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Evidence-based practice and the management of Archiritis in the Upper West Region of Ghana: Challenges in implementation and practice

BY

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DECLARATION

I NUHU NAEEM, do hereby declare that the thesis was carried out entirely by me and under the supervision of

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ABSTRACT

This research was conducted to find out the problems faced in applying evidence-based practice (EBP) to manage arthritis. The relationship between arthritis and each of the following variables; gender, weight and age was determined. The study was also intended to determine the risk factor that is most related to arthritis.

Chi-square was used to assess the relationship between arthritis and each risk factor. Test was found to be significant for all the three risk factors. Cramier's V was used to compare the strength of the statistical relationship between arthritis and each risk factor. Cramier's V value of 0.397 for age and arthritis was found to be greater than 0.236 each recorded for weight and arthritis, and gender and arthritis. The relationship between age and arthritis is therefore stronger and hence age posses the most risk of arthritis among the three risk factors (gender, age and weight). The average age and average weight of arthritis patients in the study area were found to be between 63 years and 66 years, and 63 kg and 67 kg respectively using 99 % confidence interval. Osteoarthritis is more common with 68.7 % of the cases whiles rheumatoid arthritis less common with 31.3 %. Arthritis affects women 58.7 % more than men. Knee joint is the most commonly affected joint followed by hip joint. Excessive riding of bicycle over long distances on daily bases could lead to an increase number of knee problems. Farming coupled with the practice of polygamy could result in an increase number of waist problems. Self assessment of nurses understanding of literature and literature search skills revealed that nurses have low confidence (below average) in their understanding of literature and literature search skills.

Boxplot was used to show the age distribution of OA and RA patients. It was found that the average age of OA patients is higher than the average age of RA patients. Hence RA is more likely to affect people at an early age than OA. Boxplot was also used to compare the age distribution of OA and RA against gender. It was found that in both OA and RA, the average age of female patients is lower than the average age of male patients. Hence in both OA and RA, females are more likely to be affected at an early age than males. Also, boxplot comparism of the weights of patients with OA and RA shows that the average weight of RA patients is higher than that for OA patients. This shows that in general RA patients have more weight than OA patients. In addition, comparing the weight distribution of patients with OA and RA against gender using boxplot, it was found that in both OA and RA, the average weight of female patients is higher than that of their male counterpart. This shows that females are more likely to be affected by arthritis at an early age than their male counterpart.

Furthermore, some problems that impede the successful implementation and practice of EBP were identified; CDSSs have not been implemented, there is no interdepartmental network for computers in the various departments, low patient awareness of CDSSs, electronic health records system has not been implemented, inadequate understanding of literature and literature search skills on the part of nurses, leadership styles that do not support EBP, quack herbal medicine practice, proliferation of licensed and unlicensed drug stores, and unqualified people prescribing at the drug stores.

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Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

EBP …….Evidence-based practice

RA ……...Rheumatoid arthritis

OA ……..Osteoarthritis

ICT …….Information and communication technology

IT ……Information technology

MOTECH ….Mobile and telecommunication technology

CHAG …….Christian health association of Ghana

CT ……Computed tomography

MRI …….Magnetic resonance imaging

CDSS ……..Clinical decision support system

PDSS ……..Prescription decision support system

HL7 ……Health level seven

DICOM …..Digital imaging and communication in medicine

HRT ……Hormone replacement therapy

SNOMWD CT …….Systematized nomenclature of medicine (Clinical terms)

HER ……Electronic health records

HHS ……Health and human service

US ……...United States

IOM ……Institute of medicine

CPOE …….Computerized provider order entry

ESR ……Erythrocyte sedimentation rate

CBC ……...Complete blood count

ANA ……..Antinuclear antibodies

PCV …….Pack cell volume

PT ……Physical therapy

NRAS ……..National rheumatoid arthritis society

NHIS ……...National health insurance scheme

BMLs ……...Bone marrow lesions

CRP …….C-reactive protein

Anti-CCP ….Anti-cirullinated peptide antibody test

CBC …….Complete blood count

ANA ……Anti-nuclear antibodies

WBC ……White blood cell count

RBC …….Red blood cell count

HLA …….Human leukocyte antigens

DMARD …...Disease modifying anti-rheumatic drug

NSAID …….Nonsteroidal anti-inflammatory drug

OPD …….Out patients department

CHAPTER ONE

INTRODUCTION

1.1 **Background**

The cause of arthritis is not yet understood and its management is faced with numerous challenges. Treatment guidelines vary across the globe. The situation is further compounded by the fact that most of the medicines use to manage arthritis have serious long term side effects which present a new dimension to the problem. Systems such as clinical decision support, electronic health records, order entry, laboratory information software, and regular patient education programmes are often not in place. Because of these and many other problems very little gain has been made from the vast opportunities that evidence-based practice presents. Evidence-based practice (EBP) is the new paradigm in modern healthcare and Ghana cannot wait.

A 2008 survey reported that 1.3 million adults in US are affected by rheumatoid arthritis (Charles et.al, 2008). 50 % of all disabilities among older persons are attributed to arthritis (Hughes et.al, 1995 and Hughes et.al 1991). Research shows that, child labour in cocoa-growing areas in Ghana adds to muscular skeletal problems (Diane and Stephen, 2005). According to Dr. Micheal Ofori of the Noguchi Memorial Institute of Medical Research, there is an increase in the number of autoimmune diseases in Ghana.

In future, the success of health service delivery at any facility will be a measure of the degree of integration of information technology (ICT) with healthcare services. The ministry

of health recognizing this formulated ICT Policy for the Health Sector in July 2005. “The health sector overall goal for the last decade was to use ICT to reduce the inequalities between the rural and urban centres in accessing healthcare services”, Health sector policy and strategy (2005). According to the document, ICT has the potential to; increase access to services, improve quality of healthcare, increase efficiency of health delivery, foster partnerships in improving healthcare, and improve financing for the health sector. In July 2010, a National eHealth Strategy was launch by the government of Ghana to exploit the benefits of information technology for the health sector. It has three main components; streamlining the regulatory framework for health data and information management, building the capacity of the health sector for wider applications to provide eHealth solution in the health sector, improving access and bridging equity gap in the health sector through the use of information and telecommunication technology and move towards paperless records and reporting systems. MoTECH (mobile telecommunication technology) is an example of eHealth project that is currently ongoing and sponsored by Grameen Foundation. It is a mobile phone-based health education project targeting pregnant women. The system is design to tell women what to expect during pregnancy, remind pregnant women of their scheduled periodic visits, eliminate myths and bad cultural practices during pregnancy, remind workers of their schedules (appointments) and provide general health information. This system also helps community health workers to record and keep truck of services delivered and newborns in the area. Each rural health worker concerned is provided with a smart mobile phone on which the MoTECH Java application for health workers is installed.

Furthermore, to improve the efficiency and quality of service a national information system for health was proposed. The information systems that constitute the consolidated health information system initiative of the Ghana Health Services are; Ghana health services information system, teaching hospitals information system, national health insurance information system, food and drug board information system, pharmacy information system ,nurses and midwifes information system, medical and dental council information system, private hospitals and maternity homes information system, traditional and alternative medicine information, national emergency information system, Christians Health Association of Ghana (CHAG) information system, private sector information system and hospital management information system. The core modules in the hospital management information system are; patient billing, pharmacy, laboratory, order entry, patient records and admissions, discharge and transfers.

In another development, the ministry of health came out with a treatment manual called the Standard Treatment Guidelines to facilitate rational use of drugs. The document is meant to support prescribers (doctors, medical assistants, midwife), pharmacists, dispensers and other care givers who prescribe at primary care facilities in their duties. The Standard Treatment Guidelines seeks to enforce the application of evidence-based resources at the point of care. It provides that prescriptions should be backed by evidence and medications supported by high quality evidence are preferred. Where medications back by high quality evidence exist, prescribers should not prescribe medications with low quality or no evidence. Even where evidence does not exist, any cause of action will have to be justified among colleague practitioners.

Despite all these efforts, medical error remains a global challenge and evidence-based practice sought to minimize it. In another development, Dr. Micheal F. Ofori, an immunologist at the Noguchi Memorial Institute for Medical Research stated that arthritis is on the increase in Ghana. He made this statement in an annual ceremony for people living with autoimmune diseases organized by Share-Ghana in 2008. Research by Fary et.al (2012) to assess physiotherapy workforce readiness to co-manage patients with rheumatoid arthritis in Western Australia reveals that physiotherapy workforce have low confidence (22.7 %-58.2 %) in co-managing rheumatoid arthritis and need professional development. Another study reveals that of the roughly one trillion dollars spent on healthcare in the USA in 1998, about 25 % was on unnecessary or avoidable care, redundant tests and excessive administrative costs. Evidence-based practice seeks to correct these limitations.

Evidence-based practice happens to be one of the giant initiatives taken to improve health outcomes. Higgs and Jones (2000) define 'evidence' as "knowledge derived from a variety of sources that has been subjected to testing and found to be credible". The term "evidence-based medicine" was first used in 1992 Publication of the Journal of The American Medical Association as a new field in medical education and practice. A group of professors called the evidence-based medicine working group drown from epidemiology, medical informatics and biostatistics at McMaster University started the evidence-based movement. It seeks to find out the problem of medical error and wasteful spending from the use of unscientific medical interventions and suggest solutions to these problems by introducing decision making-technology that would relegate to the background unsystematic and intuitive methods of the individual clinical experience for a more scientifically rigorous

approach. This ideology preaches that clinical decisions should be based on the best available scientific evidence. According to Sackett (1996), “Evidence-Based Practice is the conscientious and judicious use of current evidence in making decisions about the care of the individual patient. It means combining individual clinical expertise with the best available external clinical evidence from systematic research. The patient brings to the fore, his or her own unique concerns, expectations and values”. This could however not be achieved without the needed information technology.

Information systems and technology contributions to evidence-based practice are divided into six application areas; reference databases, clinical data repositories, contextual and case-specific information, decision support software (expert system) and internet-based interactive health information.

The development of expert system started in the 1950s and MYCIN and INTERNIST-I were developed. In 1965, the National Library of Medicine began to use MEDLINE and MUMPS. MUMPS became the most commonly used programming language for clinical applications by the 1970s and 1980s. An expert system connected to patient monitoring devices can provide real time alerts and warnings to medical staff when there is a change in the patient's condition. They can also be used for less critical situations to provide tasks lists for clinicians. Patient data can be compared to the system knowledge-base in order to present possible diagnoses. This is most beneficial when the clinician is inexperienced or when the patient's symptoms are complex or appear unrelated. A specialized CDSS known as a Prescribing Decision Support System (PDSS) can check for drug-to-drug interactions, dosage errors, and drug contraindications such as patient allergies. A good number of

systems also enable automated script generation and electronic transmission to the pharmacy. PDSS is one of the widely accepted and used CDSSs. CDSSs can assist in the location and retrieval of appropriate and accurate clinical data which may be used for diagnosis or treatment planning. Depending on the complexity of the system, the CDSS may simply perform as a filter to search queries or be able to assess the importance, applicability, or utility of the information it retrieves. Expert systems are now capable of interpreting clinical images ranging from simple x-rays to MRIs or CT scans. Critiquing systems examine treatment plans looking for inconsistencies, errors, omissions, or potential contraindications. The system works by judging the proposed treatment against the patient data and known standards of care. Essentially, a critiquing system looks at a treatment plan in comparison to a set of "rules". A planning system, on the other hand, uses a knowledge-base of treatment protocols and guidelines to actually assist in the creation of a treatment plan.

The internet-based interactive health communication provides wider reach by creating new avenues for evidence-based practice in the area of; opportunity for interaction among users of the internet by email, capacity to spread more information and up-dating content, opportunity to direct information to specific needs, combining text, audio and visuals to display information, opportunity for users to remain anonymous thereby facilitating access to sensitive information and frank discussions concerning patients health and access to health information and support on demand in any given site via a plane telephone line or any combination of wireless communication options, thus, bridging the gap between the well-endowed hospitals and the less endowed hospitals, providing access to a practitioner

anywhere in the world up-to-date information at the point of care. The practitioner will have to appraise the evidence, compare it with patient specific information and together with his experience, come out with a treatment plan for the patient. Patients can use health portals to access clinical information from a specialist website for a second opinion. This is even more important when the patient is suffering from a chronic disease. Some journals such as the journal of medical genetics provide free access to medical literature whiles others such as the New England Journal of Medicine requires subscription. Large databases such as MEDLINE and the Cochrane Database are also available for free access. Primary sources published research findings whiles secondary sources summarize published research to concise and easily readable form to reduce the burden of reading the lengthy research and aid quick reference. Even though anybody can use search engines to search the web for clinical information, not all the information can be understood by all people. There are patient oriented portals which try to simplify clinical information for patient understanding whiles others are meant for professional use and require a knowledge threshold to understand. One major challenge though is the proliferation of unauthorized and unendorsed websites displaying health related information. This is a potential danger to unsuspecting information seekers. Also, internet security breaches such as intrusion in patient private information (hacking), unsolicited advertisement (spamming), pirating and so on are a major setback to widespread adoption of internet applications in the delivery of quality care. Despite these impediments, more people are searching the internet for information concerning their health. Studies in the USA shows that, of the fifty (50) million adults who

use the internet in 1997 and 1998, over seventeen (17) million searched it for health related information.

