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DEPRESSION, ANXIETY AND QUALITY OF LIFE OF PATIENTS WITH RHEUMATOID ARTHRITIS AT THE KORLE BU TEACHING HOSPITAL

BY

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DECLARATION

I **Joshua Sanka Kodi,** do hereby declare that this dissertation is a result of my own effort under the guidance of my supervisor and to the best of my knowledge has not been presented wholly of partly to this institution or any other institution. All references used in this work have been duly acknowledged.

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KODI JOSHUA SANKA DATE

(STUDENT)

……... ……..

DR IRENE KRETCHY DATE

(ACADEMIC SUPERVISOR)

DEDICATION

I dedicate this dissertation to my beloved mother

To God be the glory

ACKNOWLEDGEMENT

I am grateful to the Almighty God for His abundant mercies.

I want to express my sincerest gratitude to Dr. Irene Kretchy, my academic supervisor who offered me the needed guidance and motivation to help me finish this work.

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ABSTRACT

Introduction: Depression and anxiety may affect quality of life (Qol) and levels of medication adherence in patients with rheumatoid arthritis. Very little data exist on the subject in sub-Saharan Africa.

Objective: To identify the symptoms of depression and anxiety among patients with rheumatoid arthritis and assess the associations among depression, anxiety, adherence and quality of life.

Methods: A hospital-based cross-sectional quantitative study was carried out on 93 patients with rheumatoid arthritis at the Korle-Bu Teaching Hospital in Ghana. The Hospital Anxiety and Depression Scale, EQ-5D-5L and Morisky-Green-Levine scale were used to measure depression and anxiety, QoL and adherence respectively. Data were analysed using Stata 15. Simple linear regression, logistic regression and chi square were used to assess associations between variables.

Results: Depression and anxiety prevalence was found to 20.4% and 29.0% respectively. Adherence to drug regimen among respondents was 62.4%. The mean EQ5D index and EQVAS measured were 0.71 ± 0.13 and 70.10 ± 18.33 respectively. The median EQ5D index and EQVAS were 0.71 with IR of 0.147(0.653-0.800) and 70 with IR of 30(55-85) respectively. Although initial analysis found significant association between anxiety and depression and quality of life after adjustments were done these were found not to be significant. Comorbid hypertension and age were found however to affect quality of life and adherence respectively.

Conclusion: The prevalence of depression and anxiety are high in patients with rheumatoid arthritis. The disease affects quality of life of sufferers negatively. There is therefore the need to actively seek and manage these accordingly to improve clinical outcome.

Keywords: Rheumatoid arthritis, depression, anxiety, HADS, quality of life, adherence.

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LIST OF ABBREVIATIONS AND ACRONYMS

WHO – World Health Organisation

NICE – National Institute Health and Clinical Excellence

QoL – Quality of Life

KBTH – Korle Bu Teaching Hospital

ACR – American College of Rheumatology

EULAR – European League Against Rheumatism

DMARDs – Disease-modifying antirheumatic drugs

HADS – Hospital Anxiety and Depression Scale

cOR – crude Odds Ratio

aOR - adjusted Odds Ratio

CHAPTER ONE

INTRODUCTION

1.1 Background

Rheumatoid arthritis is a common autoimmune inflammatory disease which affects joints including that of the hands and feet causing pain, swelling, stiffness and deformity of the joints (Kahl, De Fer, & Henderson, 2012). Most often the disease exhibits chronicity and can be disabling and sometimes having systemic effects (Kahl et al., 2012). The intensity of the disease may range from mild to severe. The disease which often relapses is treated with analgesics and disease modifying medicines which reduce inflammation, and surgery which is occasionally employed in very badly deformed joints (Kumar & Clark, 2017).

According to the World Health Organization, the disease is more common in women and has a prevalence of between 0.3% and 1% (2018). The disease is however ranked forty-second (42^{nd}) out of 291 diseases, just below malaria in the global disability of disease burden in 2010 making it a significant cause of disability worldwide (Cross et al., 2014). Projection based on hospital-based studies in 1990 for the African population estimates the 2010 crude prevalence rate of rheumatoid arthritis at 0.42% and puts the disease patient burden at 4.3 million (Dowman, Campbell, Zgaga, Adeloye, & Chan, 2012). It should be noted however that hospital-based studies under-report the prevalence by about 6 times in comparison to population–based studies (Dowman et al., 2012).

Among patients attending rheumatology clinic in the Korle-Bu Teaching Hospital, 68% of them had rheumatoid arthritis making it the commonest rheumatologic condition (Ampofo, Sarpong, &

Botwe, 2016). In 2011 and 2012 rheumatoid arthritis was the ninth most common disease seen at the medical out-patients department at the same hospital (Korle-bu Teaching Hospital, 2012).

The risk of developing stroke, myocardial infarction and osteoporosis are higher in patients with rheumatoid arthritis (Kahl et al., 2012). In patients with untreated rheumatoid arthritis, there is an interesting paradoxical relationship between cholesterol and cardiovascular disease where low levels of cholesterol lead to an increased cardiovascular disease (Choy, Ganeshalingam, Semb, Szekanecz, & Nurmohamed, 2014). The inflammatory state in rheumatoid arthritis is a predisposing factor for developing cardiovascular disease (Kahl et al., 2012).

Freud's analysis at the turn of the twentieth century on the relationship between physical illness and the mind proved to be the first challenge to the biomedical theory of disease (Ogden, 2007) . This gave birth to Engel's biopsychosocial model also known as the body mind unity theory which sought to include socioeconomic and psychological factors as determinants of health and disease (Egger & Von, 2013; Havelka, Despot, & Lu, 2015). This concept has completely changed the practice of modern medicine with management of most diseases encompassing multidisciplinary teams often including psychologist and social workers (Egger & Von, 2013).

The disease process and management of rheumatoid arthritis is a case in point where the importance of this model cannot be overemphasized. The United Kingdom's internationally recognised National Institute for Health and Care Excellence (NICE) guidelines for management of rheumatoid arthritis proposes management by a multidisciplinary team and further recommends an annual evaluation for co-occurring conditions including depression (NICE, 2018). Earlier NICE protocols calling for same had been supported by a systemic review and meta-analysis which showed that rheumatoid arthritis had a substantial negative impact on the quality of life of its patients (Matcham et al., 2014). In addition, Margaretten, Julian, Katz, & Yelin (2011) state that,

patients with rheumatoid arthritis who have depression have worse health outcomes, including poor medication adherence, increased health service utilization, pain, disability and death (Margaretten et al., 2011). Choudhary, Tyagi, Kumar & Grover, (2018) in a study done in India showed a 30% prevalence of anxiety disorder in rheumatoid arthritis patients (Choudhary et al., 2018). These findings bring to bear how important psychological issues are in patients with rheumatoid arthritis.

1.2 Problem Statement

Rheumatoid arthritis, like many other chronic diseases is often associated with psychological strain on both patients and their families and this affects the quality of their lives (Golics & Finlay, 2013; Lam & Lauder, 2000). The interplay between the psychological state of the patient and the rheumatoid arthritis disease process is a complex one with multiple facets. The disease process can cause severe pain and cause severe psychological distress, depression or anxiety in these patients. According to Matcham et al., (2013), the prevalence of depression among patients with rheumatoid arthritis is high (Matcham et al., 2013).

The prevalence of clinical depression among patients with chronic rheumatologic conditions in a Pakistani study was found to be 42% (Azad, Gondal, & Abbas, 2008). Another study done in Egypt found statistically significant difference in depression and anxiety between rheumatoid arthritis patients and a control group (Mohammed, Al-fadl, Ali, Thabit, & El-serogy, 2014). The patients with rheumatoid arthritis had higher anxiety and depression scores than the control group.

Conversely the psychological state of the patient can affect the disease outcome and ultimately the quality of life of the patient. Higher depression symptoms are related to negative disease perception

and higher levels of pain (Rezaei et al., 2014). Additionally, the psychological state of patients can affect adherence to medications and quality of life. Psychological factors are targets for improving adherence in rheumatoid arthritis (Morgan et al., 2015). According to Pasma et al., (2017) besides increasing disease outcome improving adherence is also associated with increased savings in healthcare cost.

According to Machin et al., (2017) though some patients with rheumatoid arthritis and comorbid anxiety and/or depression recognise the interaction between their arthritis and mood problems, others only make this link when it is highlighted by a clinician. The authors concluded that it was needful therefore to explore the mood of patients as part of an annual review for patients with rheumatoid arthritis, whether this is conducted in primary or specialist care. Furthermore, improving recognition and management of anxiety and depression could lead to reduced overall morbidity and mortality (Machin et al., 2017)

Physicians are increasingly aware of the how crucial it is to attend to the psychological needs of patients as part of the holistic care (Brown et al., 2002) . In practice however, owing to low reduced patient-doctor interaction time resulting from the low doctor to patient ratio, doctors often do not actively seek psychological symptoms in their patients. In Ghana, this is further compounded by the lack of certain cadre of mental health workers such as clinical psychologist (Ibrahim, Asampong, & Sackey, 2018). The United Kingdom's NICE guideline for managing rheumatoid arthritis recommends an annual evaluation for depression (NICE, 2018). In Ghana although efforts have been made to include the management of rheumatoid arthritis in the standard treatment guideline, the guideline fails to make mention of the need for a regular assessment of psychological conditions in these patients (Ministry Of Health, 2017). Perhaps this is because locally there is research deficit to suggest a need.

This study therefore sought to identify the symptoms of depression and anxiety among patients with rheumatoid arthritis at the Korle-Bu Teaching Hospital and to assess the associations among depression, anxiety, adherence and quality of life outcomes.

1.3 Research Questions

- Are patients with rheumatoid arthritis experiencing symptoms of depression and anxiety?
- What is the quality of life profile of patients with rheumatoid arthritis?
- What is the level of medication adherence among patients with rheumatoid arthritis?
- Does being depressed or anxious relate with medication adherence and quality of life?

1.4 Objectives

GENERAL OBJECTIVE: To identify the symptoms of depression and anxiety among patients with rheumatoid arthritis at the Korle-Bu Teaching Hospital and to assess the associations between depression, anxiety, adherence and quality of life outcomes.

SPECIFIC OBJECTIVES

- To determine the prevalence of depression and anxiety in patients with rheumatoid arthritis.
- To estimate the quality of life of patients with rheumatoid arthritis.
- To determine the level of medication adherence among patients with rheumatoid arthritis.
- To determine how depression and anxiety relate with medication adherence and quality of life.

1. 5 Significance of Study

Patients with rheumatoid arthritis develop more emotional problems than the general public (Ahmed, Radwan, & Baddary, 2016) and therefore there is the need to actively screen for depression and anxiety among them. In their systemic review and analysis of the prevalence of rheumatoid arthritis in low and middle income countries, the authors stated that a formal meta–analysis could not be performed for the sub–Saharan African region due to limited data (Matcham et al., 2013) . According to Mody (2017), to improve the understanding of many rheumatic diseases there is need for collaborative research with African countries.

Although studies have been done in other parts of the world to show the prevalence of psychological conditions among patients with rheumatoid arthritis, very little data exist on the subject in Ghana and sub-Saharan Africa (Azad et al., 2008; Margaretten et al., 2011; Mostafa & Radwan, 2013; Yılmaz et al., 2017). Again the quality of life of patients has been shown to be adversely affected by the disease in many parts of the world (Abd Elazeen & Salem, 2018; Lam & Lauder, 2000; Mohammed et al., 2014; Munchey & Pongmesa, 2018).

There is limited literature on emotional problems in rheumatoid arthritis in the sub-Saharan region. Findings from research in other countries cannot be fully applicable to Ghana because of environmental and cultural differences.

This study will thus ascertain if depression and anxiety exist in the Ghanaian rheumatoid arthritis population. The information will help fill in the knowledge gap on the area of research in Ghana and the entire sub-region. Furthermore information gathered from this research can help formulate a region specific treatment guideline for rheumatoid arthritis patients not only in Ghana but the

entire sub region. Knowledge gained will also further advance the science of rheumatology globally.

