.gov.gh
Website: www.kbth.gov.gh

24th March, 2021

MILLICENT OBODAI
DEPARTMENT OF EDUCATION AND PSYCHOLOGY
UNIVERSITY OF CAPE COAST

SCIENTIFIC AND TECHNICAL COMMITTEE APPROVAL
PROTOCOL IDENTIFICATION NUMBER: KBTH-STC 00020/2021

The Korle Bu Teaching Hospital Scientific and Technical Committee (KBTH-STC), on 24th March, 2021 approved your submitted study protocol.

TITLE OF PROTOCOL: "Application of the Biopsychosocial- Spiritual Model in Improving the Quality of Life of Sickle Cell Disease Patients in the Greater Accra Region of Ghana."

PRINCIPAL INVESTIGATOR: Millicent Obodai

This approval requires that you **forward your approved document to Korle Bu Teaching Hospital –Institutional Review Board (KBTH-IRB) for the ethical aspect of the proposal to be assessed before the project can be initiated.**

This STC approval is valid till 30th December, 2021
You may, however, request extension of the approval period, or renewal as the case may be, should the study extend beyond the stated period.

Upon completion, you are required to submit a final report on the study to the STC. This is to enable the STC ensure among others that, the project has been implemented as per the approved protocol. You are also required to inform the KBTH-STC and Research Directorate of any publications that may emanate from the research findings.

Kindly note that, should the need arise, the KBTH-STC or IRB may institute appropriate measures to satisfy itself that study is being conducted according to the highest scientific and ethical standards.

Please note that any modification to the study protocol without Scientific Technical Committee (STC) approval renders this approval invalid.

Sincere regards,

Prof. G. Obeng Adjei
Chairman, KBTH-STC

Cc: The Chairman, KBTH-IRB

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Tel: +233 302 667759/673034-6
Fax: +233 302 667759
Email: Info@kbth.gov.gh
pr@kbth.gov.gh
Website: www.kbth.gov.gh

20th May, 2021

MILLICENT OBODAI
DEPARTMENT OF EDUCATION AND PSYCHOLOGY
UNIVERSITY OF CAPE COAST

APPLICATION OF THE BIOPSYCHOSOCIAL-SPIRITUAL MODEL IN IMPROVING THE QUALITY OF LIFE OF SICKLE CELL DISEASE PATIENTS IN THE GREATER ACCRA REGION OF GHANA.

KBTH-IRB /00020/2021

INVESTIGATOR: Millicent Obodai

The Korle Bu Teaching Hospital Institutional Review Board (KBTH IRB) reviewed and granted approval to the study entitled: "Application of the Biopsychosocial- Spiritual Model in Improving the Quality of Life of Sickle Cell Disease Patients in the Greater Accra Region of Ghana."

Please note that the Board requires you to submit a final review report on completion of this study to the KBTH-IRB.

Kindly, note that, any modification/amendment to the approved study protocol without approval from KBTH-IRB renders this certificate invalid.

Please report all serious adverse events related to this study to KBTH-IRB within seven days verbally and fourteen days in writing.

This IRB approval is valid till 30th April, 2022. You are to submit annual report for continuing review.

Sincere regards,

DR. DANIEL ANKRAH
VICE CHAIR (KBTH-IRB)
FOR: CHAIR (KBTH-IRB

Cc: The Chief Executive Officer, KBTH
The Director of Medical Affairs, KBTH

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KORLE BU TEACHING HOSPITAL
1923
Excellence in Healthcare

KORLE BU TEACHING HOSPITAL
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KORLE BU, ACCRA.

Tel: +233 302 667759/673034-6
Fax: +233 302 667759
Email: Info@kbth.gov.gh
pr@kbth.gov.gh
Website: www.kbth.gov.gh

20th May, 2021

MILLICENT OBODAI
DEPARTMENT OF EDUCATION AND PSYCHOLOGY
UNIVERSITY OF CAPE COAST

INSTITUTIONAL APPROVAL: KORLE BU TEACHING HOSPITAL-SCIENTIFIC AND TECHNICAL COMMITTEE/INSTITUTIONAL REVIEW BOARD (KBTH-STC/IRB/00020/2021

Following approval of your study entitled "Application of the Biopsychosocial-Spiritual Model in Improving the Quality of Life of Sickle Cell Disease Patients in the Greater Accra Region of Ghana" by the Korle Bu Teaching Hospital-Scientific and Technical Committee/Institutional Review Board.