Considering the numerous and varied software systems operated by the various departments, the desired results will still not be achieved if these systems cannot coordinate with each other. Interoperability will facilitate the smooth coordination of the various software systems to synchronize the activities of the various departments and reinforce evidence-based practice. This implies; more complete information will be provided for treatment decisions, opportunity to reduce operational cost and effective use of resources, widened ability to demonstrate performance consistent with regulations and professional standards, streamline management duties and make it easy, improved efficiency in dealing with other providers and outside bodies, and less paper work. To support interoperability, Health Level Seven (HL7) and Digital Imaging and Communication in Medicine (DICOM) are the platforms used to specify standards, guidelines and methodologies by which the various healthcare systems can communicate. These data standards allow healthcare organizations to share clinical data. Clinicians and organizations use different clinical terminologies that refer to the same thing. For instance, the term hormone replacement therapy and HRT mean the same thing to a rheumatologist, but to a computer, they may refer to different things. For clinical information exchanged between different healthcare settings, providers and researchers should be consistent. A comprehensive, unified medical terminology system is needed to be part of the information infrastructure. In this respect, SNOMED CT (Systematized Nomenclature of Medicine-Clinical Terms) was formulated to systematically organize a collection of medical terminology, in areas of clinical information

such as diseases, findings, procedures, microorganisms, pharmacology etc. that can be processed by a computer.

By the 1970s a number of commercial vendors had started to selling price management and electronic medical records systems. Electronic Health Records (EHR) is an aid to EBP. It is a systematic collection of electronic health information about individual patient or population. It can be accessed by different healthcare settings when networked. Records stored may include; demographic data, medical history, medication, allergies, immunization status, laboratory test results, radiology images and billing information. It can be understood as a complete record of patient encounters that allows providers to automate and streamline workflow in healthcare settings whiles increasing safety through evidence-based decision support, quality management and outcome reporting. It can reduce possible errors such as drug prescription related errors, test and procedures and preventive care. Recognizing the relevance of interoperability, the US Department of Health and Human Services (HHS) in 2004, formed the office of the National Coordinator for Health and Information Technology with a mission to derive a widespread adoption of interoperable Electronic Health Records (EHR) in the US within ten years.

The US Institute of Medicine (IOM) in an effort to create the awareness of medical errors in its report in November 1999 titled “To err is Human” stated that many people die as a result of preventable error. The report analyzed multiple studies conducted by various organizations on patient safety and concluded that between 44,000 and 98,000 patients die each year as a result of preventable medical errors. In its report in 2004, suggested a 21st

Century Healthcare System to improve patient safety. This system should have electronic patient records, electronic medical ordering, computer and internet based information systems to support clinical decisions. Also in 2006, the Institute of Medicine stated that prescribing errors are the largest source of preventable errors. That Computerized Provider Order Entry (CPOE) can reduce total medication error rate by 80 % and adverse errors by 55 %.

Arthritis refers to any disorder that affects the joint. It does not refer to a single disease but to a group of many rheumatic diseases and conditions that can cause pain, stiffness and swelling in the joint. However, some arthritis can affect other parts of the body too. There are numerous symptoms for arthritis. These include; pain on movement, swelling of joints, bony enlargement of the joint, limitation on range of movement, and joint deformation. The cause of arthritis disease is unknown. Treatment is targeted at the symptoms (relieving pain, remove or reduce inflammation and prevent deformities). Medication (chemotherapy), physical therapy, surgery and natural or herbal therapies are some of the common treatment techniques use to achieve these targets. Age, stressful jobs, hereditary, obesity, and gender are some of the risk factors associated with arthritis. Diagnosis is a very a critical stage in the management of arthritis. It is difficult to diagnose arthritis because some of the symptoms and signs are common to many different diseases and multiple tests have to be performed to diagnose it. It is however helpful for the patient to give an accurate description of what happens to him or her and how him or her feels. In fact, a doctor reviews the patient's complete medical history and conducts a physical examination for joints' redness, tenderness, ease of movement, warmth and damage. Internal organs may also be affected, so

physical examination should include lungs, heart, throat, mouth, eyes, ears, abdomen and nervous system. Laboratory tests should be ordered afterwards to help confirm a diagnosis. Blood samples, synovial fluid, and urine may be requested for the tests. Some of the laboratory tests and procedures include urinal analysis, synovial fluid examination, rheumatoid factor, erythrocyte sedimentation rate (ESR), complete blood count (CBC), antinuclear antibodies (ANA), hematocrit (PVC-pack cell volume), complete blood test, cretonne blood test, etc. To further confirm the diagnosis X-ray, CT (computed tomography) scans, magnetic resonance imaging (MRI), ultrasound and arthrography may be required.

Immediately after diagnosis, appropriate medications may be given. Physical therapy (PT) may be prescribed to strengthens the muscles, improve flexibility and joint movement. Occupational therapy may be applied by designing specific exercise programmes and pain management techniques to assist the patient manage his daily activities. Exercise in general helps to ease arthritis symptoms by reducing pain and joint stiffness and therefore is recommended. Research shows that maintaining a healthy weight reduces the risk of developing arthritis. Too much weight can damage the knees and hips. In addition to exercise, a balanced diet is required to keep healthy. Dietician may provide an advice depending on the condition. The patient can contribute to improve his/her condition by acquiring knowledge of the disease/condition that will help them prevent their case from getting worse. Surgery may be performed to improve movement, relief pain and improve joint alignment. However, a doctor needs to discuss the risks thoroughly with the patient so that an informed decision can be taken by the patient. Joint surgery may include bone fusion, joint replacement (arthroplasty), arthroscopic surgery, and osteotomy.

Both primary and secondary data shall be used and questionnaire shall be the survey instrument. SPSS software shall be used to analyze the data.

National Rheumatoid Arthritis Society (NRAS), Lioyd TBS Foundation, Big Lottery Fund in the UK, Arthritis Care in Wales, Arthritis Self Help Carmarthern, American College of Rheumatology, and Arthritis Society of Canada support arthritis patients in diverse ways. Some of them like Arthritis Care in Wales and Arthritis Self Help Carmerthern are charity groups supporting people with arthritis. Others like the Big Lottery Fund and Lioyds TSB Foundation give financial support to arthritis programmes and projects. American College of Rheumatology, National Rheumatic Arthritis Society and Arthritis Association of Canada are into research and education programmes, and other support programmes. ShareCare Ghana, a non-governmental organization also supports people with autoimmune conditions.

Upper West Region is found in the northern part of Ghana. It is the last region to be created out of 10 regions in the country. It has 10 districts out of this only 6 have District/Municipal Hospitals; Wa Municipal Hospital, Nadole District Hospital, Jirapa District Hospital, Lawra District Hospital, Nandom District Hospital and Tumu District Hospital. The Health Service in the region is headed by the Regional Director of Health and at the District/Municipal level it is headed by the District/ Municipal Director of Health. Each District Hospital has at least one medical officer.

CHAPTER TWO

LITERATURE REVIEW

2.0.1 Introduction

This chapter seeks to review what other researchers have done in relation to the topic so as to position the topic in a way that will link it to previous works such that research is continuous. It helps to identify what areas the researcher can contribute to the existing knowledge and how others went about theirs. This contributes to reduce duplication so that scarce resources can be put into good use. In view of the above, this chapter also contains an overview of the management of arthritis and the practice of evidence-based medicine. This includes; definition of key terms, prevalence, risk factors, symptoms, diagnoses, laboratory test, pharmacological and non-pharmacological treatments, medication, management of arthritis in Ghana, problems in implementing EBP and suggested solutions, steps in the practice of EBM and conclusion.

2.0.2 Definitions

Higgs and Jones (2000) define 'evidence' as "knowledge derived from a variety of sources that has been subjected to testing and found to be credible". According to Sackett (1996), "Evidence-Based Practice is the conscientious and judicious use of current evidence in making decisions about the care of the individual patient. It means combining individual clinical expertise with the best available external clinical evidence from systematic research. The patient brings to the fore, his or her own unique concerns, expectations and values".

Osteoarthritis is a joint disorder caused by damaged cartilage and consequently allows the joint bones to rub each other and causing pain. It often attacks the hip, Knee, and shoulder. It is the most common form of arthritis but its cause is unknown.

Rheumatic arthritis (RA) is an autoimmune inflammatory disease of the joints characterized by symmetrical inflammation of the synovial tissue. For instance, it affects both writs and both knees. The exact cause of rheumatic arthritis is not known. The body's immune system is unable to differentiate between the body and a foreign body and hence attack healthy cells and tissues. This results in inflammation in and around the joints and consequent destruction of the skeletal system. RA can attack other organs too, such as the heart and lungs. Factors that initiate the attack may include: hereditary (Rhesus factor), injury resulting from accident, occupations that involve repeated use of joints, (such as typing and painting, for wrist joints, farming for hip joint etc) diabetes mellitus, and so on.

Figure 2.1 Picture showing osteoarthritis of the knees (source: Dpa)

Figure 2.2 picture of rheumatoid arthritis of the fingers (source: Dpa)

2.0.3 The Concept of Evidence-Based Practice (Conceptual Framework)

Evidence-based practice combines explicit knowledge from research findings, tacit knowledge of the practitioners and information technology applications as a vehicle, to optimize health outcome.

There are five steps in the EBP process;

(i) Examine the patient to find out the problem.

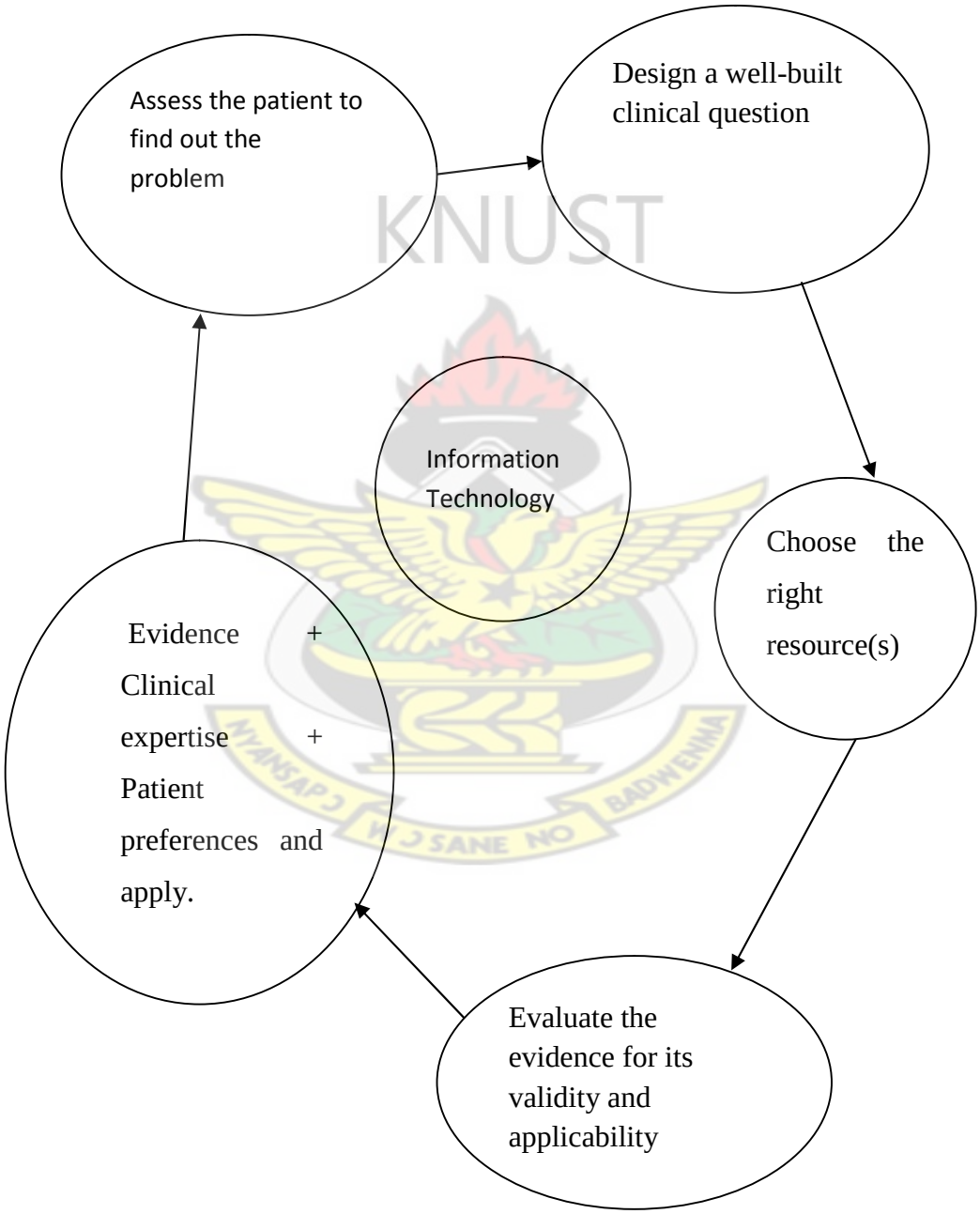
(ii) Design a well-built clinical question from the problem.

(iii) Choose the right resource(s) and search for evidence

(iv) Evaluate the evidence for its validity (closeness to the truth) and applicability (usefulness in clinical practice)

(v) Go back to the patient and integrate the evidence with clinical expertise, patient preferences and apply it to practice

Figure 2.3 Model for the Framework



Evidence-based practice process is a cycle. If there is breakdown in any part of the cycle, the system fails to work. Information technology is at the centre of this practice and hence without appropriate technology this practice cannot be exploited. Breakdown in the cycle may come in the form of clinicians in ability to appreciate evidence, evidence resources not being available to practitioners, practitioner's inability to design a well-built clinical question to conduct the search, inability of the practitioner to assess the applicability of the evidence, a non-cooperating patient who does not share his experience in full or does not follow treatment etc.

2.0.4 Research Question

Why is Ghana not deriving optimum benefit from evidence-based practice?

2.0.5 Hypothesis

1. H_0: Arthritis does not relate to gender of a patient

   H_1: Arthritis is related to the gender of patient (Claim)

2. $H_{0:}$ arthritis is independent of the age of a patient

$H_{1:}$ Arthritis depends on the age of the patient (Claim)

3. H_0: Arthritis does not relate to the weight of a patient

H_1: Arthritis is related to the weight of the patient (Claim)

2.0.6 **General Objective**

The overall aim of this research is to identify the factors militating against the implementation of evidence-based practice in Ghana with respect to arthritis.