1.6 Conceptual Framework

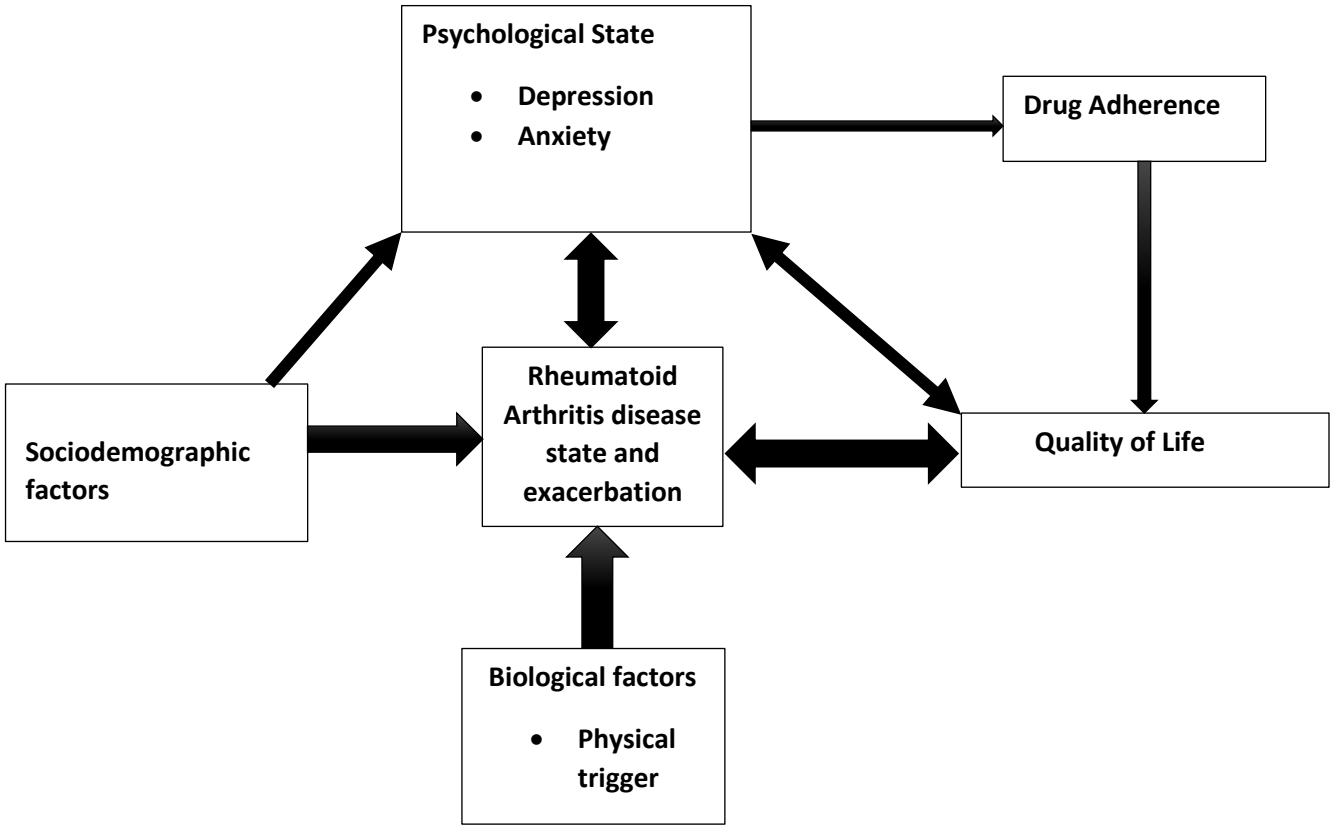

Fig 1.1: Conceptual framework showing how various factors contribute towards QoL in rheumatoid arthritis

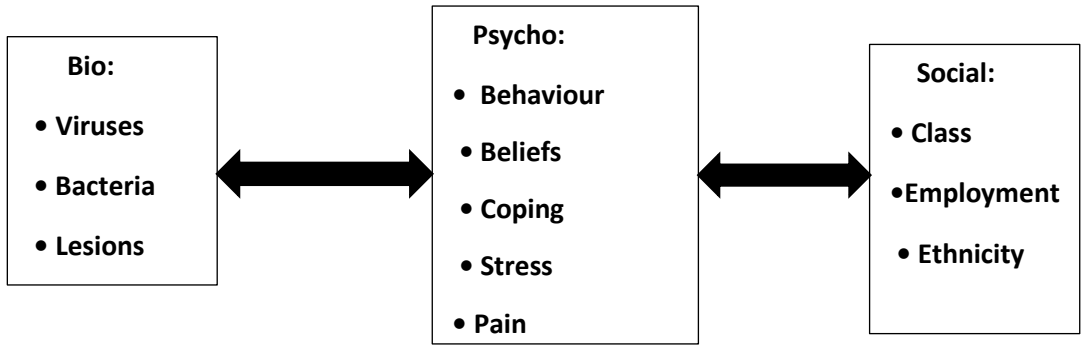

Fig 1.2: The biopsychosocial model of health and illness (after Engel 1977, 1980)

1.7 Narrative

The conceptual model is adapted from Engel's biopsychosocial model of health and illness (Ogden, 2007) seen in Fig 1.2 . This was modified to include variables under study. Significant evidence exist in support of the biopsychosocial model which shows the interplay between biological, social and psychological factors in the disease process, state and exacerbation (Havelka et al., 2015). The pathogenesis of rheumatoid arthritis involves a trigger by an external agent which in turn sets off an autoimmune cascade leading to chronic inflammation of the joints (Firestein, Budd, Gabriel, Mcinnes, & O'dell, 2013).

The daily problems of Rheumatoid arthritis imposes great psychological distress on patients. This is seen in the form of depression and anxiety (Abd Elazeen & Salem, 2018; Azad et al., 2008; Matcham et al., 2013). Disease exacerbation has also been found to be associated with depression and anxiety (Mostafa & Radwan, 2013; VanDyke et al., 2004). Sociodemographic variables also has a bearing on the depressed or anxious state of a patient. The psychological state of patients' affects the quality of their life. According to Mohammed et al., rheumatoid arthritis significantly affects the health-related quality of life of patients (2014).

Patients with rheumatoid arthritis who show psychiatric symptomatology among other things have reduced drug compliance (Ahmed et al., 2016). A systemic review done by Hope et al., also concluded that improved adherence correlated with increased disease outcome(Hope et al., 2016)(Hope et al., 2016) (Hope et al., 2016).

CHAPTER TWO

LITERATURE REVIEW

2.1 Rheumatoid arthritis

Rheumatoid arthritis is inflammatory symmetric polyarthritis which untreated can lead to erosions, joint space loss, and destruction of the affected joints (Kahl et al., 2012). The cause and course of rheumatoid arthritis are complex and multifaceted. A number of predetermined genes and random events as well as environmental factors contribute to susceptibility and pathogenesis (Firestein et al., 2013).

Typically, the disease has an insidious onset. Patients present classically with symmetric joint pain, swelling, and morning stiffness worsening over several weeks. Less common presentations include acute, rapidly progressive polyarthritis and more rarely, monoarthritis (Kahl et al., 2012). Diagnosis and classification is made based on the criteria set by the European League Against Rheumatism (EULAR) and the American College of Rheumatology (ACR) (Firestein et al., 2013). Although previous versions of the standard treatment guidelines for Ghana did not outline a management plan for rheumatoid arthritis, the latest version introduced in 2017 for the first time spells of the condition with a comprehensive management plan (Ministry Of Health, 2017). This suggest that despite supposed rarity of the disease some attention is now being given to it in Ghana.

The cornerstones for management of rheumatoid arthritis is early recognition of disease and pharmacologic treatment. Treatment is done usually with a goal of achieving remission or low disease activity (Firestein et al., 2013). Pharmacological treatment includes the use of Non-steroidal anti-inflammatory drugs (NSAIDs), disease-modifying antirheumatic drugs (DMARDs), and corticosteroids. Non-pharmacologic treatments, including patient education, physical therapy,

occupational therapy, orthotics, and surgery are also used alongside medications (Kahl et al., 2012).

Although both the NICE guidelines of the UK and the Standard treatment guidelines (STG) for Ghana recommend a similar pharmacological treatment, the latter fails to add psychological interventions to its non-pharmacological treatment (Ministry Of Health, 2017; NICE, 2018). The NICE guidelines proposes psychological interventions like cognitive coping skills, relaxation therapy, stress management as part of the treatment to enable rheumatoid arthritis patient adjust to life with the condition (NICE, 2018).

2.2 The biopsychosocial model

Following the scientific revolution in the 16th and 17th centuries a reductionist biomedical model was propounded to explain illness (Wade & Halligan, 2017) . This model founded on the Cartesian dualism of separate mind and body attributed illness to a physical change located within the body caused by chemical imbalance, bacteria, virus and predispositions in the genes (Ogden, 2007; Wade & Halligan, 2017). This left no room for behavioral, social and psychological dimensions of illness. Treatment under the biomedical model are aimed at changing physical states through vaccination, surgery, chemotherapy and radiotherapy (Ogden, 2007).

Engel criticized this model proposing a more encompassing one which had psychosocial components. He defined the biopsychosocial model which seeks to integrate information from a patient's social, biological and psychological life in the construction of framework to explain illness (Farre & Rapley, 2017). Treatment based on this model which is now widely accepted is holistic rather fixated on only physical changes. The teaching of coping strategies, behavior change

communication, improving adherence and helping build social support are but a few of the ways recommended in this holistic treatment approach (Ogden, 2007).

Although various players in the healthcare space are aware of the existence of the BPS, its application leaves a lot to be desired. There is a need to equip healthcare workers with skills to understand the multifaceted nature of patient needs and embrace a multidisciplinary biopsychosocial approach to patient care (Vries, Moser, Mertens, & Linden, 2012).

2.3 Psychological issues in rheumatoid arthritis

The World Health Organization asserts the importance of mental health in everyday healthcare with an emphatic statement "There is no health without mental health" (World Health Organisation, 2018a). Ghana also passed a mental health act in 2012 aiming to restructure and improve on mental healthcare (Walker & Osei, 2017). According to Ibrahim et al., (2018), the implementation of this act however has been setback by many challenges.

There are numerous social and emotional consequences associated with a physical illness like rheumatoid arthritis. Owing to pain, joint stiffness and deformities associated with rheumatoid arthritis, patients are usually unable to perform a range of tasks whether as a parent, provider or worker. A British Medical Association board of science policy report, advocates for equal importance to be given to psychological and social needs of patients as a part of holistic healthcare delivery (British Medical Association, 2011). Psychological stress and mood status have been implicated as independent factors for relapse occurring in patients with rheumatoid arthritis (Yılmaz et al., 2017). Treating unrecognized depression is probably the psychosocial intervention with the greatest impact and is frequently required (Firestein et al., 2013). Engel's biopsychosocial model further strengthens the argument to pay attention to psychological issues in a chronic disease

like rheumatoid arthritis. The importance of psychological issues and mental health as a whole in the rheumatoid arthritis population can therefore not be overlooked.

It is therefore not surprising that the United Kingdom's NICE guideline for managing rheumatoid arthritis recommends an annual evaluation for depression (NICE, 2018). In Ghana although efforts have been made to include the management of rheumatoid arthritis in the standard treatment guideline, the guideline fails to make mention of the need for a regular assessment of psychological conditions in these patients (Ministry Of Health, 2017). Perhaps this is because locally there is research deficit to suggest a need.

2.4 Depression and Anxiety in Health

Globally, the total number of people with depression was estimated to exceed 300 million in 2015. Nearly that number again suffers from a range of anxiety disorders (World Health Organisation, 2017). The two can occur independently or as mixed condition of anxiety and depression. Depression is characterized by low mood, anhedonia, reduced energy, diminished activity, poor concentration and attention, poor self-esteem and self-confidence feelings of guilt and unworthiness, pessimistic views of the future, disturbed sleep and anorexia (Teifion & Craig, 2009). Anxiety on the other hand presents as persistent apprehension, disturbed sleep, muscle tension, tremor, restlessness and autonomic over activity characterized by sweating, tachycardia and epigastric discomfort (Teifion & Craig, 2009). Both conditions are treatable with psychological and drug therapy. According to the WHO (2017), although depression and anxiety can affect all people, the risk is increased in certain groups of people which includes people with physical illness (World Health Organisation, 2017).

2.5 Rheumatoid arthritis and depression

There exist significant statistical difference in depression scores between patients with rheumatoid arthritis and healthy controls (Yılmaz et al., 2017). According to Marrie et al., (2018), when compared with a matched population, the incidence of psychiatric conditions like depression is higher in patients with rheumatoid arthritis.