I am pleased to inform you that institutional approval has been granted for the conduct of your study in Korle Bu Teaching Hospital.

Please contact the Heads of Departments to discuss the commencement date of the study.

Please note that, this institutional approval is rendered invalid if the terms of the Institutional Reviewed Board/Scientific and Technical Committee approval are violated.

Sincere regards,

Dr. Ali Samba
Director of Medical Affairs
For: Chief Executive

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GICG

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GHANA INSTITUTE OF
CLINICAL GENETICS

P.O. BOX 150, KORLEBU
ACCRA - GHANA
TEL: 0302690822

My Ref. No:......................................
Your Ref. No:....................................

MINISTRY OF HEALTH, GHANA

7th June, 2021

Dear Ms. Millicent Obodai,

RE: PERMISSION TO CARRY OUT A PROJECT AT THE SICKLE CELL CLINIC, KORLE-BU

You are welcome to carry out your study at the Ghana Institute of Clinical Genetics – Sickle Cell Clinic, Korle-Bu. You are also reminded to give a copy of your project work after completion to the institute.

Thank you.

Dr Yvonne Dei-Adomakoh
Director

Sponsors: Ministry of Health

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APPENDIX B

UNIVERSITY OF CAPE COAST

INSTITUTIONAL REVIEW BOARD

INFORMED CONSENT FORM

TITLE: Application of the Biopsychosocial- Spiritual model in improving the quality of life of sickle cell disease patients in the Greater Accra Region of Ghana.

Principal Investigator: MILLICENT OBODAI

Address: Department of Education and Psychology, Faculty of Educational Foundations, University of Cape Coast.

General Information about Research

Sickle cell disease is a blood disorder that is characterised by severe, often unpredictable, chronic pain episodes or "crises" that may require hospitalisation. This disease affects any part of the human body and varies widely between individuals. The typical solution to those chronic pain episodes by many health facilities has been to provide drugs and hospitalisation, what we call biomedical therapies.

Because individuals have psychological issues and are often supported by or find themselves among a social environment, many researchers have found the use in integrating psychological intervention and social support with drugs or hospitalisation. Also, the religious and spiritual resources of people have been found to be a good help in treating them. This research seeks to find out how doctors and other healthcare givers have included social support or the

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spiritual resources of their clients in treating chronic pain in Sickle cell disease.

Your responses would help the researchers and subsequent scientists to deepen understanding of the integrated treatment model.

Procedures

To find answers to some of these questions, we invite you to take part in this research project. If you accept, you will be required to:

Fill out a questionnaire which will be provided and collected by Millicent Obodai.

You are being invited to partake in this research because you fall into category of people experiencing chronic pain in sickle cell disease. Data on your experiences with your care giver, your quality of life as well as your spiritual resources would be collected.

You may skip any questions you do not wish to answer. When you fill the questionnaire form, your information will be kept anonymous and confidential and no one but Millicent Obodai would have access to the information. You will participate in the research for approximately 20-25 minutes.

Possible Risks and Discomforts

There are no direct risks to filling out the questionnaire however if it makes you uncomfortable to sit for long times, you may pause for a while and relax.

VERITAS LUMEN NOBIS

Possible Benefits

The results of the research will be beneficial to deepening knowledge of helpful practices in healthcare delivery among sickle cell patients. This would be vital in helping sickle cell patients through their chronic pain.

Alternatives to Participation

Not Applicable.

Confidentiality

Your information will be protected to the best of our ability. Your name would not be mentioned and any personally identifying information would be anonymised. After the period of the research, all physical data would be destroyed and soft copies kept securely.

Compensation

There will be no form of compensation

Additional Cost

There will be no additional costs for the participants to bear

Staying in the Research

Not Applicable

Voluntary Participation and Right to Leave the Research

Participation in this research is purely voluntary and you reserve the right to withdraw consent now or at any point during this research.

VERITAS NOBIS LUMEN

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Termination of Participation by the Researcher

If you do not meet our inclusion criteria, we would terminate your participation and you may not proceed.

Contacts for Additional Information

For any information pertaining to this research or any injury inflicted by this research contact:

The Principal Investigator

Millicent Obodai

Mobile: 0241592158

Email: millicentobodai3@gmail.com

Your rights as a Participant

This research has been reviewed and approved by the Institutional Review Board of University of Cape Coast (UCCIRB). If you have any questions about your rights as a research participant you can contact the Administrator at the IRB Office between the hours of 8:00 am and 4:30 p.m. through the phones lines 0558093143/0508878309/0244207814 or email address: irb@ucc.edu.gh.