2.0.7 Specific Objectives

1. To determine the relationship between arthritis and each of the following risk factors; age, gender and weight.
2. To determine among the risk factors the one that is most related to arthritis.
3. To determine the challenges in applying current and up-to-date evidence (best practice) in managing arthritis.
4. To assess the implementation of the core modules of the proposed hospital information management system.

2.0.8 **Significance of the Study**

Knowing current leadership style and how it affects Evidence-Based Practice will assist in defining management training needs. Team Leadership style is the required leadership style that can support Evidence-Based Practice. Giving people the needed training to become team leaders will be a step forward. Leaders who are not Evidence-Base Practice conscious have the tendency to water down any effort in support of Evidence-Based Practice. Leaders that can blend healthcare management with information technology effectively will be in the best position to apply knowledge management tools in a manner that will motivate colleague workers to embrace Evidence-Based Practice. This research will identify clinicians training needs in the use of Evidence-Based Practice tools. Evidence is useless if clinicians cannot use them effectively and to the benefit of the patients. Ongoing

research is overwhelming and health technology is getting sophisticated by the day, clinicians will have to be trained over and over again to keep up with the changing pace of research evidence and health technology. When the relationship between gender, age and weight and arthritis is known, it will help focus intervention on the most vulnerable group or groups and thus improve the management of scarce resources. The state can use the outcome of this research to assess how far it has gone with the implementation of the ICT Policy for the Health Sector. Unearthing leadership challenges that militate against evidence-based practice could inform policy makers to streamline existing policies that are inimical to the practice of evidence-based practice. In general, knowing the impediments on the way of evidence-based practice will be a step forward in arriving at the solution. As health informatics student, I look forward to managing a healthcare facility and this topic will expose me beforehand to management issues on the ground. In addition, various researches have been done on evidence-based practice and arthritis management in different parts of the world but not exactly in the same perspective and not in the study area. More importantly, this research is in partial fulfillment of the requirement for the award of a masters' degree in Health Informatics by the Kwame Nkrumah University of Science and Technology (KNUST).

2.0.9 **Scope and Limitations of the Research**

The study covers Wa Municipal Hospital, Nadole District Hospital, Jirapa District Hospital, Lawra District Hospital, Nandom District Hospital and Tumu District Hospital. Only the management of rheumatoid arthritis (RA) and osteoarthritis (OA) will be

considered. It was very difficult to secure an appointment with a medical doctor in particular probably due to their tight schedule. Many respondents claim the questions were technical so even when an appointment was made it was difficult to get a prospective respondent answer the questionnaire. Some respondents under the pretext of confidentiality prove difficult. Few doctors took part in the survey because there are no many doctors in the study area. It will be worthwhile to include more doctors by extending the study area to get a wide variety of opinions. Rheumatologist would have provided a better insight than the General Practitioners and nurses, however they were not available.

2.1.0 Prevalence

Prevalence is crucial in assessing the burden of arthritis. A 2008 survey reported that 1.3 million adults in US are affected by rheumatoid arthritis (Charles et.al, 2008). 50 % of all disabilities among older persons are attributed to arthritis (Hughes et.al, 1995 and Hughes et.al 1991). And almost 10 % of Canadians have OA. Data in Ontario shows that, prevalence varies by region and gender. In the US the prevalence ranges from 8 % to 16.4 % whiles in UK the prevalence stands at 12.5 %. It is reported that the prevalence is about 8 % to 13 % in Australia, New zeal, Belgium and the Netherlands. In developing countries physician-confirmed OA prevalence is relatively low and range between 2.3 % to 11.3 %. The prevalence of RA in Canada is approximately 1.0 % whiles in the US it is estimated at 0.6 % in adults 18yrs and above (Population census Bureau, 2005). However, a relatively high prevalence ranging from 2.0 % to 4.0 % in Australia, New Zealand, and the Netherlands was reported. RA is more prevalent in females than in males and increases with age (Rose et.al,

2010). In this report data from peer-reviewed literature was used and the World Wide Web searched for population-base Health survey reporting data on arthritis and rheumatic conditions. A study done in rural Tswana population of Phokeng, South Africa shows that prevalence of Knee Osteoarthritis in Africa is 20238 per 100,000 persons for males who are 35 years and above and 30208 per 100,000 persons for females who are 35 years and above. In this research clinical assessment was used as the diagnostic criteria and x-ray photograph of patients were analysed. The prevalence for hip Osteoarthritis is 3278 for males who are 55 years and above and 725 for females who are 55 years and above. From the study above it is evident that hip Osteoarthritis is common with men in the study area, (Debora et.al, 2000). In Ghana, autoimmune diseases are on the increase according to Dr. Micheal F. Ofori, immunologist at the Noguchi Memorial Institute for Medical Research. This was made clear at the launch of ShareCare Ghana on Thursday 19th 2008. Nana Yaa Agyeman, the coordinator, called for the inclusion of autoimmune diseases under the National Health Insurance Scheme (NHIS).

2.1.1 Risk factors

Age, gender, family history, occupation, diabetes mellitus, hysterectomy, accident (injury) are some of the risk factors that initiate the attack. Research shows that women with high body mass index at the age of 40 have a relative risk of 9.2 of developing severe knee Osteoarthritis later in life, and for men at the same age, the relative risk was 3.9, (Joos et.al, 1993). Research shows that, child labour in cocoa-growing areas in Ghana adds to muscular skeletal problems, (Diane and Stephen, 2005). Other research works show a relationship between arthritis and age, gender, weight and occupation, (Helene et.al, 1999).

2.1.2 Symptoms

Pain at the start of walking, morning stiffness, limited joint movement, swollen in the joint and deformities are the symptoms of OA. OA often affects the knee, hip and shoulder. The most common affected joints by RA are the hands, wrist, ankles, elbows, shoulders and knee joints. RA causes symmetrical inflammation of the joints. Symptoms may vary from one individual to another. Some of the common symptoms are; stiff joints, inflamed and painful joints, frozen joints, cysts behind the knees that may rupture, causing lower leg pain in the affected joints, low-grad fever, occasionally, blood vessels may be inflamed resulting in nerve damage and leg sore, membranes around the lungs and the sacaround of the heart inflame, scaring around the lungs themselves result in chest pain, difficult breathing, and abnormal heart function, swollen humph nodes, dry eyes and mouth, eye inflammation etc. If a person has four or more of the following symptoms, she/he may be diagnosed with RA; morning stiffness that last for more than an hour for six or more weeks, three or more joints that are inflamed for six or more weeks, presences of pain and difficulty in moving hand, wrist, or finger joints for six or more weeks, blood tests that shows the presences of rheumatic factor and X – rays that shows characteristic changes in the joints.

2.1.3 Diagnosis

It is often difficult to diagnose arthritis at the early stages because the symptoms may be very subtle that X-ray and blood sample tests may not detect it. A complete medical history and physical examination of the patient will be needed to support diagnosis. X-ray diagnostic test which involves using invisible electromagnetic waves (energy) to produce images of the internal tissues, bones, and organs onto film, computed tomography (CT)

which gives a three dimensional view of the affected joint for better visualization and blood tests to detect certain antibodies called rheumatic factor and other indicators of rheumatoid arthritis are use for diagnosing RA. For OA, X-ray of the affected joint, magnetic resonance imaging (MRI) to help detect the presence of bone marrow lesions (BMLs) and CT can be useful in detecting it.

2.1.4 Laboratory Test

Very often, a physician will need more information after medical history and physical examination has been completed. Blood tests provide more specific information and often use to confirm what the doctor suspects in the diagnosis. Blood tests are also use to monitor the effectiveness of a treatment and disease activity after a diagnosis has been confirmed. Initial visit may call for a few of these tests base on the medical history and physical examination. Some of these tests include; Rheumatic factor which is an antibody or immunoglobulin which is present in most adults who have rheumatoid arthritis. Erythrocyte sedimentation test (ESR) indicates the presence of nonspecific inflammation, C-reactive protein (CRP) is a protein produced by the liver as a result of tissue injury. The level of plasma increases as CRP increases faster after period of acute inflammation or infection making it a better indicator of disease activity than the erythrocyte sedimentation test which changes more slowly, anti-cyclic citrullinated peptide Antibody Test (anti-CCP) is a blood test popularly used and it is ordered if rheumatoid arthritis is suspected. Mild to severe cases of anti-CCP in a patient's blood confirms the diagnosis. This test is more accurate than rheumatoid factor. Antinuclear Antibodies (ANA) are abnormal auto antibodies.

Moderate to high levels of antinuclear antibodies suggest immune disease. 30 to 50 per cent of rheumatoid arthritis patients result in positive antinuclear antibody test. Complete blood count determines the white blood cell count (WBC), red blood cell count (RBC), hemoglobin, hematocrit, several red blood cell indices and the platelet count. Elevated white blood cells count is an indication that inactive patients who are taking corticosteroids may have elevated WBC as a result of the medication. However, chronic inflammation may result in low red blood cells count. Low hematocrit and hemoglobin may be a sign of anemia associated with chronic diseases or possible bleeding due to medications. High platelet count is often observed in rheumatoid arthritis patients. Meanwhile some potent medications can cause platelets level to go low. Human Leukocyte Antigens (HLA) is protein on the surface of cells. For some rheumatic diseases, specific Human Leukocyte Antigens are the genetic markers. For alkalosis, spondylitis and other spondyloarthropaties patients will be tested for HLA-B27 whiles rheumatoid arthritis is associated with HLA-DR4. High levels of uric acid in the blood (hyperuricema) may cause crystals to form which are deposited in the tissues and joints, resulting in painful gout attacks. Uric acid is the final product of purine metabolism in humans. For some rheumatic diseases, biopsies of some organs can give important diagnostic information. A single test result or symptom is not sufficient to diagnose arthritis. Multiple tests have to be performed so that some types of arthritis can be ruled out in the process and finally arrived at definite and specific type of arthritis.

2.1.5 Treatment

Physicians determine specific treatment for RA based on medical history, overall health and age of the patient, the level (extent) of condition, therapies, procedures and tolerance of the patient's body to specific medications, expectation for the course of the condition, patient opinion or preference. If patients report condition early enough diagnosis and treatment can be done early to prevent joint damage and impairment which some time occurs at the early stages of the disease. Treatment of RA may involve, resting affected joint regularly, non-steroidal anti-inflammatory medications (e.g. ibrufen), Disease modifying Anti Rheumatic Drugs (DMARD) to slow down deformation (e.g.). Corticosteroids to reduce inflammation, immunosuppressive medications to suppress inflammation (e.g. methotrexate), exercise to keep the joints as flexible as possible, physical therapy to keep knee joints as from becoming immobile, heat or cold application to the joints, surgery to repair, replace or fuse together a joint that has been affected, assistive devices such as walking sticks and crutches. For OA, treatment starts with acetaminophen and step up to nonsteroidal anti-inflammatory drugs. A combination of glucosamine and chondroitin, hyaluronic acid injections and corticosteroid injections are use to provide relief and slow the progress of the disease. Total joint replacement of the knee, shoulder or hip is recommended for patients with chronic pain and disability.

2.1.6 Medication

Various groups of medications have been use to control arthritis symptoms, prevent joint damage and improve mobility and function. There are five categories of arthritis

medication; non-steroidal anti-inflammatory drugs (NSAID), analgesics (Painkillers), Disease Modifying Anti-Rheumatic Drugs (DMARDs), corticosteroids, and the recent biologics. Non-steroidal anti-inflammatory drugs (NAIDs) have been used for many years and have anti-inflammatory, analgesic (painkilling), and fever reducing properties. Analgesics are use to relieve pain. The pain relieve induced by analgesics work by either blocking the pain signals going to the brain or by interfering with the brain's interpretation of the signals without causing loss of consciousness. Corticosteroids (steroids) are drugs similar to the hormone cortical which is naturally produced in the outer layer of the andrenal gland and are use to reduce inflammation of the joints. They are use orally or by injection. Disease modifying anti-rheumatic drugs (DMARDs) slows the progress of the disease by modifying the immune systems. Biologic response modifiers (biologics) stimulate or restore the ability of the immune system to fight the disease or infection. For example TNF-alpha is involved in inflammatory reactions. When anti-TNF drugs are applied, it binds to TNF-alpha, rendering it inactive and unable to interfere with inflammatory activity and thus decreasing joint damage. Arthritis affects more women than men due to the loss of the hormone estrogen in women as they grow old. Research evidence shows that women receiving long term estrogen replacement therapy (ERT) have 38 percent lower risk of osteoarthritis of the hip than those not receiving the hormone. Women taking the estrogen replacement therapy for less than ten years, experience a 25 percent hip osteoarthritis reduction compared to 43 percent risk reduction for those taking the hormone for more than ten years (Wluka, et.al, 2001). Similar study revealed that women who receive estrogen replacement therapy (ERT) had thicker knee cartilage compared to those women who did

not receive the hormone (Callahann et.al, 1996). Hence hormone replacement protects against the wearing off of cartilage by continuous replacement of estrogen.