Matcham et al., in a systemic review and meta-analysis found that depression is highly prevalent in rheumatoid arthritis and associated with poorer outcomes (Matcham et al., 2013). Their review which involved a total of 72 studies, including 13,189 patients found forty methods of defining depression, the HADS being the most used tool for diagnosis. Most of the studies were from Europe and America with only two from Egypt in Africa. The prevalence of depression according to the HADS with thresholds of 8 and 11 were 34.2% (95% CI 25%, 44%) and 14.8% (95% CI 12%, 18%); respectively. They also found that increased depression in rheumatoid arthritis was significantly associated with low mean age.

A study involving 170 patients done in Sohag University Hospital in Egypt in the period between October 2012 and March 2013 with rheumatoid arthritis found that the prevalence of depression was 15.29% (Mostafa & Radwan, 2013). The study used the Hospital Anxiety and Depression Scale (HADS) as the screening tool for detecting depression in the patient population. Covic et al., (2012), also using HADS score cut-off of 8 and 11 found the prevalence of depression to be 28.3% and 9.4% respectively in a study that recruited patients with rheumatoid arthritis from Leeds in the United Kingdom and Sydney, Australia.

Consistently it has been shown that depression is associated with worse outcomes in rheumatoid arthritis. According to Rathbun, Harrold and Reed, symptoms of depression affects the course of rheumatoid arthritis negatively (2015).

Depression in rheumatoid arthritis is also a an important independent risk factor for cardiovascular disease, myocardial infarction, suicide, and all-cause mortality in the rheumatoid arthritis population (Santiago, Geenen, Jacobs, & P, 2015).

2.6 Rheumatoid arthritis and anxiety

According to VanDyke et al., (2004) it is not surprising to have an elevated anxiety in patients with rheumatoid arthritis because it is a challenging and severe illness (VanDyke et al., 2004). Numerous conditions associated with it including pain, decreased functional status, reduced income may all contribute trait anxiety observed in these patients (VanDyke et al., 2004).

In a case control study in Egypt involving 26 rheumatoid arthritis cases and 22 age and sex matched healthy controls, the anxiety score for case and controls were 9.35 ± 5.477 and 5.82 ± 4.895 respectively with significant P-value of 0.024 (Mohammed et al., 2014). In another case control study in Meerut, India, patients with rheumatoid arthritis scored more on Hamilton's Anxiety Rating, with 30% of cases having anxiety disorder while only 5% of controls had anxiety (Choudhary et al., 2018). These show that anxiety is more prevalent in the rheumatoid arthritis population compared to the general public.

A descriptive cross-sectional study conducted in Egypt on generalised anxiety Disorder in patients with rheumatoid arthritis found the following prevalence and degrees of anxiety by Hamilton score: 62.0% of patients considerably suspected to had mild anxiety, 23.0% had moderate anxiety,14.0% had severe anxiety and 1.0% had very severe anxiety (Ahmed et al., 2016). Covic et al., (2012), using HADS score cut-off of 8 and 11 found the prevalence of anxiety to be 35.3% and 18.6% respectively.

2.7 Rheumatoid arthritis and Quality of life

Quality of Life (QoL) measures have become a vital and often required part of health outcomes appraisal (Burckhardt & Anderson, 2003). The WHO defines QoL as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. The concept of QoL is affected by the person's physical health psychological state, personal beliefs, social relationships and their relationship to salient features of the environment (World Health Organisation, 2018b). In chronic disease states, measuring Quality of Life provides a meaningful way to determine the impact of health care when cure is not possible (Burckhardt & Anderson, 2003).

Evidence abounds in studies done in different parts of the world to show that rheumatoid arthritis affects QoL negatively. In a Thai study done in a tertiary care hospital using QoL measures, it was found that the health related QoL and functional ability of patients with rheumatoid arthritis were partially affected by the disease (Munchey & Pongmesa, 2018). They recorded mean QoL values measured using the EQ-5D Utility and EQVAS as 0.65± 0.25 and 68.39 ± 19.53 respectively. Mohammed et al.,(2014), also found significantly higher QoL scores in a control group as compared to case patients with rheumatoid arthritis(Mohammed et al., 2014). In a systematic review of 33 articles on the impact of rheumatoid arthritis on QoL, the authors confirmed that rheumatoid arthritis negatively affects health related QoL.

2.8 Depression, anxiety and quality of life

Depression and anxiety have been found to affect quality of life (Moore, Höfer, McGee, & Ring, 2005; O'Neil, 2008). De Leval postulated that both depression and quality of life are part of a continuum in time. The theory proposes that, for a depressed person, time passes slowly and that,

the present is dissociated from the past and the potential for the future is lost or viewed with hopelessness (de Leval N:, 1995). Moore, Höfer, McGee, & Ring in a study confirmed this model stating that depression and hopelessness influence a person's present and future QoL (Moore et al., 2005).

A study in Brazil that set out to verify the occurrence of depression and changes in QoL in individuals with rheumatoid arthritis found that, the disease has negative impact on QoL and depression is associated with decrease of the functional capacity of patients (Paula, Campos, Silva, Castro, & Graminha, 2013). Another prospective cohort study on patients with rheumatoid arthritis in the UK found after 3months of follow up that patients who had depression showed less improvement (Nugaliyadde, Culfear, Nandagudi, & Bharadwaj, 2017). Mostafa & Radwan also concluded from their study on Egyptian patients with rheumatoid arthritis and co-morbid depression that this class of patients have worse outcomes (Mostafa & Radwan, 2013). In a Latin American study, anxiety was found to be associated with lower quality of life scores in rheumatoid arthritis patients (Rogers, Brotherton, Leonor, & Plaza, 2015). Furthermore rheumatoid arthritis patients who have depression and anxiety are less likely to go into remission (Michelsen et al., 2017). According to Wan et al.,(2016), depression is a major predictor of health related quality of life. They suggest interventions for depression be included in the management of rheumatoid arthritis (Wan et al., 2016).

2.9 Depression, anxiety and Medication adherence

Medication adherence is defined by the WHO as the extent to which a person's behaviour in terms of taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider (World Health Organisation, 2003). The WHO classifies factors associated with poor medication adherence into five categories, namely

socioeconomic factors, therapy-related factors, patients-related factors, condition-related factors, and health system/health care team related factors. Depression and anxiety in rheumatoid arthritis can be categorized under condition-related factors.

Non-adherence may range from patients having drug holidays where they miss some days of medication, catch up intake after drug-holiday to complete non-adherence where patient does not take drug at all (Hope et al., 2016). It is important that when medications are prescribed for patients for their condition, they do well to take them as prescribed. Comparatively patients with rheumatoid arthritis are more adherent than patients with other chronic conditions mainly because of the pain they experience (Pasma, 2015). Patients with chronic conditions often have high levels of adherence in the acute stages of disease with a dip in adherence levels after 6 months of treatment (Hope et al., 2016).

In treatment of rheumatoid arthritis, first line therapy is usually a first-line DMARD with a treatment goal of achieving remission. When the first line fails to achieve the set target, higher doses or an alternate DMARD is initiated. Failure of the patient to adhere to treatment plan will therefore not only lead to their condition worsening but also additionally may make the physician erroneously conclude that the treatment is ineffective and proceed to give a more aggressive treatment (Pasma, 2015).

According to meta-analysis on depression and medication done in the United states by Grenard et al., (2011), there is evidence to show that depression is associated with poor adherence to medication across a range of chronic diseases. The estimated odds of a depressed patient being non-adherent was found to be 1.76 times the odds of a non- depressed patient, across 31 studies and 18,245 participants. A cross sectional study done in Sweden also showed patients with psychological distress are at increased risk on non-adherence(Lam & Fresco, 2015). Patients with

rheumatoid arthritis have been found in studies to have suboptimal levels of medication adherence (Alhefny, El-rahman, & El-moteleb, 2016; Marie & Suarez-Almazor, 2016). According to Pasma, (2015) patients with rheumatoid arthritis showed an increase in non-adherence levels over time and that this is a predictor of disease activity . Additionally non-adherence is associated with high costs for the entire healthcare system (Pasma, 2015).

In summary, although depression and anxiety can affect all people, the risk is increased in certain groups of people which includes people with chronic physical illness such as rheumatoid arthritis (WHO, 2017). This has a significant bearing on the quality of life and adherence to treatment regimen. Globally, the evidence suggests that there is a high prevalence of depression and anxiety in patients with rheumatoid arthritis (Covic et al., 2012; Mohammed et al., 2014; Mostafa & Radwan, 2013; VanDyke et al., 2004). Although there is evidence of psychological issues in other chronic conditions such as sickle cell disease locally, little is known about the situation in patients with rheumatoid arthritis in Ghana (Adzika, Glozah, Ayim-aboagye, & Ahorlu, 2017).

CHAPTER THREE

METHODOLOGY

This chapter presents the methods by which data was collected and analyzed on anxiety, depression, adherence and quality of life of patients. The chapter describes the study area, the study population, the sampling procedure, sample size, the data collection tools and ethical considerations taken.

3.1 Research design

A hospital-based cross-sectional quantitative study design was carried out on patients with rheumatoid arthritis at the Rheumatology clinic in Korle-Bu Teaching Hospital.

3.2 Study Area

The study was conducted in the Korle-Bu Teaching Hospital (KBTH) which is in the newly created Ablekuma West Municipality (carved out of the Accra Metropolis) in the Greater Accra region of Ghana. It currently is the leading referral centre in Ghana and also serves countries in the sub-region.

The hospital was built in 1923 with an initial bed capacity of 200. The hospital since then has seen significant expansion and now has 2000 beds and 17 clinical and diagnostic department. The average daily out-patients attendance is 1500 with 250 daily admissions (Korle-bu & Teaching Hospital, 2012).

Administratively, the hospital is organized into various departments known as sub-budget managing centres. The Rheumatology unit is part of the Medical sub-budget managing centre. The unit holds a Rheumatoid Arthritis clinic fortnightly on Thursdays where the needs of patient with

rheumatoid arthritis are attended to. The rheumatology clinic also attends to patients with other autoimmune diseases like inflammatory arthritis, psoriatic arthritis, systemic lupus erythematosus and many others. The KBTH was chosen as the study site because it was the closer of the two hospitals in Ghana with a rheumatology clinic.

3.3 Study Population

The study population were patients with rheumatoid arthritis attending the fortnightly rheumatoid arthritis clinic held in KBTH on Thursdays. Patients' folders were checked to ensure they met the inclusion criteria.

The inclusion criteria for respondents who took part in the study are as follows

- Confirmed diagnosis of rheumatoid arthritis.
- Should be an attendant at the clinic for at least 3months. This was done to ensure that all patients had been on medication for a period to enable measurement of adherence.
- Must be 18years and above.

The exclusion criteria for the study were

- Confirmed diagnosis of rheumatoid but has not been in clinic for up to 3months.
- Patients with organic psychiatric disease before diagnosis of rheumatoid arthritis. This was checked from past medical history of the patients' record.
- Patients with autoimmune condition other than rheumatoid arthritis. The rheumatology clinic had other patients with other autoimmune diseases other than rheumatoid arthritis hence the need to check from patients records to ensure such patients were not included.
- Patient with rheumatoid arthritis but less than 18years.

- Pregnant patients with rheumatoid arthritis
- New attendants at the clinic.

3.4 Sampling procedure

Simple random sampling was used to select participants from a register of patients booked to be seen on each clinic day. Attendance at the clinic was strictly by appointment. A list of all patients scheduled to attend clinic each clinic day was obtained and each name assigned a number. Balloting was then done to select prospective respondents. They were recruited into the study after the study was explained to them and they consented.

3.5 Sample size

The Rheumatology department holds a rheumatoid arthritis clinic fortnightly on Thursdays. The average number of patients with rheumatoid at each clinic day is approximately 35. Over a 6-week period from October to November 2018 the number of rheumatoid arthritis patients that attended the clinic was 105. This was used as an estimated population of patients with rheumatoid for the six weeks over which the data collection was to be done.

Yamane provides a simplified formula to calculate sample sizes. A 95% confidence level and P = 0.5 are assumed.

$$n = N / [1 + N (e)^{2}]$$

Where n is the sample size, N is the population size, and e is the level of precision (Ajay & Micah, 2014). Using the Yamane's formula, with 105 as population size and a precision of 5% the minimum sample size was found to be 84.

Data were collected throughout the months of May and June 2019.

3.6 Study variables

3.6.1 Dependent variables

The dependent variables of interest in the study were Quality of life and Medication Adherence.

3.6.2 Independent variables

The independent variables of interest in the study were Depression and Anxiety.