VOLUNTEER AGREEMENT

The above document describing the benefits, risks and procedures for the research titled APPLICATION OF THE BIOPSYCHOSOCIAL- SPIRITUAL MODEL IN IMPROVING THE QUALITY OF LIFE OF SICKLE CELL DISEASE PATIENTS IN THE GREATER ACCRA REGION OF GHANA

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has been read and explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I agree to participate as a volunteer.

____________ ________________________________

Date Name and signature or mark of volunteer

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered and the volunteer has agreed to take part in the research.

______________ ____

Date Name and signature of witness

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

__________________ ____

Date Name Signature of Person Who Obtained Consent

VERITAS LUMEN NOBIS

APPENDIX C

UNIVERSITY OF CAPE COAST

DEPARTMENT OF EDUCATION AND PSYCHOLOGY

RESEARCH QUESTIONNAIRE

The instrument aims at eliciting your views in your treatment process given by your health care provider, you quality of life as well as your spirituality. You are kindly asked to offer truthful and honest responses that will help the researcher collect reliable data for this study as this questionnaire is only intended for academic use. All of your responses will be kept private.

Informed consent

I have given my consent to participate in this study after acquainting myself with all the relevant knowledge I require to make a decision. Please tick the box if you agree [ ].

Please peruse the questions and answer the following

SECTION A

SOCIO-DEMOGRAPHIC CHARACTERISTICS.

Tick (√) the appropriate box

1. What is your current age? …………
2. Gender: Male [ ] Female [ ]
3. What is your highest educational qualification? No school [ ] Primary [ ] Junior high [ ] Senior high [ ] Tertiary [ ]
4. Marital status: Single [ ] Married [ ] Separated [ ] Divorce [ ]
5. Religious affiliation: Christianity [ ] Islamic [ ] Traditionalist [ ] Other [ ]

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SECTION B

Directions: Please answer the following statements by placing a tick (√). **1= Always; 2= Very often; 3= Sometimes; 4= Rarely; 5= Never**

How often does your health care provider

S/N	Statement	1	2	3	4	5
1	Ask your genotype?					
2	Ask your age?					
3	Ask you to run a test?					
4	Ask you if any family member has the disease?					
5	Ask if any family member have similar problems?					
6	Ask what brought you to the clinic?					
7	After listening to your complaint explain what the next step will be?					
8	After running relevant tests and examinations, informed you or your attendant about the diagnosis?					
9	Inform you about the cause of the disease?					
10	Inform you about the treatment plan?					
11	Ask whether you understood or not?					
12	Prescribe medicine for you?]					
13	Ask if you were worried about situations in which you might panic?					
S/N	Statement	1	2	3	4	5

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14	Ask if you were worried about situations in which you might make a fool of yourself?					
15	Ask if you felt you had nothing to look forward to?					
16	Ask if you felt that you are using a lot of energy?					
17	Ask if you found yourself getting agitated?					
18	Ask if you couldn’t seem to experience any positive feeling at all?					
19	Ask if you found it difficult to relax?					
20	Ask if you felt down-hearted?					
21	Ask if you experience breathing difficulty?					
22	Ask if you were unable to be enthusiastic about anything?					
23	Ask if you felt you were not worth much as a person?					
24	Ask if you felt scared without any good reason?					
25	Ask if you felt that life was meaningless?					
26	Ask if you were close to panic?					
27	Ask if you are aware of dryness of your mouth?					
28	Ask if you over react to situations?					
29	Ask you to see a therapist?					
30	Introduce him/herself?					
S/N	Statement	1	2	3	4	5

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31	Ask you to introduce yourself?					
32	Ask about your occupation?					
33	Ask you to change certain lifestyle as a result of your illness?					
34	Ask about your lifestyle before the illness?					
35	Ask if others cared about what happens to you?					
36	Ask if people show you love and affection?					
37	Ask if you had the chance to talk to others about your problems?					
38	Ask if you had the chance to talk with someone you trust about personal and family problems?					
39	Ask if you had the chance to talk to someone about your financial matters?					
40	Ask if you were invited to go out and do things with others?					
41	Ask if someone advised you about important things in life?					
42	Ask if someone helped you when you were sick?					
43	Ask if you have a problem interacting with people in society?					
44	Ask if you participate in a social activity?					
45	Ask if your interaction with people affects your sleep?					
S/N	Statement	1	2	3	4	5