2.1.7 Non-pharmacological Treatment

Physiotherapists design rest and exercise programme to co-manage the disease, (Hochberg et.al 2012). These activities strengthen the muscles and improve joint movement. People leaving with arthritis and other rheumatic diseases are less active compared to the general population. On the contrary, they need a lot of exercise to keep their health. The 1996 Surgeon General's Report on Physical Activity and Health reported that persons with osteoarthritis need regular activity to keep normal muscle strength, joint structure and function. Another research added that, although physical activities such as walking have been scientifically proven to be effective in improving physical function and arthritis symptoms, individuals with osteoarthritis tend to pay less attention to it. It shows that osteoarthritis can be managed through the implementation of proven effective walking programmes in clubs and associations. In this study, a single-blind, randomized control trial was conducted. 222 Subjects were randomized to one of three groups: 1) Walking and Behavioral intervention (WB) (18 males, 57 females) which included the supervised community-based aerobic walking program combined with a behavioral intervention and an educational pamphlet on the benefits of walking; 2) Walking intervention (W) (24 males, 57 females) wherein participants only received the supervised community-based aerobic walking program intervention; 3) Self-directed control (C) (32 males, 52 females) wherein participants only received the educational pamphlet. One-way analyses of variance were

used to test for differences in quality of life, adherence, confidence, and clinical outcomes among the study groups at each 3 month assessment during the 12-month intervention period and 6-month follow-up period. Significant gains in health outcome were observed in all three groups but more in the first group (walking and behavioral intervention). The last group recorded the least improvement. Hence a more holistic approach is needed in the management of arthritis. In the past twenty years, doctors usually advise patients with arthritis not to exercise for the fear that they may cause damage to their cartilage. Now physicians and physiotherapists co-manage the disease and design exercise programmes that strengthen muscles, build endurance and facilitate that joint movement is not limited. Self-management is an important component of arthritis management. Acquiring knowledge about the risk factors, symptoms, diet, exercise, medication and general information about the disease will place the patient in a better position to contribute to the management of his/her health. To buttress this point the arthritis foundation is encouraging people with arthritis to take a six-week course at the Stanford University that will help them manage the disease. Research conducted by the university shows that persons who offered the course reduce their pain by 20 percent and reduce their hospital visits by 40 percent relative to those who did not take the cause. The study further suggests that insurers or health plans that include at least 10,000 people with arthritis in their enrollees could save 2.5 million dollars for a period of four years if they offer the course

2.1.8 Natural remedies (herbal medicine)

Herbal medicine as an alternative treatment of arthritis is gaining popularity and complement traditional (clinical) therapies. However, more scientific research is required to establish the claim of its effectiveness.

Each of these medication options have serious side effects which should be discussed sufficiently with the patient so that he or she can effectively weigh the options and decide.

2.1.9 Problems in Implementing EBP

A study reveals that one-third (33%) of arthritis patients reported Unmet expectations after visiting a rheumatologist, (Jaya et.al, 2004). It was carried out in a period of 6 to 12 months and has an enrollment period of 2 weeks. It was done in six outpatient facilities. A sample of 177 patients was considered and questionnaire used as the research instrument. Six Unmet expectations were listed and respondents were to indicate yes or no for each. The patients were enrolled from 6 outpatient facilities; 3 universities and 3 private rheumatology practices. Demographic information was taken by reviewing medical records and diagnoses made by rheumatologists after the subjects agree to take part in the study. Telephone survey was used at first to call patients within two weeks after they made an appointment with a rheumatologist, followed by two surveys in 6 months and 12 months respectively. Questions of unmet expectations were contained in the 12 months survey. The six month survey was used as the baseline survey and the 12 months as the follow-up survey. Only patients who responded to the baseline survey and the follow-up survey were included in the analysis. Poor adherence to standard treatment guidelines, limited times, complex guidelines and inadequate in-service training are some of the reasons cited for this

problem. A related research indicates that 15-25% of patients leave hospitals with unmet expectations, (Jackson et.al 1999). Various researches show that there are regional and subspecialty variations in the use of non-pharmacologic, pharmacologic and surgical treatment modalities and the quality of care. However, there is significant variability in the quality of methodology for rheumatoid arthritis guidelines, (Hochberg et.al, 1996, Katz et.al, 1996, Maclean et.al, 2000).

Most developing countries do not have adequate evidence-based clinical policies to guide practice and where it exists, it lacks quality, also appropriate technology does not exist to apply the policy in full or there is laxity in enforcing it, (Haynes, R.B, A Haines, 1998). Accessing best evidence is a problem in some health care facilities especially in rural and some urban areas where there is no reliable electricity and poor internet service or no internet service at all. There is no regular and adequate number of in-service training programmes for clinicians to keep abreast with the changing wave of clinical practice where best practice is changing at a fast pace; thousands of new findings are added to clinical knowledge every year. However, there is no proportional increase in the retraining of health professionals. Research to assess physiotherapy workforce readiness to co-manage patients with rheumatoid arthritis in Western Australia reveals that physiotherapy workforce have low confidence (22.7%-58.2%) in co-managing rheumatoid arthritis and need professional development. A related research in Australia reveals that further training for community base physiotherapy workforce is necessary for the effective and sustainable implementation of health policy (Robyn et.al, 2012). Similar study reveals gaps in areas of knowledge and skilled workforce, (Self management strategic framework, 2011). After attending a training

or workshop, workers often do not apply the knowledge acquired to practice. Low patient adherence to treatment is another problem. If all steps are taken and patients refuse to follow treatments, the effort of EBP will not yield the desired results. High initial cost with respect to new equipment, networking and high subscription fees are some of the obstacles to the adoption of evidence-based practice.

2.2.0 Conclusion

The guidelines use in the management of arthritis in Ghana has low quality as seen in the evidence rating (C) of the chemotherapy. This may be due to the non-availability of high quality drugs that have been proven to be effective in managing the disease or the associated cost of the drugs. Biologic response modifiers which restore the body's ability to fight the disease should be included in the guidelines. In general, most research works in arthritis (chemotherapy) have relatively low quality. Guidelines of high quality could reduce unmet expectations. However, until the cause of arthritis is found, issues of unmet expectations will persist. Treating symptoms cannot cure the disease. More research should be encouraged to find the cause of this notorious slow killer that confines the aged for a long time until they depart. Uniform guidelines for the management of arthritis should be adopted all over the world. The problems of evidence-based practice are surmountable given the required commitments. Before the implementation of any evidence-based programme or practice, managers should be given training. This will prepare them adequately for the smooth take off of the programme. Prescribers should not be in hurry to switch to new drugs since adverse findings take many years to establish.

CHAPTER THREE

METHODOLOGY

3.0.1 Introduction

Methodology is an essential component of every research and if the right procedures for data collection are not followed or are being compromised, the outcome will not be a true reflection of what is on the ground. This chapter gives a vivid account of how the data was collected for the research and the principles underlying the methods used.

3.0.2 Population

The target population consists of doctors, physiotherapists, nurses, arthritis patients and support staff. Each of these categories will be a sampling unit. Six District and Municipal Hospitals will be involved. These include; the Wa Municipal hospitals, Nadole District Hospital, Jirapa District Hospital, Lawra District Hospital, Tumu District Hospital and Nandom District Hospital.

3.0.3 Sampling

In this research both probability sampling and non-probability sampling were used. Probability sampling was used to select arthritis cases for the research. Non-probabilty sampling was used to enroll respondents to answer the questionnaire. It will be very difficult financially, and also the volume of work involved using the entire population for this research even though that will be ideal. According to the law of large numbers, large random samples are almost always representative of the population. As the sample size increases, the

sample distribution approaches normal distribution. It is on this basis that a large sample ($n \geq 30$) was used instead of the entire population. Quota sampling, stratified sampling and random and non-random sampling were used to collect samples.

The population was stratified into five strata and each stratum represents a district hospital. There were five sampling units in each stratum; 1 doctor, 1 physiotherapist, 1 system analyst or records officer and 3 nurses. Non-random sampling was used to enroll participants. This provides the opportunity to enroll subjects who are in a better position to provide adequate and reliable information for the research instead of random samples that will introduce people who have no adequate knowledge on the subject. Non-random samples were also used because this part of the research is explorative; available members of the target group were made to answer questionnaire. For the primary data a total of 36 samples were collected; 6 from each of the six hospital. For the secondary data; arthritis cases from January to April, 2013 was sorted out and random samples taken. The analysis of this data involved hypothesis testing as such a quantitative approach was used to determine sufficient sample size. This was done to strengthen the power of the test.

3.0.4 Sample Size

It very important to determine the amount of samples that is sufficient for the research. Adequate sample size will strengthen the power of the test. In hypothesis testing, sufficient sample will ensure that the test is able to reject the null hypothesis when it is false and reduces the probability of committing type II error (the inability to reject a false claim). On the other hand, a small sample increases the chance of committing type II error.

Unnecessarily large sample increases the cost of the research by increasing the number of interviews to be conducted, the number of questionnaire to be administered and the volume of data to analyze. Hence the need to estimate adequate sample size for the research.

3.0.5 Sample Size determination

For a given precision and alpha level, the sample size of population proportion can be determined using the formula below;

$$n = pq\,(Z_{\alpha/2})^2 / E^2$$

Where n = the sample size, p = population proportion, q = population variance, α = the risk of committing an error (Type I error) and E = the precision.

Since the test involves comparing proportions of males and females with arthritis, the formula for estimating the sample size for proportion was used. The population proportion p was considered to be 0.5 because the formula produces the maximum possible value of n for any given risk (α) and precision (E) when p=0.5. For a desired precision of 5%, the calculation was done as follows;

Using p = 0.5, q = (1 - p) = 1 - 0.5 = 0.5 and risk of 5% (α = 0.05). Using a two-tailed distribution, $\mathbf{Z_{\alpha/2} = Z_{\alpha/0.025} = 1.96}$

$n = 0.5 \times 0.5\ (1.96)^2/0.05^2 = 384.15$

$n \approx 385$

Hence the minimum sample required is 385 patients.

Arthritis cases from January to April 2013 were sorted out and a random sample of 396 patients collected, 66 from each hospital. This was done using simple random sampling without replacement. Cases were identified in the consulting room and random samples of folder numbers taken to trace the folders in the records office.

Randomization will ensue that the characteristic of interest is distributed evenly in the sample and that it is not overly represented. This makes the sample representative of the population (Douglas G.A & J.M Bland, 1999). Where there was no physiotherapist, 4 nurses were interviewed.

3.0.6 Survey methods

In this research, data was collected from both primary and secondary sources (Appendix 2 and 3) and summaries were stored in a database using SPSS (Appendix 1). Secondary data (Appendix 2) collection involves extracting data from patient records such as age, gender, weight, the type of arthritis (OA or RA), and affected joint; this was done by looking for cases in the consulting room records and taking folder numbers to trace the folders in the records office. The folder numbers were written on pieces of papers and placed in an opaque box. Simple random sampling without replacement was used to select 66 patients for the study. The required data is then extracted from the folders. This was applied to all other hospitals involved in the study. Patients were put into three age groups; young age was defined as patients below 41 years, middle age as patients who are more than 40 years but less than 61 years and old age as patients who are 61 years and above. Also, Patients were put into three weight groups; Light weight is define as patients who are 50 kg and below,

middle weight is defined as patients who are above 50 kg but less than 81 kg and heavy weight is defined as patients above 81 kg. A bar chart was drawn for the distribution of arthritis cases by affected joint. Chi-square analysis was use to establish the relationship between arthritis and each of the risk factors. Cramier's V was used to compare the strength of the relationship between and each of the risk factors; gender, age and weight and determine the risk factor that poses the most risk of getting arthritis. Confidence interval was used to determine the average age and average weight of arthritis patients. A comparism of the age distribution of patients with OA and RA against gender was made using boxplot. It was also used to compare the weight distribution of patients with OA and RA against gender.

Below are tables showing how the secondary data was processed;

Table 3.0.1: Frequency Distribution of Arthritis Cases

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Osteoarthritis	272	68.7	68.7	68.7
	Rheumatoid arthritis	124	31.3	31.3	100.0
	Total	396	100.0	100.0	

Arthritis affects women more than men (Rose et.al, 2010 and Micheal Ofori, 2010). Chi-square analysis was performed to establish the relationship between arthritis and each of the risk factors; age, gender, and weight. Contingency table, Chi-square analysis, and Cramier's V, were performed for arthritis and each risk factor. Cramier's V is meant to assess the strength of the relationship between arthritis and each risk factor.

Table 3.0.2: Contingency Table for the Distribution of the Type of Arthritis Case by Gender of Patient.

			Gender of patient		
			Female	Male	Total
Type of arthritis	Osteoarthritis	Count	188	84	272
		% within Type of arthritis	69.1%	30.9%	100.0%
	Rheumatoid arthritis	Count	55	69	124
		% within Type of arthritis	44.4%	55.6%	100.0%
Total			243	153	396
			61.4%	38.6%	100.0%

Table 3.0.3: SPSS Output for Chi-square Test

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	22.029[a]	1	.000		
Continuity Correction[b]	20.997	1	.000		
Likelihood Ratio	21.745	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases[b]	396				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 47.91.

b. Computed only for a 2x2 table

Table 3.0.4: SPSS Output for Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.236	.000
	Cramer's V	.236	.000
N of Valid Cases		396	

Age was grouped into young (below 41years), middle age (patients who are more than 40years but less than 61 years) and old age (61years and above).

Table 3.0.5: Contingency Table for the Distribution of Arthritis Cases by Type of Arthritis and Age Group of Patient

			Age group of the patient			
			midAge	old	young	Total
Type of arthritis	OA	Count	55	208	9	272
		% within Type of arthritis	20.2%	76.5%	3.3%	100.0%
	RA	Count	72	44	8	124
		% within Type of arthritis	58.1%	35.5%	6.5%	100.0%
Total		Count	127	252	17	396
		% within Type of arthritis	32.1%	63.6%	4.3%	100.0%

Weight was also grouped into light weight (patients who are 50kg and below), middle weight (50kg but less than 81kg) and heavy weight (as patients above 81kg).

Table 4.0.6: SPSS Output for Chi-square Test

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	62.478	2	.000
Likelihood Ratio	61.601	2	.000
N of Valid Cases	396		

0 cells (.0%) have expected count less than 5. The minimum expected count is 5.32.

Table 4.0.7: SPSS Output for Symmetric measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.397	.000
	Cramer's V	.397	.000
N of Valid Cases		396	

Table 3.0.8: Contingency Table for the Distribution of arthritis Cases by Type of Arthritis case and Weight Group of Patient.