3.7 Data collection tools

Patient records was used to confirm if patients met the inclusion criteria. A questionnaire covering sociodemographic details as well as measures of depression, anxiety, quality of life and medication adherence was then administered to be filled after consent was taken.

The Hospital Anxiety and Depression Scale (HADS) was used as screening tool for Anxiety and Depression. It must be noted the HADS is only a screening tool. The HADS is a fourteen-item scale, with seven items related to depression and seven items related to anxiety. Each item is scored on a scale of 0-3 meaning a person can score between a score of 0-21 for either depression or anxiety. A score between 0-7 is considered normal, between 8-10 borderline abnormal (borderline case) and 11-21 considered abnormal (case). Some of the questions on the scale include “I feel as if I am slowed down”, “I look forward with enjoyment to things” and “I feel tense or wound up”. Some questions on the scale are reversed to avoid acquiescence bias. These items were reverse scored. Many studies have confirmed the validity of the HADS (Al Aseri et al., 2015; Bjelland, Dahl, Tangen, & Neckelmann, 2002). Other studies have shown it to be a useful instrument in clinical practice (Snaith, 2003). The Cronbach’s alpha for the HADS-A and HADS-D was found to be 0.90 and 0.80 respectively for this study.

Quality of life was assessed using the EQ-5D-5L which has proven validity worldwide (Bekairy et al., 2018; Hunger et al., 2012; Luo et al., 2017; Pinto et al., 2011). It has however not been used in Ghana hence its use in this study to determine if it is a reliable tool worth using in this country also. It has two components; the EQ-5D-5L descriptive system and the EQ visual analogue scale (EQ VAS). The EQ-5D-5L which is a standardized measure of health status can be used in postal surveys, in clinics, and in face-to-face interviews. It is easy to fill and not cognitively demanding, taking only a few minutes to complete (Janssen, 2015). The descriptive system comprises the following 5 dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Each dimension has 5 levels of severity of problems; no problems, slight problems, moderate problems, severe problems, and extreme problems. These 5 dimensions are written out as a 5L profile. To determine health status this 5L can be converted to a single index value based on value sets that exist for different countries. There were no value sets for Ghana hence the index values for Zimbabwe which is the only African country with value sets was used. The index values for that assess health status range from -0.004 to 0.900 with 0.900 representing the highest QoL. The visual analogue scale records a respondent's self-rated health on a 20 cm vertical, visual analogue scale with extreme ends reading 'the best health you can imagine' and 'the worst health you can imagine'. The visual analogue scale has values from 0 to 100, with 0 being worse health state and 100 being best health state as rated by the patient. The Cronbach's alpha for the EQ5D scale was found to be 0.82.

Medication Adherence was measured using the Morisky-Green-Levine Test. This a 4 item-scale for which a Yes or No answer is given to each item. A Yes answer is scored one (1) while a No answer is scored zero (0). The score for each item is then added. The possible range scores are 0-

4. A total score of 0 is interpreted as high adherence, 1 or 2 medium adherence and 3 or 4 low levels of adherence. This scale was named as one of six validated questionnaires among twelve scales assessed in the United States of America (Pérez-Escamilla, Franco-Trigo, Moullin, Martínez-Martínez1, & García-Corpas, 2015). The reliability coefficient of this scale in this study was found to be 0.64.

Questionnaires were filled with the help of research assistants who when necessary further explained the questions to participants. Participants who cannot read and write were interviewed in order to help them fill the questionnaire. So as not to inconvenience participants, questionnaires were filled while patients waited in the queue to see their doctor.

3.8 Pre-testing of Questionnaire

The questionnaire was pretested using 10 participants from the Sickle cell clinic in KBTH to ensure its feasibility. This group was chosen because sickle cell disease like rheumatoid arthritis is a chronic condition and is also associated with pain. The questionnaire was then modified based on results from pre-testing.

3.9 Data Analysis and Processing

Filled questionnaires were evaluated before entry into Microsoft Excel spreadsheets. This was crosschecked to ensure the entries had been done appropriately. Data was then cleaned and imported into STATA software version 15 .Further analysis of data was done using STATA 15IC. Descriptive statistics was used to analyse demographic characteristics of respondents. Associations among quality of life and adherence to medication and independent variables (depression, anxiety and demographic characteristics) was analyzed using simple linear regression

and logistic regression model respectively. The results were presented in a form of frequencies, tables, charts, means, standard deviation, proportions, graphs and percentages.

Frequencies and proportions of sociodemographic characteristics; age, sex, religion, ethnicity, marital status, educational level and occupation were presented in tables. The median and interquartile ranges of QoL indices were reported and illustrated in box plots. The proportion of adherence amongst respondents were presented on a pie chart with 95% confidence interval stated.

To determine factors associated with medication adherence, a bivariate analysis (chi-square and simple logistic) between each independent variable (depression, anxiety and sociodemographic variables) and medication adherence was done. The factors that were found to be significantly associated were fitted into a final multiple logistic regression reporting adjusted odds ratios and their respective 95% CI.

For quality of life indices, simple linear regression was done between each independent variable and quality of life. Factors that revealed significant mean differences were filled into a multiple linear regression model. Statistical significance was set at $p < 0.05$.

3.10 Data Protection and Participant's Confidentiality

Strict confidentiality and anonymity of respondent was ensured throughout the study. All questionnaires collected in this study were given code numbers. No name was recorded on the questionnaire so that the data collected cannot be linked in any way to any participant. Filled questionnaires were kept in a locked file and stored in a locked cabinet. A soft copy of the data collected was coded and locked on a computer and only accessible to the principal investigator.

3.11 Ethical concerns

Ethical approval and study site approval was given from the Korle-Bu Teaching Hospital Scientific and Technical Committee and the Institutional Review Board after all requirements had been met (Approval ID KBTH-STC/IRB/00012/2019). A research proposal with an introductory letter from the School of Public Health was submitted to these committees before the approvals were granted. A letter of introduction was then forwarded to the head of the medical department and the head of the rheumatology unit to enable data to be collected. Before the administration of the questionnaire, the purpose of the study was explained to all respondents. Additionally, they were each given an information sheet to read. A structured consent form was then administered to all participants who agreed to take part in the study. Participants were assured of privacy and confidentiality during data collection. Detailed information was given or read out to the participants on how the study will be carried out, why the study is being conducted and the population-wide benefit that would be gained from the study.

CHAPTER FOUR

RESULTS

4.1 Socio-demographic characteristics of respondents

Socio-demographic characteristics of respondents are shown in Table 4.1. The mean age of respondents was 49.3 years ± 13.9 SD. The majority of the respondents were females (89.2%). Also, Christians were in the majority (94.6%). Respondents were spread across the different ethnic groups with 42(45.1%) of them being Akans. Nearly 67% of respondents were married. Only nine (9.7%) had not been to school whilst 35.5% have had up to tertiary education. There were 22(23.6%) respondents who were unemployed. The median duration with which respondents have been living with rheumatoid arthritis is 4 years. More than half of the respondents did not have any other condition (54.8%) besides the rheumatoid arthritis whilst 30% of them had hypertension as a comorbid condition.

Table 4.1 Socio-demographic characteristics of respondents (n=93)

Variables	Frequency	Percent (%)
Age in years (M ± SD)	49.3 ± 13.9	
Sex		
Male	10	10.8
Female	83	89.2
Religion		
Christianity	88	94.6
Muslim	5	5.4
Ethnicity		
Ga-Adangbe	28	30.1
Akan	42	45.1
Ewe	18	19.4
Northern tribe	4	4.3
Other	1	1.1
Median duration of RA in years	**4**	
Interquartile range	6 (2 -8)	

Variables	Frequency	Percent (%)
Marital status		
Single	19	20.4
Married	62	66.7
Divorced	4	4.3
Widow/widower	8	8.6
Educational level		
Tertiary	33	35.5
Senior high school	16	17.2
Junior high school	32	34.4
Primary	3	3.2
None	9	9.7
Occupation		
Artisan	5	5.4
Trading	35	37.6
Civil servant	9	9.7
Student	5	5.4
Health worker	5	5.4
Private formal sector	5	5.4
Unemployed	22	23.6
Others	7	7.5
Comorbid conditions		
Hypertension	28	30.1
Diabetes	4	4.3
Heart diseases	2	2.2
None	51	54.8
Others	8	8.6

4.2 Symptoms of depression and anxiety among patients with rheumatoid arthritis

Using the HADS as a screening tool for anxiety and depression amongst respondents, most of the rheumatoid arthritis patients in this study were considered normal in terms of depression (79.5%) and anxiety (70.9%). However, 19.4% of respondents had abnormal levels of anxiety (HADS score

between 11 and 21) and 6.5% had abnormal levels of depression (HADS score between 11 and 21). The prevalence of depression and anxiety among patients with rheumatoid arthritis was found to be 20.4% and 29.0% respectively

Table 4.2.1 Symptoms of depression and anxiety among patients with rheumatoid arthritis

Variables	Frequency	Percent (%)
Depression		
Normal	74	79.5
Borderline	13	13.9
Abnormal	6	6.5
Anxiety		
Normal	66	70.9
Borderline	9	9.7
Abnormal	18	19.4

Table 4.2.2 Prevalence of anxiety and depression among patients with rheumatoid arthritis

Variables	Using a cut off 8 (%)	Using a cut off 11 (%)
Depression Prevalence	20.4	6.5
Anxiety Prevalence	29.0	19.4

4.3 Rheumatoid arthritis and quality of life

The minimum EQ-5D-5L quality of life index was 0.322 and the maximum 0.9. The mean EQ-5D-5L quality of life index value was 0.71 ± 0.13SD. The median was 0.701 with an interquartile

range of 0.147 (0.653 - 0.800). A distribution of the EQ-5D-5L quality of life index value is shown in the box plot (figure 4.3.1).

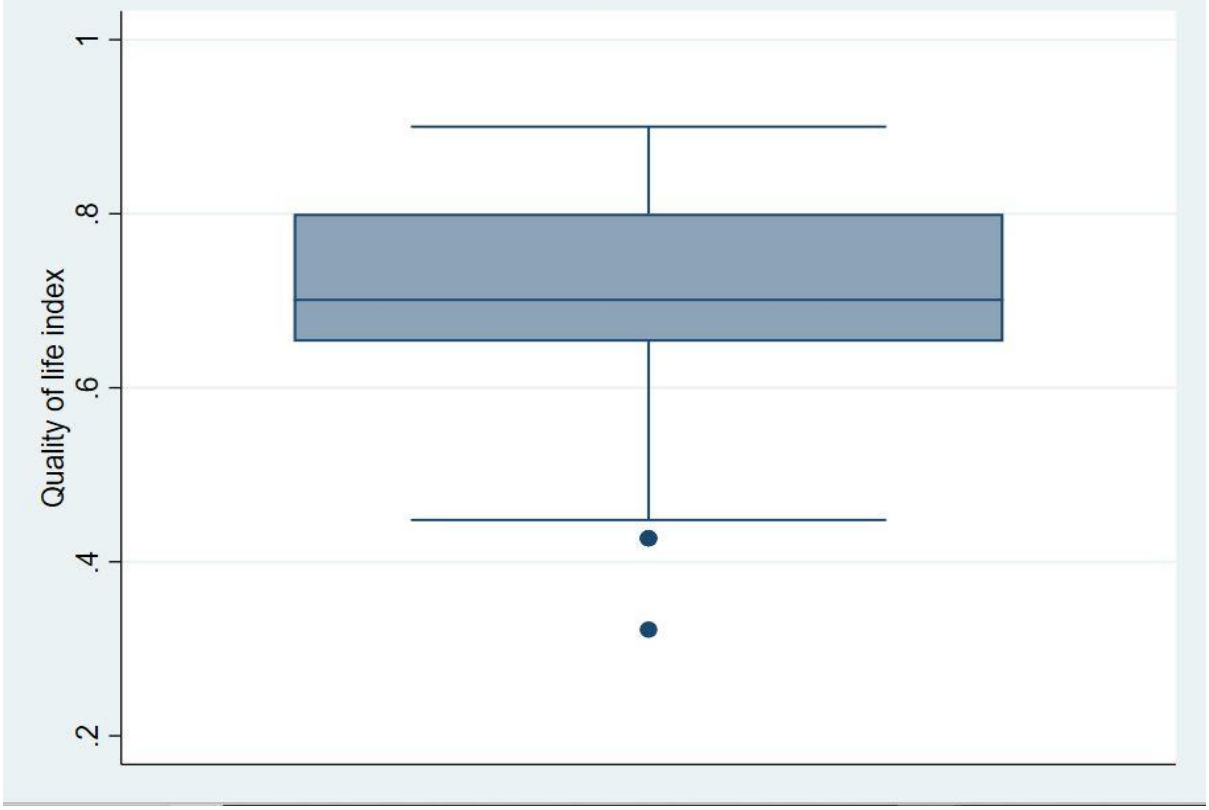

Figure 4.3.1: Rheumatoid arthritis and quality of life index value

The minimum EQVAS quality of life was 20 and the maximum 100. The median was 70 with an interquartile range of 30 (55- 85). A distribution of the EQVAS quality of life is shown in the box plot (figure 4.3.2).