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46	Ask if your condition affects your daily functions?					
47	Ask if your condition affects you from accessing health care?					
48	Ask if you were comfortable during your interaction?					
49	Ask if you felt at ease while talking to him/her?					
50	Ask you to seek social support?					
51	Ask if any problem interfered with your ability to participate in public spiritual activities?					
52	Ask if any problem interfered with your ability to participate in private spiritual activities?					
53	Ask if you pray?					
54	Ask if you attend religious activity?					
55	Ask if your life really mattered?					
56	Ask if you listen to spiritual programs?					
57	Ask if you have a sense of purpose in life?					
58	Ask if your life lacks meaning and purpose?					
59	Ask you to seek counsel from a spiritual authority?					

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SECTION C

This section assesses your quality of life. ‘‘Think about your life in the last four weeks and answer the following questions. **1= Very poor; 2= Poor; 3= Neither poor nor good; 4= Good; 5= Very good**

1.	How would you rate your quality of life?					

1= Very dissatisfied; 2= Dissatisfied; 3= Neither satisfied nor dissatisfied; 4= Satisfied; 5= Very Satisfied

2.	How satisfied are you with your health?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last four weeks. **1= Not at all; 2= A little; 3= A moderate amount; 4= Very much; 5= An extreme amount**

3.	To what extent do you feel that physical pain prevents you from doing what you need to do?	1	2	3	4	5
4.	How much do you need any medical treatment to function in your daily life?					
5.	How much do you enjoy life?					
6.	To what extent do you feel your life to be meaningful?					
7.	How well are you able to concentrate?					
8.	How safe do you feel in your daily life?					

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9.	How healthy is your physical environment?					

The following questions ask about how completely you experience or were able to do certain things in the last four weeks. **1= Not at all; 2= A little; 3= Moderately; 4= Mostly; 5= Completely**

10.	Do you have enough energy for everyday life?	1	2	3	4	5
11.	Are you able to accept your bodily appearance?					
12.	Have you enough money to meet your needs?					
13.	How available to you is the information that you need in your day-to-day life?					
14.	To what extent do you have the opportunity for leisure activities?					

Please tick the appropriate one **1= Very poor; 2= Poor; 3= Neither poor nor good; 4= Good; 5= Very good**

15.	How well are you able to get around?	1	2	3	4	5

Please tick the appropriate one **1= Very dissatisfied; 2= Dissatisfied; 3= Neither satisfied nor dissatisfied; 4= Satisfied; 5= Very Satisfied**

16.	How satisfied are you with your sleep?	1	2	3	4	5
17.	How satisfied are you with your ability to perform your daily living activities?					
18.	How satisfied are you with your capacity for work?					

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19.	How satisfied are you with yourself?					
20.	How satisfied are you with your personal relationships?					
21.	How satisfied are you with your sex life?					
22.	How satisfied are you with the support you get from your friends?					
23.	How satisfied are you with the conditions of your living place?					
24.	How satisfied are you with your access to health services?					
25.	How satisfied are you with your transport?					

The following question refers to how often you have felt or experienced certain things in the last four weeks. **5= Never 4= Seldom 3= Quite often 2= Very often 1=Always**

26.	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	5	4	3	2	1

SECTION D

Directions: Select the degree to which the statement apply to you by placing a tick (√)**1= Strongly Agree; 2= Agree; 3= Undecided; 4= Disagree; 5= Strongly Disagree**

S/N	Statement	1	2	3	4	5
1.	It is important for me to spend time in private spiritual thought and meditation.					
2.	I try hard to live my life according to my religious beliefs.					
3.	The prayers or spiritual thoughts that I say when I am alone are as important to me as those said by me during services or spiritual gatherings.					
4.	I enjoy reading about my spirituality and/or my religion.					
5.	Spirituality helps to keep my life balanced and steady in the same ways as my citizenship, friendships, and other memberships do.					
6.	My whole approach to life is based on my spirituality''.					

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APPENDIX D

RESULTS OF EXPLORATORY ANALYSIS

Table 16: Biological Domain and its Determinant, KMO, Chi Square, Sig Value and Total Variance.