			Weight group of the patient			
			heavyW	lightW	midW	Total
Type of arthritis	OA	Count	21	22	229	272
		% within Type of arthritis	7.7%	8.1%	84.2%	100.0%
	RA	Count	30	6	88	124
		% within Type of arthritis	24.2%	4.8%	71.0%	100.0%
Total		Count	51	28	317	396
		% within Type of arthritis	12.9%	7.1%	80.1%	100.0%

Table 3.0.9: SPSS Output for Chi-square Test

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	62.478	2	.000
Likelihood Ratio	61.601	2	.000
N of Valid Cases	396		

0 cells (.0%) have expected count less than 5. The minimum expected count is 5.32.

Table 3.1.0 SPSS Output for Symmetric measures

		Value	Approx. Sig.
Nominal	by Phi	.397	.000
Nominal	Cramer's V	.397	.000
N of Valid Cases		396	

A bar chart was drawn to give a vivid picture of the distribution of the affected joints.

Box plot was used to make a graphical comparism of the age distribution of arthritis patients for osteoarthritis and rheumatoid arthritis. These are shown in chapter five.

T-test was used to determine the mean age and mean weight respectively for patients with arthritis and construct 90 %, 95 % and 99 % confidence intervals for the mean age and mean weight of arthritis patients. Tables for these are shown below;

Table 3.1.1: One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Age of patient	396	64.56	11.320	.569
Weight of patient	396	65.09	10.675	.536

Table 3.1.2: One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	90% Confidence Interval of the Difference	
					Lower	Upper
Age of patient	113.494	395	.000	64.561	63.62	65.50
Weight of patient	121.345	395	.000	65.093	64.21	65.98

Table 3.1.3: SPSS Output for T-test (One-Sample Test)

	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig.(2-tailed)	Mean Difference	Lower	Upper
Age of patient	113.494	395	.000	64.561	63.44	65.68
Weight of patient	121.345	395	.000	65.093	64.04	66.15

Table 3.1.4: One-Sample Test

	Test Value = 0					
					99% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Age of patient	113.494	395	.000	64.561	63.09	66.03
Weight of patient	121.345	395	.000	65.093	63.70	66.48

3.0.7 Research Instrument

For the primary data, a random sample of 396 people were taken from the public, and their weights taken; 66 from each district. People were selected at the main market centres of the districts. Yes or No was written on a piece of paper and folded. This was given to a prospective candidate for the selection. When a candidate picks yes, his or her weight is taken in kilogram with a balance and the gender recorded. If a candidate picks No, his/her weight and gender are not recorded. In all, 33 females and 33 males were selected from each of the six districts. Table 3.1.5 is a summary of statistics for the data.

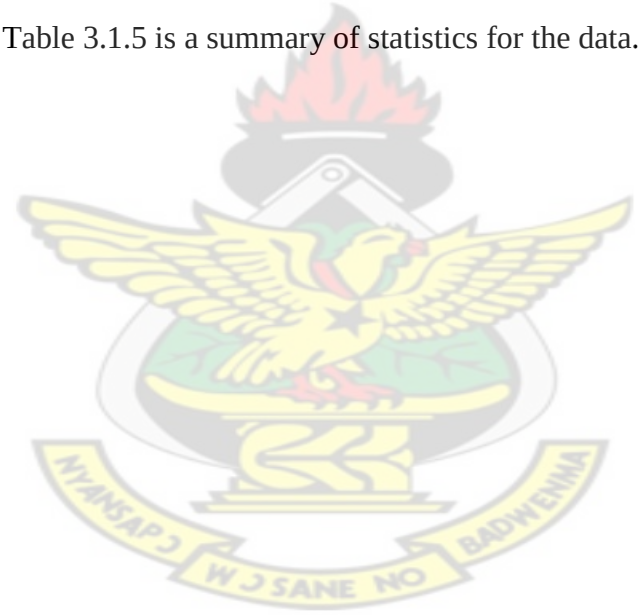


Table 3.1.5: Descriptive Statistics for the Weights of People drawn from the Public

			Statistic	Std. Error
Weight of people from the public	Mean		60.00	.404
	99% Confidence Interval for Mean	Lower Bound	58.96	
		Upper Bound	61.05	
	5% Trimmed Mean		59.37	
	Median		58.00	
	Variance		64.595	
	Std. Deviation		8.037	
	Minimum		47	
	Maximum		95	
	Range		48	
	Interquartile Range		10	
	Skewness		1.286	.123
	Kurtosis		2.026	.245

Questionnaire was used as the data collection instrument (Appendix 1). Both closed and open ended questions were used. The closed questions were used to control the variability of responses. However, it was also necessary to open up some questions to give room to unexpected responses that often lead to the discovery of new ideas. The information the questionnaire sought for were; access to literature, self assessment of doctors understanding of literature and literature search ability, the use of CDSS, the existence of specialized CDSS for arthritis, self assessment of nurses literature search ability and understanding, access to internet, inter-departmental network for computers, in-service training, training on EBP, sensitization, public education on arthritis, leadership's effort in implementing and practicing EBP, leadership style, hospital management information system and problems in applying evidence-based practice to manage arthritis. Pie chart was used to make a graphical representation of respondent rating of patient awareness of CDSS. Below are the summaries;

Table 3.1.6: What is your specific field of work?

Responses	Frequency	Percentage
Rheumatologist	0	0.0
physiotherapist	2	5.5
General practitioner	6	16.7
Nurse	22	61.1
Others	6	16.7
Total	36	100.0

Table 3.1.7: Do you have access to literature?

Responses	Frequency	Percentage
Yes	6	16.7
No	30	83.3
Total	36	100.0

Table 3.1.8: Self assessment of doctors understanding and literature search ability

Responses	Frequency	Percentage
Below average	0	0.0
Average	0	0.0
Good	2	33.3
Very good	3	50.0
Excellent	1	16.7
Total	6	100.0

Table 3.1.9: Do you use clinical decision support systems in your field?

Responses	Frequency	Percentage
Yes	0	0
No	36	100
Total	36	100

Table 3.20: Do you have specialized CDSS for arthritis?

Responses	Frequency	Percentage
Yes	0	0
No	36	100
Total	36	100

Table 3.2.1: Ratings of nurses' literature search ability and understanding

Responses	Frequency	Percentage
Below average	13	59.1
Average	5	22.7
Good	3	13.6
Very good	1	4.6
Excellent	0	0.0
total	22	100.0

Table 3.2.2: Are you provided with internet access at work by your employer?

Responses	Frequency	Percentage
Yes	8	22.2
No	28	77.8
Total	36	100.0

Table 3.2.3: Do you have interdepartmental network for computers?

Responses	Frequency	Percentage
Yes	0	0
No	36	100
Total	36	100

Table 3.2.4: How often do you have in-service training in your specific field of work?

Responses	Frequency	Percentage
monthly	0	0.0
Quarterly	18	50.0
Every 6months	11	30.6
Every year	7	19.4
Every 2years	0	0.0
Total	36	100.0

Table 3.2.5: How many times do your trainings include evidence-based practice?

Response	Frequency	Percentage
none	25	69.4
once	6	16.6
2times	2	5.6
3times	1	2.8
More than 3times	2	5.6
Total	36	100.0

Table 3.2.6: How often do you sensitize the public about arthritis and its management?

Responses	Frequency	Percentage
Quarterly	0	0
Every 6months	0	0
Annually	0	0
No regular programme	36	100
Total	36	100

Table 3.2.7: Do you think there is enough public education about arthritis?

Responses	Frequency	Percentage
Yes	0	0
No	36	100
Total	36	100

Table 3.2.8: How do you rate leadership's effort in respect of implementing evidence-based practice?

Responses	Frequency	Percentage
poor	32	88.9
Good	3	8.3
Very good	1	2.8
Excellent	0	0.0
Total	36	100.0

Table 3.2.9: SPSS Output of Descriptive statistics for the Distribution of Scores for Leadership Styles in the Hospitals

	N	Minimum	Maximum	Mean	Std. Deviation
Leadership's concern for people	396	2	7	4.74	.908
Leadership's concern for task	395	4	9	7.00	.880
Valid N (listwise)	395				

Table 3.3.0: Which of the following core modules of the Hospital Management Information System do you have? Indicate your response with Yes or No.

Core Modules	Yes	No	Total
A. patient billing software	0	6	6
B. pharmacy software	0	6	6
C. laboratory software	0	6	6
E. order entry software	0	6	6
F. patient records software	0	6	6
G. admissions, discharge and transfers software.	0	6	6
Total	0	36	36

3.0.8 Piloting

The questionnaire was first piloted before the main questionnaire was applied. One doctor, one nurse, and one administrator filled the pilot questionnaire. Some questions did not receive the intended responses and were modified in the main questionnaire. For instance, the question "are computers in the various department networked?" was changed to "do you have inter-departmental network of computers? "Do you have access to internet?" was changed to "Do you have access to internet at your workplace?" The section for administrator/IT Officer was also changed to Medical doctor/System Analyst. In the secondary data collection form no changes were made.

3.0.9 Ethical Consideration

I took a letter of introduction from my school to the hospitals which formally introduced me to the hospitals as a student of the university conducting a thesis research on the above topic. I also wrote another letter and introduced myself, stated the purpose of the research, research objectives and the data to be collected. Data confidentiality was also assured in this letter. The letter was then attached to the one from my school and distributed to the hospitals concerned. Also in the questionnaire, the reason for collecting the data was stated and respondents were assured of confidentiality.

CHAPTER FOUR

DATA ANALYSIS AND RESULT

4.0.1 Introduction

Data analysis involves processing raw data into information from which a conclusion could be drawn. These conclusions can sometimes be generalized, tested and also a basis for another research. Often projections are made from the findings to make decisions to save time, energy and resources. This section takes you through how data for this research was analyzed and the results of the research.

Analytical procedure helps to draw inductive inferences from data and differentiates the phenomenon of interest from the noise (fluctuations in statistics) present in the data (Shamoo and Resnik, 2003). The form of analysis depends on the particular qualitative approach and the form of the data. Accurate and appropriate analysis of research findings is an important component of ensuring data integrity. Improper statistical findings could mislead readers (Shepard, 2002), distort research findings and may even have a negative influence on public perception of research. Methods of data analysis may differ from one discipline to another. The optimal stage for determining appropriate analytical procedure occurs early in the research process and not an afterthought. Statistical advice should be sought at the early stages of planning an investigation so that data collection techniques and analysis can be synchronized (Smeeton and Goda, 2003). The main purpose of data analysis is to differentiate between and event occurring as either reflecting a true effect or a false one. Any bias coming from data collection will increase the opportunity of drawing a bias

inference. Bias may occur when recruitment of subjects falls below the minimum number required to demonstrate statistical power or failure to do sufficient follow-up required to demonstrate an effect (Altman, 2001). Honesty and accurate analysis is key in every research. The reason for this is to reduce the likelihood of statistical error. Researchers are faced with the temptation of excluding outliers, filling in missing data, data mining and altering data (Shamoo, Resnik, 2003). Sometimes a researcher may enhance the impression of significant findings by deciding a way to present derived data (instead of the raw data), which portion of the data is shown and how it should be presented (Resnik, 2003). Data analysis could be influenced by the method in which data was recorded. For instance, research events could be documented by; using closed ended or open ended survey, recording an audio and / or visual and transcribing later, requesting that participants take notes themselves, compile and bring them to the researchers, researcher administered survey or self administered survey, and preparing ethnographic field notes from a participant or observer. Whiles each method employed has rationale and advantages, issues of objectivity and subjectivity may be raised when data is analyzed.

4.0.2 Frequency distribution of arthritis cases

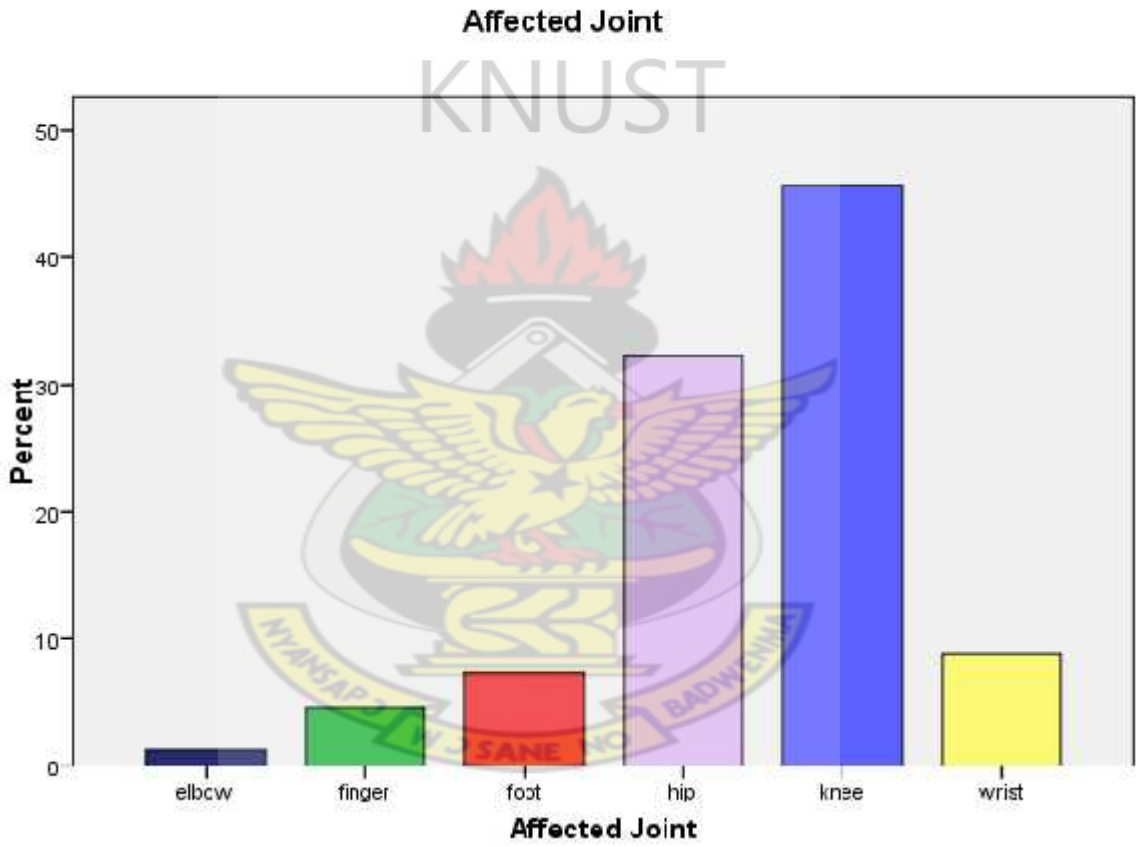
This section looks at how common each type of arthritis is in the study area.