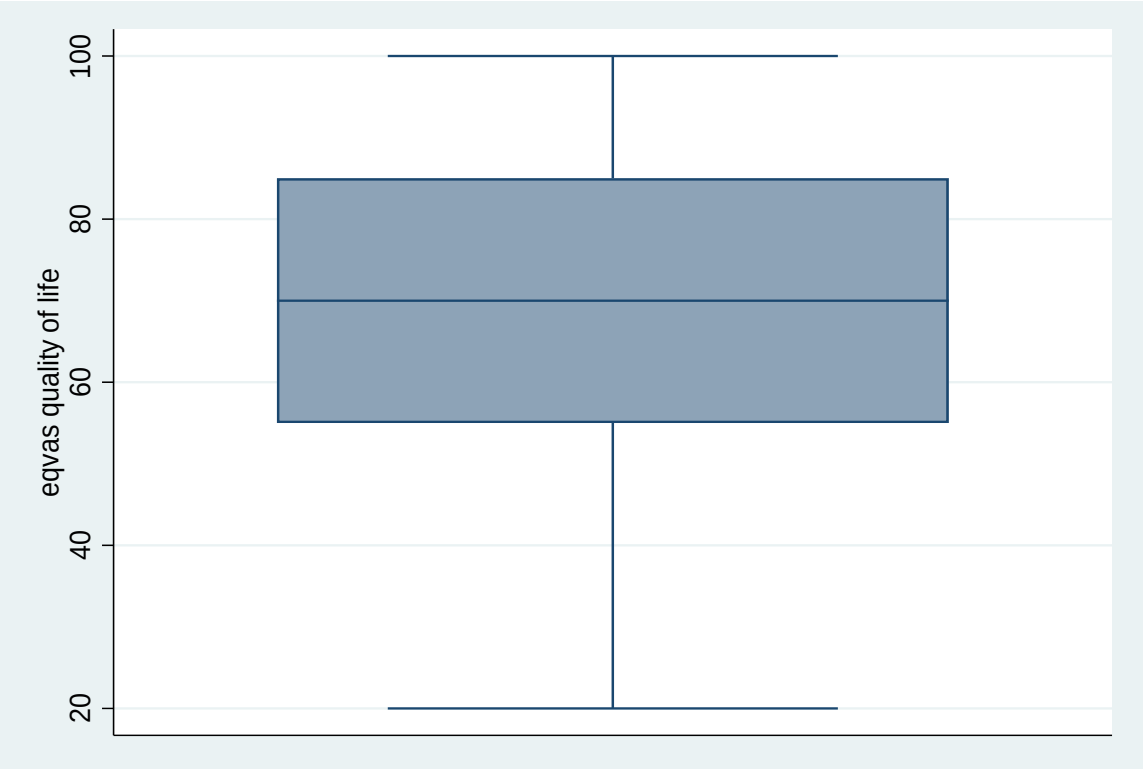

Figure 4.3.2: Rheumatoid arthritis and EQVAS quality of life

4.4 Level of medication adherence amongst respondents

Figure 4.4.1 below is a pie-chart showing the distribution of adherence level to medication among respondents. Most respondents (62.4%) had Morisky-Green-Levine scores of zero (0) and hence had high adherence to their rheumatoid arthritis medication. Thirty-one (31.2%) of respondents had medium adherence (score 1 to 2) and 6.4% of respondents had low adherence (score > 2) to their rheumatoid arthritis medication.

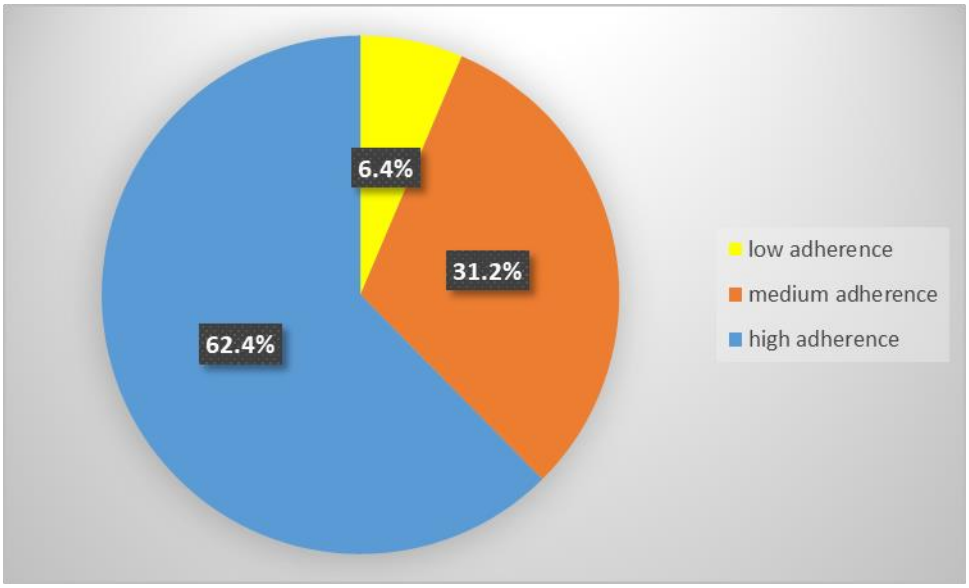

Figure 4.4.1: Proportion of adherence among respondents

Figure 4.4.2 shows adherence levels dichotomized into two. That is (high adherence = adherence) and (medium + low adherence = non adherence). With this dichotomization, 62.4% of respondents were deemed to have adherence to their rheumatoid arthritis medication and 37.6% having medium to low adherence to their rheumatoid arthritis medication.

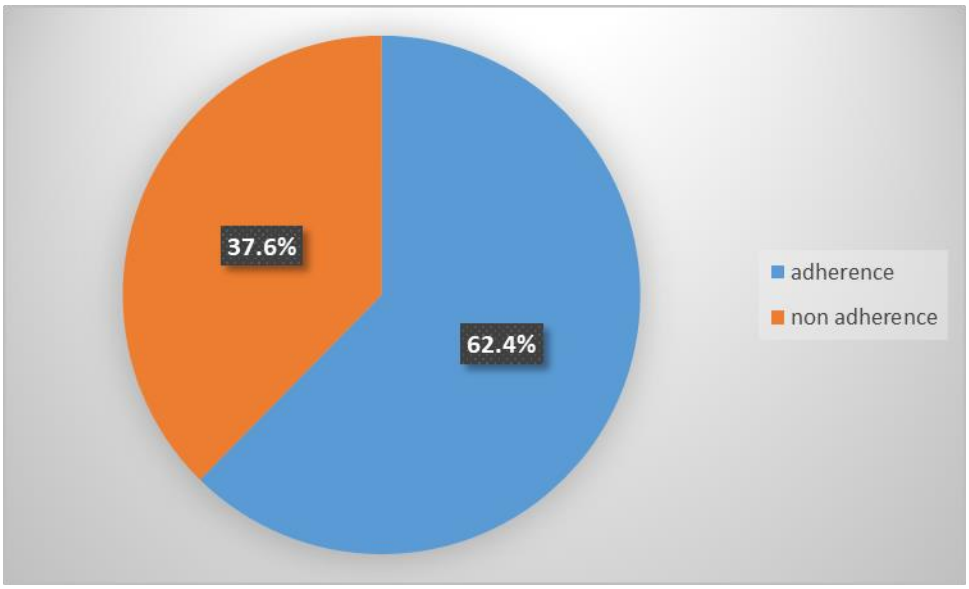

Figure 4.4.2: Proportion of adherence among respondents dichotomized into two levels

4.5.1 Factors influencing quality of life among respondents (EQ-5D-5L index)

A simple linear regression conducted to determine factors that predict the EQ-5D-5L quality of life index revealed educational level, depression and anxiety were found to be significant predictors of quality of life among respondents as shown in Table 4.5.1.

No formal education among respondents significantly reduced the EQ-5D-5L quality of life index by 0.14 compared to tertiary education among respondents (unadjusted mean difference = -0.14; 95% CI = -0.23 - -0.04; p = 0.005) as shown in Table 4.5.1. However, after adjusting for all other variables this association was found not to be statistically significant (adjusted mean difference = -0.09; 95% CI = -0.18 - 0.0034; p = 0.063) as shown in Table 4.5.2.

Amongst respondents who were depressed, the EQ-5D-5L quality of life index was significantly reduced by 0.14 compared to those who were not depressed (unadjusted mean difference = -0.14; 95% CI = -0.19 – 0.08; p < 0.001) as shown in Table 4.5.1. This was association was not found to be statistically significant after adjusting for all other variables (adjusted mean difference = -0.08; 95% CI = -0.17 - -0.00005; p = 0.050) as shown in Table 4.5.2.

The EQ-5D-5L quality of life index was significantly reduced amongst respondents who were anxious by 0.11 as compared to those who were not anxious (unadjusted mean difference = -0.11; 95% CI = -0.16 – - 0.06; p < 0.001) as shown in Table 4.5.1 . This was association was not found to be statistically significant after adjusting for all other variables (adjusted 1ean difference = -0.05; 95% CI = -0.12 – 0.03; p = 0.202) as shown in Table 4.5.2.

Table 4.5.1 Factors influencing quality of life among respondents (EQ-5D-5L index)

Variables	Unadjusted mean difference	95% CI	p-value
Age	0.00002	(-0.002 - 0.002)	0.984
Sex			
Male	1.00		
Female	-0.03	(-0.11 - 0.06)	0.532
Religion			
Christianity	1.00		
Muslim	0.10	(-0.01 - 0.22)	0.084
Ethnicity			
Ga-Adangbe	1.00		
Akan	0.01	(-0.05 - 0.08)	0.671
Ewe	-0.02	(-0.09 - 0.06)	0.602
Northern tribe	0.05	(-0.08 - 0.19)	0.442
Other	-0.01	(-0.28 - 0.25)	0.928
Marital status			
Single	1.00		
Married	0.005	(-0.06 - 0.07)	0.892
Divorced	-0.005	(-0.15 - 0.14)	0.946
Widow/widower	0.05	(-0.06 - 0.15)	0.408
Educational level			
Tertiary	1.00		
Senior high school	-0.006	(-0.08 - 0.07)	0.866
Junior high school	-0.016	(-0.08 - 0.05)	0.599
Primary	-0.004	(-0.15 - 0.15)	0.960
None	-0.14	(-0.23 - -0.04)	**0.005***
Occupation			
Artisan	1.00		
Trading	-0.04	(-0.17 - 0.08)	0.478
Civil servant	-0.05	(-0.19 - 0.09)	0.526
Student	-0.03	(-0.19 - 0.13)	0.711
Health worker	0.07	(-0.09 - 0.23)	0.394
Private formal sector	-0.04	(-0.20 - 0.12)	0.600
Unemployed	-0.07	(-0.19 - 0.06)	0.303
Others	-0.11	(-0.26 - 0.04)	0.153
Methotrexate			
No	1.00		
Yes	0.03	(-0.02 - 0.09)	0.200

Variables	Unadjusted mean difference	95% CI	p-value
Other DMARD			
No	1.00		
Yes	-0.008	(-0.08 - 0.07)	0.841
Hydroxychloroquine			
No	1.00		
Yes	0.02	(-0.05 - 0.09)	0.498
Prednisolene			
No	1.00		
Yes	-0.05	(-0.13 - 0.04)	0.260
Intra articular or intramuscular depot steroid injection			
No	1.00		
Yes	0.01	(-0.17 - 0.19)	0.893
Nsaids			
No	1.00		
Yes	-0.04	(-0.14 - 0.05)	0.365
Multivitamin supplement			
No	1.00		
Yes	-0.03	(-0.08 - 0.03)	0.324
Omeprazole			
No	1.00		
Yes	-0.01	(-0.07 - 0.04)	0.665
Others			
No	1.00		
Yes	0.01	(-0.17 - 0.19)	0.880
Duration of RA	0.0006	(-0.01 - 0.01)	0.852
Comorbid conditions			
None	1.00		
Hypertension	-0.03	(-0.09 - 0.03)	0.266
Diabetes	-0.09	(-0.23 - 0.03)	0.147
Heart diseases	0.03	(-0.16 - 0.21)	0.778
Others	-0.07	(-0.16 - 0.03)	0.174
Depression			
Not depressed	1.00		
Depressed	-0.14	(-0.19 - -0.08)	**<0.001**
Anxiety			
Not anxious	1.00		
Anxious	-0.11	(-0.16 - -0.06)	**<0.001**