Domain	Determinant	KMO	Chi square	Df	Sig	Total variance explained
Biological	.033	.656	320.262	66	.000	42.3%

Source: Field data, 2021

Table 17: Factor Loadings for the Biological Domain

Items	Genetics	Med. Information
Ask your genotype?	.369	
Ask your age?	.497	
Ask you to run a test?		.429
Ask you if any family member has the disease?	.811	
Ask if any family member have similar problems?	.825	
Ask what brought you to the clinic?		.670
After listening to your complaint explain what the next step will be?		.645
After running relevant tests and examinations, informed you or your attendant about the diagnosis?		.714
Inform you about the cause of the disease?	.492	
Inform you about the treatment plan?		.542
Ask whether you understood or not?		.300
Prescribe medicine for you?		-.349

Source: Field data, 2021

Psychological

Table 18: Psychological Domain and its Determinant, KMO, Chi Square, Sig Value and Total Variance.

Domain	Determinant	KMO	Chi square	Df	Sig	Total variance explained
Psychological	8.854E-7	.914	1289.189	136	.000	68.13%

Source: Field data, 2021

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Table 19: Factor Loading for the Psychological Domain

Items	Depression	Anxiety	Stress
Ask if you were worried about situations in which you might panic?		.601	
Ask if you were worried about situations in which you might make a fool of yourself?		.692	
Ask if you felt you had nothing to look forward to?	.381		
Ask if you felt that you are using a lot of energy?			.311
Ask if you found yourself getting agitated?			.721
Ask if you couldn’t seem to experience any positive feeling at all?	.447		
Ask if you found it difficult to relax?			.808
Ask if you felt down-hearted?	.766		
Ask if you experience breathing difficulty?		.797	
Ask if you were unable to be enthusiastic about anything?	.782		
Ask if you felt you were not worth much as a person?	.775		
Ask if you felt scared without any good reason?		.514	
Ask if you felt that life was meaningless?	.845		
Ask if you were close to panic?		.713	
Ask if you are aware of dryness of your mouth?		.615	
Ask if you over react to situations?			.701
Ask you to see a therapist?			.618

Source: Field data, 2021

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Social

Table 20: Social Domain and its Determinant, KMO, Chi Square, Sig Value and Total Variance.

Domain	Determinant	KMO	Chi square	Df	Sig	Total variance explained
Social	1.286E-5	.848	1026.662	210	.000	54.0%

Source: Field data, 2021

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Table 21: Factor Loadings for the Social Domain

Items	Social Support	Patient-Provider	Activity of daily living
Introduce him/herself?		.556	
Ask you to introduce yourself?		.613	
Ask about your occupation?		.782	
Ask you to change certain lifestyle as a result of your illness?		.693	
Ask about your lifestyle before the illness?		.634	
Ask if others cared about what happens to you?	.705		
Ask if people show you love and affection?	.529		
Ask if you had the chance to talk to others about your problems?	.734		
Ask if you had the chance to talk with someone you trust about personal and family problems?	.756		
Ask if you had the chance to talk to someone about your financial matters?	.790		
Ask if you were invited to go out and do things with others?			.743
Ask if someone advised you about important things in life?	.796		
Ask if someone helped you when you were sick?	.671		
Ask if you have a problem interacting with people in society?			.646
Ask if you participate in a social activity?			.359
Ask if your interaction with people affects your sleep?			.576
Ask if your condition affects your daily functions?			.619
Ask if your condition affects you from accessing health care?			.655
Ask if you were comfortable during your interaction?		.780	
Ask if you felt at ease while talking to him/her?		.572	
Ask you to seek social support?	.560		

Source: Field data, 2021

Spiritual

Table 22: Spiritual Domain and its Determinant, KMO, Chi Square, Sig Value and Total Variance.

Domain	Determinant	KMO	Chi square	Df	Sig	Total variance explained
Spiritual	.005	.899	504.580	36	.000	68.6%

Source: Field data, 2021

Table 23: Factor Loadings for the Spiritual Domain

Items	Relationship with God	Sense of purpose
Public spiritual activity	.808	
Private spiritual activity	.791	
Pray	.861	
Attend religious activity	.847	
Life mattered to you		.840
Spiritual programs	.591	
Sense of purpose		.441
Lack meaning in life		.575
Seek spiritual counsel	.720	

Source: Field data, 2021

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