From table 3.0.1, osteoarthritis is most common in the study area with 68.7 % of the cases (272/396*100) whiles rheumatoid arthritis has 31.3 % of the cases (124/396*100).

4.0.3 Affected Joint

Arthritis often affects joints and the next table shows how frequent each joint has been affected in the study sample.

Figure 4.1: Distribution of arthritis cases by affected joint



From figure 4.1 above, knee joint is the most commonly affected joint (45.7 %) followed by hip joint (32.3 %). The elbow joint is the least commonly affected joint (1.3 %). The amount of activity a particular joint in an individual is exposed to could predispose the person to arthritis since repeated use of a particular joint could damage the cartilage in that joint. In the study area most daily activities include; walking over long distances to visit relatives and

friends, to attend funerals or to work, riding bicycle and carrying heavy loads on their heads especially the women. All these daily activities exert a lot of pressure on the knee joint. Riding a bicycle excessively on daily basis will have a toll on the knee and hip joint, carrying a load on the head and walking over long distances will have a toll on the knee joint, hip joint, and the neck joint (interestingly, no case was recorded for the neck). Hence the knee joint is the most often use joint in the study area. Sexual intercourse is a common night activity among adults in the world. Polygamy (one with 2, 3 or 4 wives) is a common practice among farmers in the area leading to excessive night activity involving the waist. Farming is the most common occupation among men and women in the study area. During farming, the waist is the most burdened part of the body. Hence farming coupled with the practice of polygamy could result in an increase number of waist problems. Research by Diane and Stephen (2005) shows that, child labour in cocoa-growing areas in Ghana adds to muscular skeletal problems.

4.0.4 Gender of patient

Arthritis patients are mostly women Joos et.al (1993) and Rose et.al (2010). Field data was collected in this study to assess whether this perception is true or not.

From the table 3.0.2, 61.4 % of arthritis cases affect women and 38.6 % of the cases are men. Arthritis affects women 58.8 % more than men. The female hormone, estrogen depletes as she grows older. This hormone is an important contributor to the strength of the cartilage. As the hormone depletes the cartilage becomes weak and wear off easily, resulting in the development of arthritis. Research shows that women who take estrogen replacement

therapy develop thicker cartilage than those who do not take the therapy Callahann et.al, (1996), Wulka et.al, (2001).

The figures in Table 3.0.2 appear to suggest that arthritis is more likely to affect women more than men. From the contingency table (table 3.0.2), osteoarthritis affects 69.1 % of females and 30.9 % of males. Rheumatoid arthritis affects 44.4 % of females and 55.6 % of males. Hence rheumatoid arthritis is more common with men than women. Also 61.4 % of arthritis cases are females whiles 38.8 % are males. This seems to suggest that arthritis affects women more than men as claimed by Dr. Micheal Ofori of the Noguchi Memorial Institute. Chi-square test was used to establish that.

1. Hypothesis;

H_0: Arthritis does not relate to the gender of the patient

H_1: Arthritis is related to the gender of patient (Claim)

From the chi-square test in table 4.0.3, SPSS returns 0.000 as the observed significance level for testing the null hypothesis, which is less than α =0.05. A small significance level is an indication of a relationship. The null hypothesis was rejected and the conclusion is that, there is enough evidence to support the claim that arthritis is related to gender. From table 4.0.4, Cramier's V is 0.236. This means that a relationship exists.

4.0.5 Age of Patient

Old people are mostly affected by arthritis and earlier researches concluded that arthritis is related to age. This is yet to be revealed by the field data in this section.

From the contingency table (table 3.0.5), 55 of osteoarthritis cases are middle age. This represents 20.2 % of osteoarthritis cases and 43.3 % of patients in the age group. 208 of osteoarthritis cases are in the old age group. This accounts for 76.5 % of osteoarthritis cases and 82.5 % of cases within the age group. 9 osteoarthritis cases are in the young age group. This represents 3.3 % of osteoarthritis cases and 52.9 % of the patients are young. For rheumatoid arthritis, 72 cases were recorded for middle age. This represents 58.1 % of rheumatoid arthritis cases and 56.7% of patients within the age group. 44 cases were recorded for old age. This represents 35.5 % of rheumatoid arthritis cases and 17.5 % of patients within the age group. 8 cases were also recorded for young age group. This represents 6.5 % of rheumatoid arthritis cases and 47.1 % of patients within the age group.

Young age group recorded 4.3 % for arthritis (OA and RA), middle age group recorded 32.1 % and old age group 63.4 %. Hence old age group has the highest cases. This suggests that old people are at a higher risk of arthritis. This apparent relationship could be as a result of random error or a true relationship. Chi-square test was used to determine whether this apparent relationship is not by chance.

2. Hypothesis;

H_0: Arthritis is independent of the age of the patient

H_1: Arthritis depends on the age group of the patient (Claim)

The relationship between arthritis and age was also determined using chi-square test.

From table 3.0.6, SPSS returns a chi-square test of significance 0.000 which is less than $\alpha = 0.05$. The null hypothesis was rejected and the conclusion is that there is enough evidence to support the claim that arthritis is related to the age of the patient.

From table 4.0.7, Cramier's V for age and arthritis is 0.396. This indicates that a statistical relationship exist between age and arthritis.

4.0.6 Weight of patient

The weight of a person has a serious burden on the joints especially the knee and foot joints. People who have high weight tend to destroy their knee joint's cartilage and this predisposes them to arthritis, Christer et.al (1999). This section tries to analyze the relationship between arthritis and the weight of a patient.

From the contingency table (table 3.1.0) for arthritis and weight, the heavy weight group rheumatoid arthritis account for 24.2 % of the cases whiles osteoarthritis accounts for 7.7 % of the cases. Light weight group has 8.1 % of the cases for osteoarthritis and 4.8 for rheumatoid arthritis. For the middle weight, osteoarthritis account for 84.2 % whiles rheumatoid arthritis account for 71.0 %. Osteoarthritis cases who are heavy weight are 21 which represent 7.7 % of all the cases and 41.2 % of patients within the age group. Light weight recorded 22 cases which represents 8.1 % of all osteoarthritis cases and 78.6 % of patients in the weight group. Middle age recorded 229 cases which represents 84.2 % of osteoarthritis cases and 72.2 % of patients within the weight group. For rheumatoid arthritis

heavy weight recorded 30 cases which accounts for 24.2 % of all rheumatoid arthritis cases and 58.8 % of patients within the age group. Light weight accounts for 7.1 % of the cases, middle weight 80.1 % and heavy weight 12.9 %. Hence light weight recorded the least cases, followed by heavy weight and middle weight the highest cases. This appears to suggest that arthritis is related to weight. Chi-square test was used to determine whether a true relationship exists or not.

3. Hypothesis;

H_0: Arthritis is not related to the weight of the patient

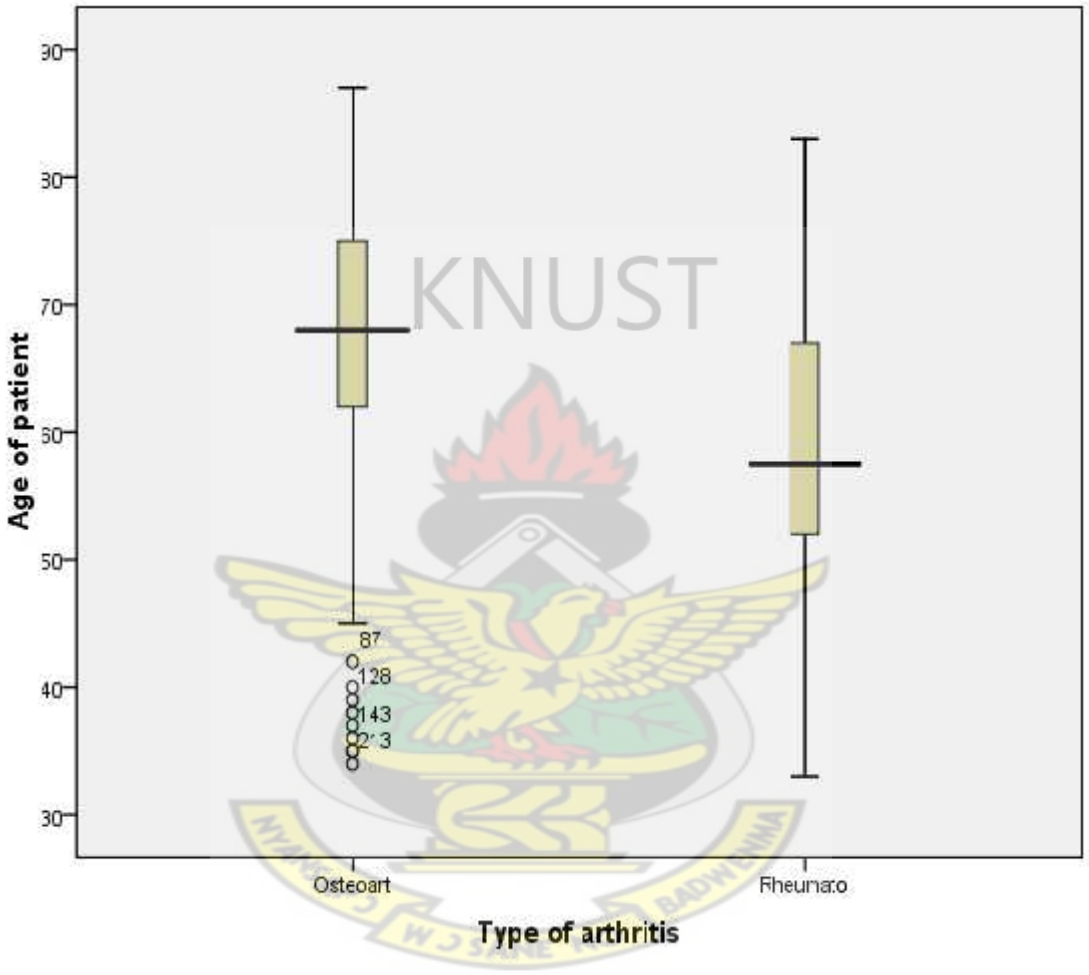
H_1: Arthritis is related to the weight of the patient (Claim)

From table 4.1.0 a, Cramier's V for weight and arthritis is 0.236. This means a statistical relationship exists between weight and arthritis.

4.0.7 Box plot

Box plot was used to make a graphical comparism of the age distribution of arthritis patients for osteoarthritis and rheumatoid arthritis.

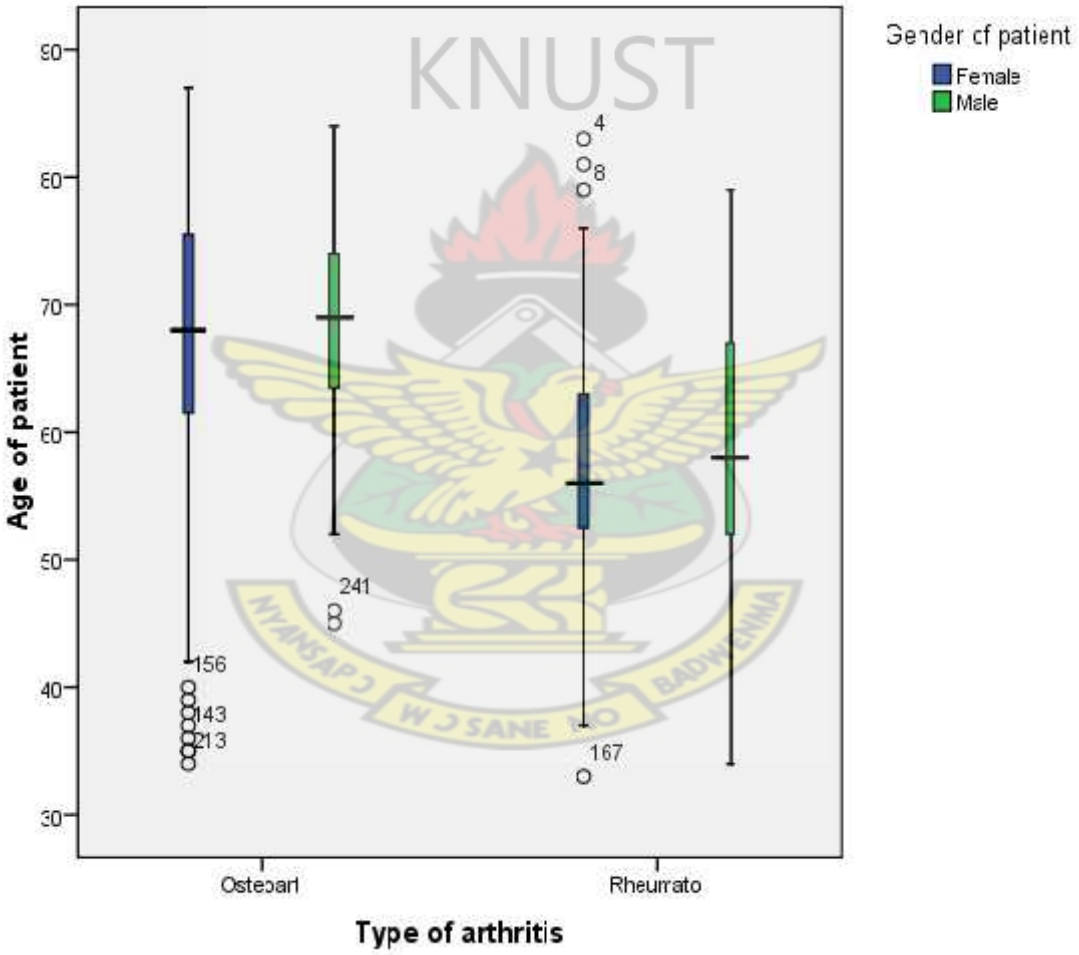
Figure 4.2 Comparing the Age Distributions for OA and RA Patients



It can be deduced from figure 4.2 above that the average (median) age of arthritis patients is higher for OA than RA. For OA, about the same number of patients in the H-spread (the middle 50 %) have their ages below and above the average age whiles in RA most patients in the H-spread are above the average age. The youngest patient is RA patient and the oldest patient is OA patient as seen in the whiskers. In general, most patients are below the average age (The age distributions for OA and RA are slightly skewed downwards). The ages 34

years, 36 years, 39 years and 42 years are rare cases (outliers). The outliers are not surprising values because one can be born with arthritis. Thus, it is possible to have even younger patients. Hence no need to discuss or further investigate them.