Table 4.5.2 Results from multiple linear regression on factors influencing quality of life among respondents (EQ-5D-5L index)

Variables	Unadjusted mean difference (95% CI)	p-value	Adjusted mean difference (95% CI)	p-value
Educational level				
Tertiary	1.00			
senior high school	-0.006(-0.08 – 0.07)	0.866	-0.01(-0.08 – 0.06)	0.803
junior high school	-0.016(-0.08 – 0.05)	0.599	-0.02(-0.08 – 0.04)	0.523
Primary	-0.004(-0.15 – 0.15)	0.960	-0.01(-0.15 – 0.14)	0.965
None	-0.14(-0.23 - -0.04)	**0.005***	-0.09(-0.18 – 0.003)	0.063
Depression				
Not depressed	1.00			
Depressed	-0.14(-0.19 - -0.08)	**<0.001**	-0.08(-0.17 – - 0.00005)	0.050
Anxiety				
Not anxious	1.00			
Anxious	-0.11(-0.16 - -0.06)	**<0.001**	-0.05(-0.12 – 0.03)	0.202

4.5.3 Factors influencing quality of life among respondents (EQVAS)

Respondents who had hypertension as a comorbid condition had their visual analogue scale ratings reduced by 10.13 compared to those who had no comorbid condition (unadjusted mean difference = -10.13; 95% CI = -18.68 – 1.63; p = 0.020). This was association was still found to be statistically significant after adjusting for all other variables (adjusted mean difference = -9.73; 95% CI = -17.96 - -1.49; p = 0.021) as shown in Tab 4.5.4.

The visual analogue scale rating index was reduced significantly by 14.09 amongst respondents who were depressed as compared to those who were not depressed (unadjusted mean difference = -14.09; 95% CI = -23.06 – - 5.13; p = 0.002). However, after adjusting for all other variables this

association was found not to be statistically significant (adjusted mean difference = -9.10; 95% CI = -21.99 – 3.79; p = 0.164) as shown in Tab 4.5.4.

Amongst respondents who were anxious, the visual analogue scale rating was significantly reduced by 11.45 compared to those who were not anxious (unadjusted mean difference = -11.45; 95% CI = -19.60 - – 3.29; p = 0.006). However, after adjusting for all other variables this association was found not to be statistically significant (adjusted mean difference = -5.61; 95% CI = -17.13 – 5.91; p = 0.336) as shown in Tab 4.5.4.

Table 4.5.3 Factors influencing quality of life among respondents (EQVAS)

Variables n = 93	Unadjusted mean difference	95% CI	p-value
Age	-0.17	(-0.45 - 0.10)	0.215
Sex			
Male	1.00		
Female	11.21	(-1.44 - 23.85)	0.082
Religion			
Christian	1.00		
Muslim	8.36	(-8.39 - 25.12)	0.324
Ethnicity			
Ga-Adangbe	1.00		
Akan	1.34	(-7.88 - 10.56)	0.773
Ewe	-1.45	(-12.78 - 9.88)	0.779
Northern tribe	9.52	(-10.33 - 29.37)	0.343
Other	10.77	(-26.89 - 48.43)	0.571
Marital status			
Single	1.00		
Married	-7.65	(-17.28 - 1.99)	0.118
Divorced	-19.72	(-39.58 - 0.13)	0.052
Widow/widower	-12.85	(-28.11 - 2.42)	0.098
Educational level			
Tertiary	1.00		
Senior high school	9.44	(-1.69 - 20.57)	0.096
Junior high school	1.75	(-7.37 - 10.86)	0.704
Primary	10.27	(-11.60 - 32.14)	0.353
None	-5.84	(-19.54 - 7.85)	0.399
Occupation			
Artisan	1.00		
Trading	-7.6	(-26.93 - 11.73)	0.437
Civil servant	-11.67	(-33.68 - 10.35)	0.295
Student	-1.25	(-27.15 - 24.65)	0.924
Health worker	-3	(-27.57 - 21.57)	0.809
Private formal sector	-18	(-42.57 - 6.57)	0.149
Unemployed	-14.77	(-34.68 - 5.14)	0.144
Others	-13.57	(-36.53 - 9.39)	0.243

Variables	Unadjusted mean difference	95% CI	p-value
Methotrexate			
No	1.00		
Yes	7.41	(-0.19 - 15.01)	0.056
Other DMARD			
No	1.00		
Yes	-1.46	(-12.43 - 9.51)	0.792
Hydroxychloroquine			
No	1.00		
Yes	3.07	(-7.55 - 13.69)	0.567
Prednisolone			
No	1.00		
Yes	-7.13	(-18.81 - 4.56)	0.229
Intra articular or intramuscular depot steroid injection			
No	1.00		
Yes	-10.33	(-36.42 - 15.77)	0.434
Nsaids			
No	1.00		
Yes	-0.79	(-14.35 - 12.76)	0.908
Multivitamin supplement			
No	1.00		
Yes	-0.32	(-8.31 - 7.67)	0.937
Omeprazole			
No	1.00		
Yes	2.09	(-6.07 - 10.25)	0.612
Others			
No	1.00		
Yes	7.57	(-18.57 - 33.71)	0.567
Duration of RA	-0.62	(-1.47 - 0.24)	0.154
Comorbid conditions			
None	1.00		
Hypertension	-10.13	(-18.68 - -1.63)	**0.020***
Diabetes	-9.06	(-27.73 - 9.61)	0.337
Heart diseases	5.94	(-19.96 - 31.84)	0.650
Others	-6.56	(-20.25 - 7.13)	0.343
Depression score			
Not depressed	1.00		
Depressed	-14.09	(-23.06 - -5.13)	**0.002***
Anxiety score			
Not anxious	1.00		
Anxious	-11.45	(-19.60 - - 3.29)	**0.006***

Table 4.5.4 Results from multiple linear regression on factors influencing quality of life among respondents (EQVAS)

Variables	Unadjusted mean difference (95% CI)	p-value	Adjusted mean difference (95% CI)	p-value
Comorbid conditions				
None	1.00			
Hypertension	-10.13(-18.68 – 1.63)	**0.020***	-9.73(-17.96 – -1.49)	**0.021***
Diabetes	-9.06(-27.73 – 9.61)	0.337	-9.53(-27.96 – 8.90)	0.307
heart disease	5.94(-19.96 – 31.84)	0.650	2.66(-22.24 – 27.57)	0.832
Others	-6.56(-20.25 - 7.13)	0.343	-4.32(-17.56 – 8.92)	0.518
Depression				
not depressed	1.00			
Depressed	-14.09(-23.06 - -5.13)	**0.002**	-9.10(-21.99 – 3.79)	0.164
Anxiety				
not anxious	1.00			
Anxious	-11.45(-19.60 - -3.29)	**0.006**	-5.61(-17.13 – 5.91)	0.336

4.6 Factors associated with adherence to medication amongst respondents

4.6.1 Socio demographic characteristics associated with adherence to medication amongst respondents

A simple logistic regression conducted between each variable and medication adherence revealed that age of respondents was significantly associated with adherence (Table 4.6.1). A one-year increase in age significantly reduced the odds of non-adherence (medium to low adherence) amongst respondents by 4% (cOR = 0.96; 95% CI = 0.93 – 0.99; p = 0.009).

From chi-square test, marital status of respondents (p = 0.005) and comorbid conditions (p = 0.031) were significantly associated with adherence to medication. Sex, religion, ethnicity, educational

level, occupation and duration of RA of respondents did not show significant association with adherence to medication.

Table 4.6.1 Socio demographic characteristics associated with adherence to medication amongst respondents

Variables	Adherence		χ^2	cOR (95% CI)	p-value
	Non Adherence (n = 35)	Adherence (n = 58)	p-value		
Age in years (M ± SD)	44.3 ± 11.7	52.3 ± 14.4		**0.96(0.93 - 0.99)**	**0.009***
Sex			+0.738		
Male	3(30.0)	7(70.0)		1.00	
Female	32(38.6)	51(61.4)		1.46(0.35 - 6.07)	0.600
Religion			+0.361		
Christianity	32(36.4)	56(63.6)		1.00	
Muslim	3(60.0)	2(40.0)		2.63(0.42 - 16.55)	0.304
Ethnicity			+0.901		
Ga-Adangbe	10(35.7)	18(64.3)		1.00	
Akan	15(35.7)	27(64.3)		1.00(0.37 - 2.71)	1.000
Ewe	8(44.4)	10(55.6)		1.44(0.43 - 4.82)	0.554
Northern tribe	2(50.0)	2(50.0)		1.80(0.22 - 14.80)	0.585
Other	0(0.0)	1(100.0)		1	
Marital status			**+0.005***		
Single	6(31.6)	13(68.4)		1.00	
Married	25(40.3)	37(59.7)		1.46(0.49 - 4.36)	0.494
Divorced	4(100.0)	0(0.0)		1	
Widow/widower	0(0.0)	8(100.0)		1	
Educational level			+0.302		
Tertiary	17(51.5)	16(48.5)		1.00	
Senior high school	6(37.5)	10(62.5)		0.56(0.17 - 1.91)	0.359
Junior high school	9(28.1)	23(71.9)		0.37(0.13 - 1.03)	0.057
Primary	1(33.3)	2(66.7)		0.47(0.04 - 5.71)	0.554
None	2(22.2)	7(77.9)		0.27(0.05 - 1.49)	0.133

+ (fisher's exact) *(statistically significant, p≤0.05)

Variables	Adherence		χ^2	cOR (95% CI)	p-value
	Non Adherence (n = 35)	Adherence (n = 58)	p-value		
Occupation			+0.142		
Artisan	3(60.0)	2(40.0)		1.00	
Trading	14(40.0)	21(60.0)		0.44(0.07 - 3.01)	0.406
Civil servant	7(77.8)	2(22.2)		2.33(0.22 - 25.24)	0.486
Student	1(20.0)	4(80.0)		0.17(0.01 - 2.82)	0.214
Health worker	1(20.0)	4(80.0)		0.17(0.01 - 2.82)	0.214
Private formal sector	2(40.0)	3(60.0)		0.44(0.04 - 5.58)	0.530
Unemployed	5(22.7)	17(77.3)		0.19(0.03 - 1.52)	0.119
Others	2(28.6)	5(71.4)		0.27(0.02 - 3.02)	0.286
Duration of RA	5.3 ± 4.7	5.8 ± 4.3		0.98(0.89 - 1.08)	0.671
Comorbid conditions			**+0.031***		
None	19(37.3)	32(62.8)		1.00	
Hypertension	7(25.0)	21(75.0)		0.56(0.20 - 1.57)	0.270
Diabetes	1(25.0)	3(75.0)		0.56(0.05 - 5.79)	0.628
Heartdisease	2(100.0)	0(0.0)		1	
Others	6(75.0)	2(25.0)		5.05(0.92 - 27.60)	0.062

+ (fisher's exact) *(statistically significant, p≤0.05)

4.6.2 Type of Drugs associated with adherence to medication amongst respondents

None of the drugs taken by the rheumatoid arthritis patients had a significant association with adherence level.