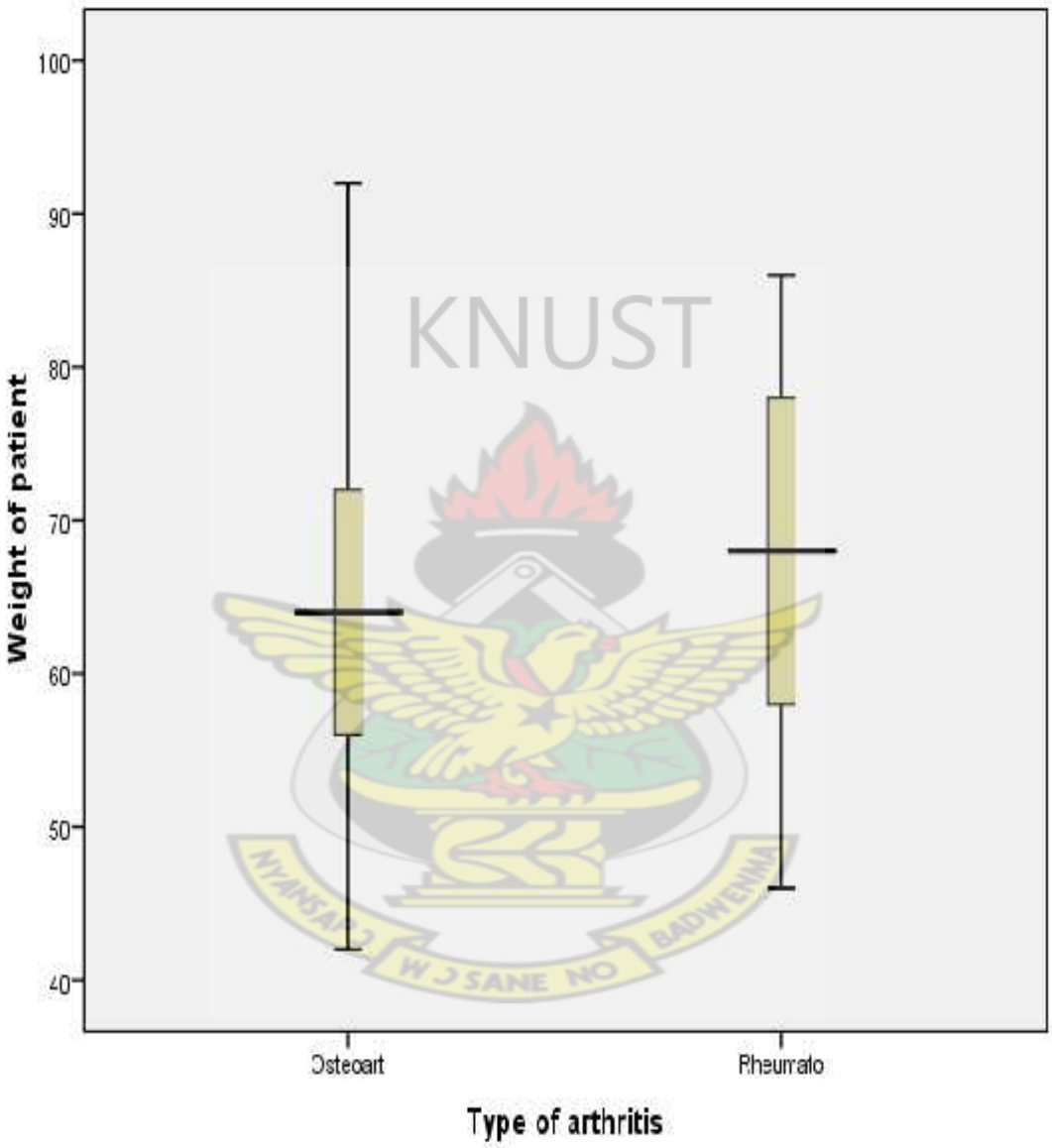
Figure 4.3 Comparing the Age Distributions of Patients with OA and RA against Gender



A graphical comparism of the weight distribution of osteoarthritis patients and rheumatoid arthritis patients was done using the box plot.

From figure 4.3 above, the average age for male patients with OA is slightly higher than that for females. The youngest OA patient is a female and the oldest is also a female. Hence the distribution of ages is more spread for females with OA than males. The ages for patients with OA are fairly distributed below and above the average ages for female and male respectively. Also, the average age for RA patients is higher for males than females. This means that females are at a higher risk of OA or RA at an early age than males. The youngest RA patient is a male and the oldest RA patient is a male. Hence the age distribution for RA patients is more spread for males than females. The ages of four female patients with OA (34 years, 36 years, 39 years and 42 years) were considered rare cases (outliers) whiles the age of one male OA patient (46 year) was considered a rare case. The ages 33 years, 79 years and 83 years were considered outliers for female patients with RA.

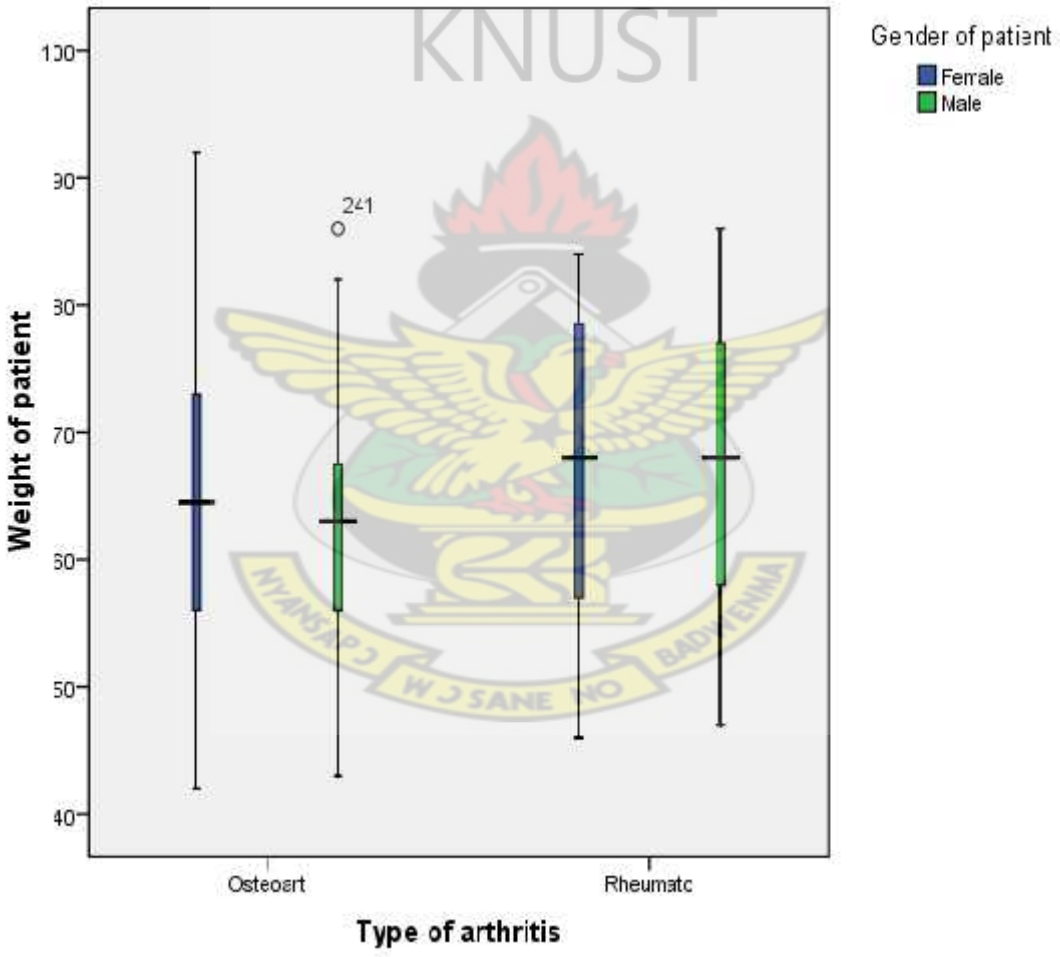
Figure 4.4 Comparing the Weight Distribution of Patients with OA and RA



From figure 4.4 above, it can be seen that the average (median) weight of rheumatoid arthritis patients is higher than the average weight for osteoarthritis patients. In both RA and OA, the weight of patients is fairly distributed below and above the average weight in the H-spread (middle 50 %). The weight distribution is more spread for OA than RA. Also,

most patients are above the average weight for OA and most patients are below the average weight for RA. The weight distribution of patients is slightly skewed upwards for OA and downwards for RA.

Figure 4.5 Comparing the Weight Distributions of Patients with OA and RA against Gender



In figure 4.5 above, for both OA and RA the average weight of a female patient is higher than the male patient. The difference is more obvious for OA than RA. It is only for males with RA that most patients have weights below the average weight and its weight

distribution is less spread. In the others, the weights are evenly distributed above and below the average weight.

4.0.8 Confidence interval

T-test was used to construct 90 % confidence interval for the mean age and mean weight of arthritis patients.

From table 3.1.1, the average age of arthritis patient is 64.56year and the average weight of arthritis patient is 65.09kg.

From table 3.1.2, 90% confidence interval for age has a mean of 64.56years, 63.62years and 65.50years as the lower and upper boundaries respectively. Also the mean weight is 65.093kg, and the lower and upper boundaries are 64.04kg and 66.15kg respectively.

One can conclude with 90 % confidence that the average age of an arthritis patient is between in the Upper West Region is between 63.62 years and 665.50 years. The average weight is between 64.21 kg and 65.98 kg.

T-test was also used to construct 95 % confidence interval for the mean age and mean weight of arthritis patients.

From table 3.1.3, the confidence interval has a mean 64.56 years, 63.44 years and 65.68 years as lower and upper boundaries respectively for the age of an arthritis patient. Hence one can conclude with 95 % confidence that the average age of arthritis patient is between 63.44 years and 65.68 years respectively. Also, one can conclude with 95 % confidence that the average weight of arthritis patient is between 64.04 kg and 66.15 kg.

T-test was also used to construct 99 % confidence interval for the mean age and mean weight of arthritis patients.

From table 3.1.4, the confidence interval has a mean 64.56 years, 63.09 years and 66.48 years as lower and upper boundaries respectively for the age of an arthritis patient. Hence one can conclude with 99 % confidence that the average age of arthritis patient is between 63.09 years and 66.03 years. Also, one can conclude with 99 % confidence that the average weight of arthritis patient is between 63.70 kg and 66.48 kg.

From table 3.1.5, the confidence interval for the weights of people drawn from the public has a mean of 60.0kg, with lower bound of 58.96kg and upper bound of 61.05kg. Hence on the average, arthritis patients have more weight than the general public in the study area.

4.0.9: Respondent's area of specialty.

This section indicates the category and number of people from each who responded to the questionnaire.

From table 3.1.6, nurses constitute the largest group of respondents (61.1 %) and rheumatologists were not represented. However, by virtue of their specialization they would have better enrich this research.

4.1.0 Access to literature

Literature here refers to published research findings. When new research findings are made accessible to workers they will be able to apply the most current information (best practice) in the delivery of service. It is therefore imperative to provide wireless internet

service to all health facilities instead of the limited service provided using modem by a section of the workers**.**

From table 3.1.7, only 6 respondents have access to literature and this was found to be doctors.

4.1.1: Self Assessment of literature search ability by doctors

To access relevant literature, workers need to have the skill to search literature to retrieve the relevant information. Without this skill it will be difficult to apply available literature on the internet to practice.

From table 3.1.8, on the average, doctors in the study area are very good in literature search. Training should be provided for other personnel.

4.1.2: Clinical Decision Support System (CDSS)

Clinical decision support systems are computer software that are use to support clinicians in the performance of their duties. These may include prescription, diagnose and critiquing.

From table 3.1.9, clinical decision support system is not in use in the study area.