Table 4.6.2 Type of Drugs associated with adherence to medication amongst respondents

Variables	Adherence		χ^2	cOR (95% CI)	p-value
	Non Adherence (n = 35)	Adherence (n = 58)	p-value		
Methotrexate			0.566		
No	19(35.2)	35(64.8)		1.00	
Yes	16(41.0)	23(59.0)		1.28(0.55 - 2.99)	0.566
Other DMARD			0.300		
No	28(35.4)	51(64.6)		1.00	
Yes	7(50.0)	7(50.0)		1.82(0.58 - 5.72)	0.305
Hydroxychloroquine			0.836		
No	6(40.0)	9(60.0)		1.00	
Yes	29(37.2)	49(62.8)		0.89(0.29 - 2.75)	0.836
Prednisolene			+0.742		
No	5(45.5)	6(54.5)		1.00	
Yes	30(36.6)	52(63.4)		0.69(0.19 - 2.46)	0.570
Intra Articular or Intramuscular Depot Steroid Injection			+0.525		
No	35(38.5)	56(61.5)		1.00	
Yes	0(0.0)	2(100.0)		1	
Nsaids			+1.000		
No	32(37.7)	53(62.3)		1.00	
Yes	3(37.5)	5(62.5)		0.99(0.22 - 4.44)	0.993
Multivitamin supplement			0.928		
No	13(38.2)	21(61.8)		1.00	
Yes	22(37.3)	37(62.7)		0.96(0.40 - 2.29)	0.928
Omeprazole			0.880		
No	23(37.1)	39(62.9)		1.00	
Yes	12(38.7)	19(61.3)		1.07(0.44 - 2.60)	0.880
Others			+0.525		
No	35(38.5)	56(61.5)		1.00	
Yes	0(0.0)	2(100.0)		1	

+ (fisher's exact) *(statistically significant, p<0.05)

4.6.3 Depression and anxiety associated with adherence to medication amongst respondents

In a bivariate analysis, both depression and anxiety were significantly associated with adherence to medication amongst respondents. The odds of non-adherence with medication amongst rheumatoid arthritis patients who were depressed was significantly 3.80 times as compared to rheumatoid arthritis patients who were not depressed (cOR = 3.80; 95% CI = 1.32 – 10.91; p = 0.013) as shown in Table 4.6.3.

Similarly, respondents who were anxious had significantly 2.88 times the odds of non-adherence with medication as compared to respondents who were not anxious (cOR = 2.88; 95% CI = 1.14 – 7.24; p = 0.025) as shown in Table 4.6.3.

Table 4.6.3 Depression and anxiety associated with adherence to medication amongst respondents

Variables	Adherence		χ^2	cOR (95% CI)	p-value
	Non adherence (n = 35)	Adherence (n = 58)	p-value		
Depression			**0.010***		
not depressed	23(31.1)	51(68.9)		1.00	
Depressed	12(63.2)	7(36.8)		**3.80(1.32 – 10.91)**	**0.013***
Anxiety			**0.023***		
not anxious	20(30.3)	46(69.7)		1.00	
anxious	15(55.6)	12(44.4)		**2.88(1.14 – 7.24)**	**0.025***

*(statistically significant, p<0.05)

4.6.4 Multiple logistic regression model for factors associated with adherence to medication amongst respondents

A one-year increase in age significantly reduced the odds of non-adherence (medium to low adherence) amongst respondents by 4% (cOR = 0.96; 95% CI = 0.93 – 0.99; p = 0.009). However, after adjusting for all other variables (age, depression, anxiety) a one year increase in age significantly reduced the odds of non-adherence amongst respondents by 5% (aOR = 0.95; 95% CI = 0.92 – 0.99; p = 0.013) as shown in Table 4.6.4 .

In a bivariate analysis, both depression and anxiety were significantly associated with adherence to medication amongst respondents. The odds of non-adherence with medication amongst rheumatoid arthritis patients who were depressed was significantly 3.80 times as compared to rheumatoid arthritis patients who were not depressed (cOR = 3.80; 95% CI = 1.32 – 10.91; p = 0.013). However, as shown in Table 4.6.4, after adjusting for all other variables (age, depression, anxiety) this association was not found to be statistically significant (aOR = 3.88; 95% CI = 0.87 – 17.19; p = 0.075).

Similarly, respondents who were anxious had significantly 2.88 times the odds of non-adherence with medication as compared to respondents who were not anxious (cOR = 2.88; 95% CI = 1.14 – 7.24; p = 0.025). However, after adjusting for all other variables (age, depression, anxiety) this association was not found to be statistically significant (aOR = 1.16; 95% CI = 0.22 – 5.99; p = 0.967) as shown in Table 4.6.4.

Table 4.6.4 Factors associated with adherence to medication amongst respondents

Variables	cOR (95% CI)	p-value	aOR(95% CI)	p-value
Age	**0.96(0.93 - 0.99)**	**0.009***	**0.95(0.92 - 0.99)**	**0.013***
Depression				
Not depressed	1.00			
Depressed	**3.80(1.32 – 10.91)**	**0.013***	3.88(0.87 – 17.19)	0.075
Anxiety				
Not anxious	1.00			
Anxious	**2.88(1.14 – 7.24)**	**0.025***	1.03(0.27 – 3.91)	0.967

*(statistically significant, p<0.05)

CHAPTER FIVE

DISCUSSION

5.1 Prevalence on anxiety and depression

The findings from the study showed a prevalence of anxiety of 29.0% out of a total of 93 respondents. This is lower than findings from Covic et al., (2012), who found an anxiety prevalence of 35.3% among patients with rheumatoid arthritis in the United Kingdom and Australia. Again the results from the study showed that out of a total 93 respondents, 19 had depression, representing a depression prevalence of 20.4%. This value is higher than the findings of Mostafa & Radwan, (2013) who found the prevalence of depression to be 15.3% among Egyptian patients with rheumatoid arthritis in Sohag University Hospital, Egypt. However it is much lower the value of 28.3% obtained by Covic et al., (2012) in their study among patients with rheumatoid arthritis in the Yorkshire Early Arthritis Register, United Kingdom and private and hospital clinics in Australia. Mostafa & Radwan, (2013) and Covic et al., (2012) had higher sample sizes, with 169 and 170 respondents respectively. This may explain the variability in the prevalence values. Additionally the differences could be as a result of differences in the location of sites and clinic attendance at the study sites.

5.2 Quality of life of patients with rheumatoid arthritis

The mean EQ 5D index value measuring QoL of patients with rheumatoid arthritis was 0.71 ± 0.13. The median was 0.701 with an interquartile range of 0.147 (0.653-0.800). This is slightly higher than the values obtained in a Thai study which was conducted to estimate QoL and functional ability of patients with rheumatoid arthritis. The Thai study recorded a mean EQ5D of 0.65 ± 0.25 and median of 0.65 (Munchey & Pongmesa, 2018). Using the EQVAS, the mean QoL score in KBTH was found to be 70.10 ± 18.33. Again this is slightly higher than the mean value

of 68.39 ± 19.53 obtained by Munchey & Pongmesa, (2018). Both studies however had the same median EQVAS score of 70. Patients with rheumatoid arthritis attending the rheumatology clinic in KBTH, Ghana had a higher QoL compared with patients in rheumatism clinic in Uttaradit Hospital, a tertiary care hospital in Thailand.

A possible explanation for this could be the varying differences in demographic characteristics which are known to affect quality of life. Marital status and education are well documented to have an effect on QoL with higher education and being married affecting QoL positively (Han et al., 2014; Javed, 2016; Mielck, Reitmeir, Vogelmann, & Leidl, 2011). Both studies recorded nearly the same proportion of people married with the Thai study having 67.4% respondents married whilst this study had 66.7% married. There was however a vast difference in educational level. The Thai study had lower education levels with 76.5% (169/221) of respondents having primary education or lower (Munchey & Pongmesa, 2018). This study on the other hand had 35.5% of respondents with tertiary education with only a small proportion of respondents, 12.9% (12/93) with primary education or lower (Munchey & Pongmesa, 2018)(Munchey & Pongmesa, 2018)(Munchey & Pongmesa, 2018).

5.3 Level of medication adherence

From the findings, the level of medication adherence among patients with rheumatoid arthritis was 62.4% (58/93). This is a sharp contrast between what Prudente et al., (2016) and Alhefny et al., (2016) found in their studies in patients with rheumatoid arthritis in the outpatients department of Clinical Hospital of the Federal University of Goiás in Brazil and Rheumatology Clinic at Ain Shams University Hospital in Egypt. The prevalence of medication adherence was much lower in those sites; 16.4% (9/55) in Brazil and 37% (37/100) in Egypt (Alhefny et al., 2016; Prudente et al., 2016). This may be explained by the heterogeneity in scales for measurement of adherence.

Whereas this study used the 4-item Morisky-Green-Levine Adherence tool to assess adherence, Prudente et al., (2016) and Alhefny et al., (2016) used the Morisky Adherence scale and Compliance Questionnaire of Rheumatology respectively. The difference in questions for each scale can affect how valid the scale measures adherence.

5.4 Relationship between depression and anxiety and quality of life

The results of the study suggest that depression is not significantly associated with both measures of quality of life.

This does not corresponds with Rogers et al., (2015), who found depression to be significantly negatively associated with QoL although they used a different scale in assessment of QoL.

The EQ-5D-5L quality of life index was not significantly reduced amongst respondents who were anxious as compared to those who were not anxious from the multivariate analysis. Again this is inconsistent with the study by Rogers et al., (2015) who found significant negative association between anxiety and QoL.

Quality of life is affected by psychological, social, physical, and spiritual dimensions of an individual's life (Mohammed et al., 2014). This explains why psychological states of depression and anxiety negatively affected QoL. This underscores the need to accept and wholly apply Engel's biopsychosocial model of health and sickness in a multidisciplinary approach to management of rheumatoid arthritis.

Additionally, findings from the study is suggestive comorbid hypertension negatively affects QoL as compared with other comorbid conditions.

5.5 Relationship between depression and anxiety and medication adherence

The study findings showed that both depression and anxiety were not significantly associated with adherence to medication amongst respondents. This is consistent with the findings of Nugaliyadde et al., (2017) who found that depression did not affect adherence in patients with rheumatoid arthritis. The findings however disagrees with many studies conducted that show that non-adherent patients had higher levels of depression in chronic diseases (Grenard et al., 2011; Huertas-Vieco et al., 2014). Again the findings do not agree with what Thunander Sundbom & Bingefors, (2013) found among Swedish prescription drug users.

Several factors affect health related behavior. These include intrapersonal factors, interpersonal processes, institutional factors, community factors and public policy (Sutton, 2004). The study sought to show how depression and anxiety which are intrapersonal factors could lead to negative health behaviors such as non-adherence.

5.6 Study limitations

1. The rather short period of the study did not allow for a large number of respondents to be recruited into study. Future studies should be run over a longer period to increase yield.
2. Secondly, the study design employed is for non-cause associations.
3. The disease activity state of patients was not recorded. The state of patients; either in disease flare or remission has an important bearing on the psychological state of patients. This should be explored in future studies.
4. Finally although the HADS has been validated in many places including other low to middle income countries it has not been validated for use in Ghana.

CHAPTER SIX

CONCLUSION

This study sought to identify the symptoms of depression and anxiety among patients with rheumatoid arthritis and assess the associations among depression and anxiety, adherence and quality of life outcomes.

The study has shown that there exists a high prevalence of depression and anxiety among the rheumatoid arthritis patient population in Ghana. The disease impacts negatively on quality of life. Also worrying is the trend of non-adherence to treatment regimen as this if not checked could further worsen the disease state and the mental state of these patients. Depression and anxiety are negatively related with the quality of life of patients with rheumatoid arthritis. Depressed and anxious patients were more likely to exhibit negative health behavior such as non-adherence to prescribed medications.

These findings gives credence to Engel's biopsychosocial model of health and illness which shows the interaction between social, psychological and biology in health. The study has shown that psychological state affects clinical course of a disease. There is a need to introduce periodic depression, anxiety and QoL assessment as part of holistic care for patients with rheumatoid arthritis. This serves as a way of actively seeking patients with psychological issues for the necessary interventional therapy to improve overall health outcome of the patient.

RECOMMENDATIONS

Patients

Patients with rheumatoid arthritis with mental health problems should overcome the stigma associated with mental health and seek help when they feel depressed or anxious. Patients must also do well to adhere to prescribed therapy.

Health care Facility

Symptoms of depression and anxiety should be actively sought during patient-health worker engagement in the rheumatoid arthritis management process.

Health talks on mental health issues can be given at the out patients department during clinic days. This should focus on making patients know that it is not uncommon for them to have such issues and that there is help available.

The clinic can employ a clinical psychologist to help with these issues.

Policy

The high levels of depression and anxiety among patients with rheumatoid arthritis calls for a review of the treatment guidelines for management of rheumatoid arthritis to include an annual screening for these psychological conditions.

Rheumatoid arthritis clinics should have in-house clinical psychologists at post to help patients deal with rheumatoid arthritis and the heavy psychological strain the disease imposes on them.

Research

Further collaborative research should be conducted by the social and behavioural sciences department of the School of Public Health and the rheumatology clinic in KBTH to determine the

factors that account for depression and anxiety among these patients. The effect of this condition of relations of patients with rheumatoid arthritis can also be explored.

Future studies can employ a more robust risk factor evaluation design example cohort study, as findings from this cross sectional study is only hypothesis-generating.

Interventional studies can also be carried out in these clinics using health psychology modules. If found to be effective, these can be used to prevent, manage or improve mental health problems in patients rheumatoid conditions worldwide.

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APPENDICES

Appendix i: Consent form

Statement of person obtaining informed consent:

I have fully explained this research to _____ and have given sufficient information about the study, including risks and benefits to enable the prospective participant make an informed decision to or not to participate.

DATE: _____ NAME: _____

Statement of person giving consent:

I have read the information on this study/research or have had it translated into a language I understand. I have also talked it over with the interviewer to my satisfaction. I understand that my participation is voluntary and not compulsory. I know enough about the purpose, methods, risks and benefits of the research study to decide that I want to take part in it. I understand that I may freely stop being part of this study at any time without having to explain myself. I have received a copy of the information leaflet and consent form to keep for myself.

NAME: _____ DATE: _____

SIGNATURE/THUMB PRINT: _____

Statement of person witnessing consent (For non-literate participants):

I _____ (Name of Witness) certify that information given to _____ (Name of Participant), in the local language, is a true reflection of what l have read from the study Participant Information Leaflet, attached.

WITNESS' SIGNATURE (maintain if participant is non-literate):

_____

Appendix ii: Participant Information Sheet

Title: DEPRESSION, ANXIETY AND QUALITY OF LIFE OF PATIENTS WITH RHEUMATOID ARTHRITIS AT THE KORLE BU TEACHING HOSPITAL

Principal Investigator: KODI JOSHUA SANKA

You are invited to take part in this research study. Before you decide to, please take time to read the following information carefully and decide whether or not you wish to take part.

What is the purpose of this study?

This study seeks to assess levels of depression, anxiety, quality of life and levels of drug adherence among patients with rheumatoid arthritis.

What does the study entail?

This is a study that will require you to answer a number of questions. There will also be questions on your personal self, mental state and adherence to medications. The questionnaire will take some of your time and will take about ten to fifteen minutes to complete. All information will remain anonymous and confidential. Your questionnaire will be coded. No name will be recorded on the questionnaire. Data collected cannot be linked in any way to any participant. No name or identifier will be used in any publication or reports from this study. Filled questionnaires were kept in a locked file and stored in a locked cabinet. A soft copy of the data collected was coded and locked on a computer and only accessible to the principal investigator.

Do I have to take part?

Your participation is entirely voluntary. Once you have read this information sheet, you will be asked to give consent in order to continue. You are free to withdraw at any time, without giving a reason. Whether or not you provide your consent for participation will have not affect the treatment you receive in the clinic.

Are there any possible risks or benefits associated with this research?

No physical risks are involved in the study. Questions may however expose participants to psychological strains they may have not aware of.

No direct benefit is envisioned to be received by participants. A future population-wide benefit that will optimise care given to patients with rheumatoid arthritis is expected.

Who can I contact if I have any questions or concerns?

If you have any questions or concerns regarding this research, please contact the principal investigator, Dr. Joshua Kodi on 0206392863 or joshuakodi@gmail.com or Dr Irene Kretchy of the School of Pharmacy, College of Health Sciences, University of Ghana.

Appendix iii: Questionnaire

A. DEMOGRAPHICS

1. Age …….yrs

2. Sex: 1. Male [ ] 2. Female [ ]

3. Religion: 1. Christian [ ] 2. Muslim [ ] 3. Traditionalist [ ] 4. Other [ ]...specify……..

4. Ethnicity: 1. Ga-Dangme [ ] 2. Akan 3. Ewe [ ] 4. Northern tribe [ ] 5. Other [ ]…specify….

5. Marital Status: 1. Single [ ] 2. Married [ ] 3. Divorced [ ] 4. Widow/er [ ]

6. Educational Level: 1. Tertiary [ ] 2. SHS/O and A levels [ ] 3. JHS/Middle school [ ] 4. Primary [ ] 5. None [ ]

7. Occupation: 1. Artisan [ ] 2. Trading [ ] 3. Civil servant [ ] 4. Student [ ] 5. Health worker [ ]

6. Private Formal sector [ ] 7. Unemployed [ ] 8. Others…[ ] specify……..

B: ABOUT YOUR RHEUMATOID ARTHRITIS

1. How long have you had RA? .....

2. What is the current treatment for your RA? (tick all applicable)

[ ] Methotrexate

[ ] Other DMARDs ….specify by circling (Sulfasalazine, leflunomide, TNF-αblockers, ciclosporin or rituximab)

[ ] hydroxychloroquine

[ ] prednisolone

[ ] intra articular or intramuscular depot steroid injection

[ ] NSAIDs

[ ] Others …specify ……

3. Other comorbid conditions 1. Hypertension [ ] 2.Diabetes [ ] 3.Heart disease 4. Others [ ]…specify……

C: ASSESSMENT OF DRUG ADHERENCE

MORISKY-GREEN-LEVINE TEST

Tick YES or NO for each of the following questions

	YES	**NO**
Do you forget to take your medicine?		
Are you careless at times about taking your medicine		
When you feel better, do you sometimes stop taking your medicine		
Sometimes if you feel worse when you take the medicine, do you stop taking it?		

D: ASSESSMENT OF ANXIETY AND DEPRESSION

HOSPITAL ANXIETY AND DEPRESSION SCALE

Tick the box beside the reply that is closest to how you have feeling in the past week.

Don't take too long over replies: your immediate is best.

A			D		
	I feel tense or 'wound up'			**I still enjoy the things I used to enjoy**	
3	Most of the time		0	Definitely as much	
2	A lot of the time		1	Not quite so much	
1	From time to time		2	Only a little	
0	Not at all		3	Hardly at all	
	I get a sort of frightened feeling as if something awful is about to happen:			**I can laugh and see the funny side of things:**	
3	Very definitely and quite badly		0	As much as I always could	
2	Yes, but not too badly		1	Not quite so much now	
1	A little, but it doesn't worry me		2	Definitely not so much now	
0	Not at all		3	Not at all	
	Worrying thoughts go through my mind:			**I feel cheerful:**	
3	A great deal of the time		3	Not at all	
2	A lot of the time		2	Not often	
1	From time to time, but not too often		1	Sometimes	

0	Only occasionally		0	Most of the time	
	I can sit at ease and feel relaxed:			**I feel as if I am slowed down:**	
0	Definitely		3	Nearly all the time	
1	Usually		2	Very often	
2	Not often		1	Sometimes	
3	Not at all		0	Not at all	
	I get a sort of frightened feeling like 'butterflies' in the stomach:			**I have lost interest in my appearance:**	
0	Not at all		3	Definitely	
1	Occasionally		2	I don't take such much as I should	
2	Quite often		1	I may not quite as much care	
3	Very often		0	I take Justas much care as ever	
	I feel restless as I have to be on the move:			**I look forward with enjoyment to things:**	
3	Very much indeed		0	As much as I ever did	
2	Quite a lot		1	Rather less than I used to	
1	Not very much		2	Definitely less than I used to	
0	Not at all		3	Hardly at all	

	I get sudden feelings of panic:			**I can enjoy a good book or radio or TV program:**	
3	Very often indeed		0	Often	
2	Quite often		1	Sometimes	
1	Not very often		2	Not often	
0	Not at all		3	Very seldom	

Scoring: total score: (A) _____ (D) _____

E: ASSESSMENT OF QUALITY OF LIFE USING EQ-5D-5L

(I) EQ DESCRIPTIVE

Under each heading, please tick the ONE box that best describes your health TODAY

MOBILITY

- ☐ I have no problems in walking about
- ☐ I have slight problems in walking about
- ☐ I have moderate problems in walking about
- ☐ I have severe problems in walking about
- ☐ I am unable to walk about

SELF-CARE

- ☐ I have no problems washing or dressing myself
- ☐ I have slight problems washing or dressing myself

- ☐ I have moderate problems washing or dressing myself
- ☐ I have severe problems washing or dressing myself
- ☐ I am unable to wash or dress myself

USUAL ACTIVITIES (e.g. work, study, housework, family or leisure activities)

- ☐ I have no problems doing my usual activities
- ☐ I have slight problems doing my usual activities
- ☐ I have moderate problems doing my usual activities
- ☐ I have severe problems doing my usual activities
- ☐ I am unable to do my usual activities

PAIN / DISCOMFORT

- ☐ I have no pain or discomfort
- ☐ I have slight pain or discomfort
- ☐ I have moderate pain or discomfort
- ☐ I have severe pain or discomfort
- ☐ I have extreme pain or discomfort

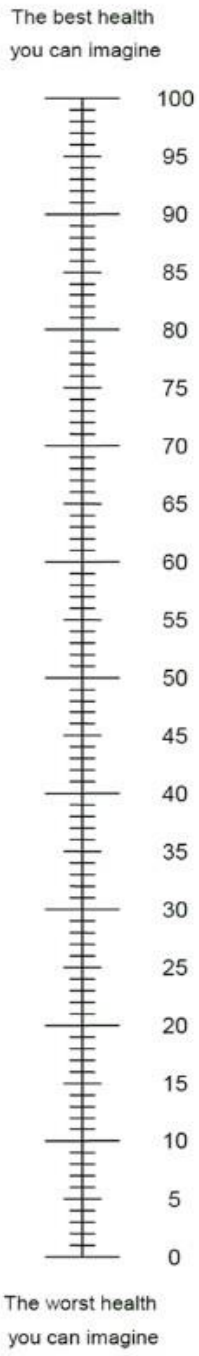
ANXIETY / DEPRESSION

- ☐ I am not anxious or depressed
- ☐ I am slightly anxious or depressed
- ☐ I am moderately anxious or depressed
- ☐ I am severely anxious or depressed
- ☐ I am extremely anxious or depressed

(II) EQ VAS

- We would like to know how good or bad your health is TODAY.
- This scale is numbered from 0 to 100.
- 100 means the best health you can imagine.
  0 means the worst health you can imagine.
- Mark an X on the scale to indicate how your health is TODAY.
- Now, please write the number you marked on the scale in the box below.

YOUR HEALTH TODAY = ☐



THANK YOU FOR TAKING TIME TO FILL THE QUESTIONNNAIRE

Appendix iv : Ethical Clearance letter

In case of reply the number
And the date of this
Letter should be quoted

My Ref. No. KBTH/rnl/C3/19

Your Ref. No......

KORLE BU TEACHING HOSPITAL
P. O. BOX KB 77,
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

23rd April, 2019

JOSHUA SANKA KODI
SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
UNIVERSITY OF GHANA
LEGON

DEPRESSION, ANXIETY AND QUALITY OF LIFE OF PATIENTS WITH RHEUMATOID ARTHRITIS AT THE KORLE BU TEACHING HOSPITAL

KBTH-IRB /00012/2019

Investigator: Joshua Sanka Kodi

The Korle Bu Teaching Hospital Institutional Review Board (KBTH IRB) reviewed and granted approval to the study entitled "Depression, Anxiety and quality of life of patients with rheumatoid arthritis at the Korle Bu Teaching Hospital"

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 March, 2020. You are to submit annual report for continuing review.

Sincere regards,

MR OKYERE BOATENG
CHAIR (KBTH-IRB)

Cc: The Chief Executive Officer
Korle Bu Teaching Hospital

Appendix v: Approved introductory letter

UNIVERSITY OF GHANA
DEPARTMENT OF SOCIAL AND BEHAVIOURAL SCIENCES
SCHOOL OF PUBLIC HEALTH

Ref. No.:.....

2nd January, 2019

The Chairperson
Research Ethics Committee
Korle-Bu Teaching Hospital

Dear Sir,

REQUEST FOR ETHICAL REVIEW
JOSHUA SANKA KODI

Joshua Sanka Kodi is a Master of Public Health student in the Department of Social and Behavioural Sciences, School of Public Health, University of Ghana, Legon.

I write as the Head of Department to support his application for ethical review of his proposal titled **"Depression, Anxiety and Quality of Life of Patients with Rheumatoid Arthritis at the Korle-Bu Teaching Hospital."**

I would be grateful if the committee could review the research proposal for possible approval, to enable the student start his data collection.

Yours faithfully,

Dr. Phyllis Dako-Gyeke
Head of Department

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