4.1.3: CDSS for arthritis

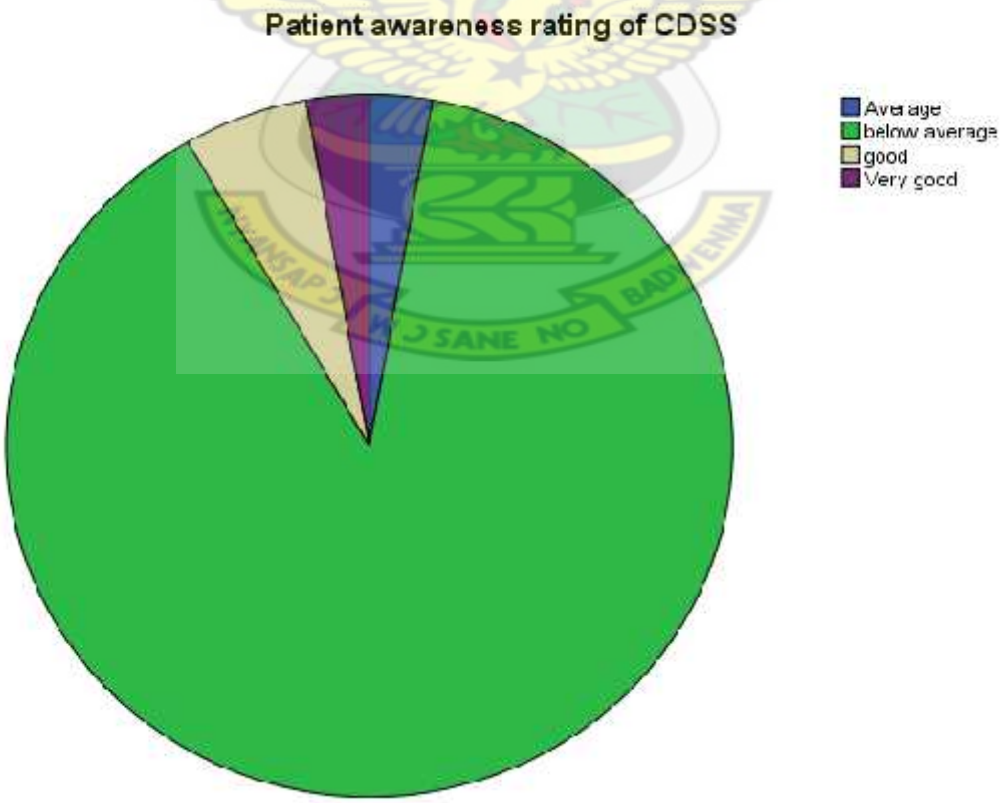
CDSS for arthritis will therefore help to manage the disease effectively and improve the lives of the arthritis patients.

From table 3.2.0 there is no CDSS specifically for arthritis in place in the study area even though CDSS are now available to support the management of arthritis.

4.1.4: Public awareness of CDSS

When patients are aware of the important role CDSS play in health care, they will begin to demand from clinicians to us CDSS in their care process. This means that patients' awareness of CDSS can reinforce their use by clinicians. The chart in figure 4.6 below illustrates patients' awareness ratings of CDSS;

Figure 4.6 patients' awareness ratings of CDSS



From figure 4.6 above, almost all respondents (about 90 %) said few patients are aware of the existence of CDSS.

4.1.5: Self assessment of nurses understanding of literature and literature search ability.

Nurses need current and up-to-date information to manage patients. They would be supported to give quality service if they are given access to literature and providing them with the needed skills through training to search for relevant information when they need them.

From table 3.2.1, 59.1 % of nurses rated their knowledge of literature search and understanding as below average and hence need training. Only one respondent (4.6 %) is rated as very good in this area.

4.1.6: Access to internet at work place

The internet is a vast resource. Having access to it brings an unlimited scope of knowledge resource close to the user. It can constantly upgrade workers knowledge if it is effectively and efficiently used. Therefore providing internet access to workers should be seen as enriching the knowledge base of the workers which is an invaluable asset though intangible. A knowledgeable workforce is most likely to deliver quality service if knowledge is effectively and efficiently used.

From table 3.2.2, only doctors are provided with access to the internet at work. This is done using mobile broadband. There is no wireless internet service in any of the facilities

concern. Nurses, doctors and support staff all need access to internet to get timely, accurate and up-to-date information for efficient health delivery.

4.1.7: Computer network

Computer networking ensures effective coordination between the various departments in the hospital such as laboratory, O.P.D, theatre, X-ray department, rheumatology, administration etc. Without this workers resort to physical movement of people to share information which is a slow process, or resort the use of telephone where it is possible but this often results in high telephone bills. It is cost effective and convenient to network computers and share information relative to the other options available.

From table 3.2.3, one of the facilities have computer network connecting the various departments. However, some departments (often the administration or accounts) can communicate within itself using computers.

4.1.8: Problems identified by respondents to impede the implementation and application of evidence-based practice to arthritis management.

1. In effective drugs – Most of the drags use in these hospitals are not effective in managing the disease (eg diclofenac and ibrufine). These drugs have low evidence rating (C) as indicated in the Ghana Standard Treatment Guidelines. This implies that they are not very effective in handling the disease.
2. Ill-equip physiotherapy department
3. Inadequate rheumatologists

4. No internet access for all workers
5. No clinical decision support systems to help manage diseases
6. In adequate training on evidence-based practice
7. Numerous side effects of arthritis medicine
8. Patients often do not report case early
9. The frequent use of herbal concoctions
10. Untrained persons prescribing at licensed and unlicensed chemical shops.
11. Power rationing, fluctuation and low voltage cause inconvenience and damage to equipments.
12. Workers do not apply skills learnt from workshop in routine practice.
13. Proliferation of drug stores in towns and villages encourages drug abuse and self-medication based on un-informed decisions. Taking these medications without caution exposes patients to serious long term side effects.
14. The media is a very powerful tool for spreading information and could be used to enhance the EBP agenda. On the contrary, the media has been use to promote drugs and medications and making claims that are often not evidence-based for commercial reasons.
15. Poor record management practice. The paper-based health record system is cumbersome and time-wasting. A lot of the patients' time at the hospital is used in retrieving patient record. This is compounded by some patients having multiple record files (folders).

16. Movement of paper records from one service point to another change the order of service as service is supposed to be first-come first service. This is a potential source of anger for patience

4.1.9: In-service training

In-service training provides an opportunity for workers to upgrade their knowledge. Healthcare is a fast changing industry and workers need to have a regular in-service programme to meet the changing demands of the industry. Thousands of findings are made every year and thus creating an ever widening gap between practice and research. In-service training is therefore needed to provide a bridge between industry and practice.

From table 3.2.4, half of the respondents said they have quarterly training on the job. 11 (30.6 %) of the respondents said they have training every 6 months and only 7 have training annually. All respondents have some training within a year.

From table 3.2.5 above, most respondents (69.4 %) never had in-service training involving evidence-based practice and only 30.6 % of respondents had at least one in-service training involving evidence-based practice.

4.2.0: Sensitization of the public about arthritis management

Ignorance itself they say is a disease. Educating people about the causes, prevention and treatment of a disease could save people from health problems whiles relieving the state from a significant cost of healthcare. It is often not possible to treat arthritis and reverse the patient precisely to his/her normal condition after the disease has caused damage to the

joints. After pain is gone side effects of drugs or restricted movement of joint may persist. Thus prevention is always better than cure.

From table 3.2.6, there is no regular programme to sensitize the public about arthritis and its management.

4.2.1: Public education on arthritis

Public education on arthritis will reduce the burden of the disease in the country and hence reduce healthcare cost to the state. Also, it is easier to educate the public about the disease than to treat the disease. Hence public education is a better alternative disease (arthritis) management.

From table 3.2.7, all respondents said there is no enough public education about arthritis.

4.2.2: Leadership's effort in implementing and applying evidence-based practice

Leaders who understand and have a good background of evidence-based practice will naturally flow in its direction and leaders who do not have good understanding of this practice will impede its implementation and practice possibly as a result of phobia and misconception. Leaders who understand evidence-based practice will support and insist that followers practice it. Those who do not understand will see it as a threat and frustrate the process. Hence for the effective implementation of evidence-based practice in any facility, the leaders must be involved to appreciate the value of the practice.

From table 3.2.8, most of the respondents (88.9 %) said leadership's effort in implementing and applying evidence-based practice is poor.

It has been revealed that none of the components of the core modules in the proposed hospital management information system has been implemented in the study area.

4.2.3: Leadership Styles in the hospitals

Leaders use various approaches to accomplish a task. These approaches are determined by measuring the leader's ability to manage the workers to feel that they are a group working to achieve a common goal, appreciate each other and support each other as partners against the leader's ability to get work done and achieve targets.

From table 3.2.9, one respondent did not give score to leadership's concern for task (thus a missing value). From the table the average score for leadership's concern for worker is 4.74 and that for task (work) is 7.00. These scores according to Leader ship Grid (1985) is within the range of authoritarian leadership style. Hence the common leadership style in the study area is authoritarian leadership.

4.2.4: Implementation of the core modules of the proposed Hospital Management Information System

The field data in table 3.3.0 revealed that none of the core modules of the proposed hospital management information system has been implemented in the study area

CHAPTER FIVE

DISCUSSION OF RESULTS

5.0.1 Introduction

This chapter presents a summary of the findings and discusses the findings in relation to other research works.

5.0.2 Challenges in implementing Evidence-Based practice

The following findings were made as the challenges in implementing evidence-Base practice in the study are:

1. Access to literature: Only doctors have access to literature. Providing them access to literature will give them an opportunity to update themselves on best practices.
2. No clinical decision support systems (CDS): CDSS can help to diagnose disease, prescribe medicine or even as a critiquing system. When implemented CDSS will help to reduce medical error and the workload of clinicians by helping in diagnoses and prescription (IOM, 2006). CDSS will help in the early detection of the disease so that treatment could be given early to prevent joint damage. Research by Hayness et al (2011) shows that CDSS can improve the process of care.
3. Patient awareness of CDSS is low: When patients are aware of the usefulness of CDSS, they can insist on the use of CDSS in their care. This can drive a widespread adoption of CDSS.
4. Inadequate knowledge of literature search and understanding: More than half (59.1 %) of nurses rated their literature search understanding as below average.

5. Internet service is not made available for all workers: only doctors have access to internet. Internet is an unlimited knowledge resource. Providing all workers with internet will help them search literature on the internet, share information by email and many others.
6. There is no interconnection (network) of computers in different departments: interconnection of computers in different departments will help the departments to coordinate effectively and improve on their work. One department can easily request information or have direct access to it so that the care process can be streamlined. One will not need to walk from department to department asking for information. A physician can sit in his office and order a laboratory test at the lab if order entry system is included in the network.
7. Ill-equip physiotherapy department: Exercise is sometimes necessary to strengthen the muscles and joint movement and physiotherapists help to play this role. Equipping the physiotherapy department will therefore improve the management of arthritis patients (1996 Surgeon's General Report).
8. Poor record management practice: The paper–base health record system is cumbersome and time–wasting. A lot of the patient's time at the hospital is use in retrieving patient records. This is compounded by some patients having multiple records. Electronic health record system when implemented will improve the system by reducing time spent in retrieving patient records, eliminating the possibility of a single patient having multiple records and can be linked to CDSS for improved function, thereby reducing prescription error (Institute of medicine, 2006)

9. The proposed hospital management information system has not been implemented: None of the core components of the proposed hospital management information system has been implemented in the study area.

These findings agree with the conclusion drawn by Hyness and Hayness (1998) that most developing countries do not have the infrastructure to tape the opportunities that EBP provides.

5.0.3 Challenges in the Practice of Evidence–Based Practice

1. In effective drugs
2. Inadequate rheumatologists
3. In adequate in-service training on evidence based practice
4. Workers do not apply skills learnt from in-service training into routine work.
5. Numerous side effects of arthritis medicine
6. Patients often do not report case early.
7. The frequent use of herbal concoctions
8. Untrained persons prescribing at licensed and unlicensed chemical shops
9. Power rationing, fluctuation and low voltage cause inconvenience and damage to equipments.
10. Proliferation of drug stores in towns and villages encourages drug abuse and self-medication based on un-informed decisions. Taking these medications without caution exposes patients to serious side effects.

11. The media is a very powerful tool for spreading information and could be used to enhance the evidence–based practice agenda. On the contrary, the media has been use to promote drugs and medications and making claims that are often not evidence-based for commercial reasons.
12. No regular programme to sensitize the public about arthritis and its management.
13. Current leadership does not have the capacity to implement evidence-based practice effectively.
14. Authoritarian leadership style is the common leadership style in the study area. Evidence-based practice requires team leaders; Leaders who are efficient, effective and persuasive enough to influence their followers to adopt evidence-based practice. Leaders who can act as role module in the practice of evidence-based practice are much needed.
15. Effective drugs are often not covered by health insurance.

5.0.4 Distribution of arthritis case

OA is most common with 68.7 % of the cases against RA with 31.3 %. Females account for 61.4 % of arthritis cases whiles males account for 38.6 %. Knee joint is the most commonly affected joint. The average age of arthritis patients is between 63 years and 66 years whiles the average weight is between 63 kg and 67 kg. These findings differ from the findings of Ware et.al (1999) who reported 62.3 years, Lars et.al (2005) who reported who reported 57 years and 69.4kg for average age and average weight respectively, and Kathleen Doheny (2011) who reported 56 years.

5.0.5 Relationship between Arthritis and Gender

Test was significant and hence the claim that arthritis is related to gender was confirmed. This agrees with the findings of Rose et.al 2010 and the conclusion made by Dr. Micheal Ofori of the Nuguchi Memorial Institute. However there is difference in the gender distribution as Ofori reported that females are affected with arthritis 70 % more than males whiles this work reveals that the difference is 58.7 % more for female.

5.06 Relationship between Arthritis and Age

Test was significant and hence the claim that arthritis is related to age was confirmed. This is similar to the findings of Rose et.al 2010.

5.0.7 Relationship between Arthritis and Weight

Test was significant and hence the claim that arthritis is related to weight was up help.

5.0.8 Comparing the strength of the relationship

Cramier's V determines the strength of the relationship between variables. The higher the value the stronger the relationship:

Gender and arthritis gives a value of 0.236, age and arthritis gives a value of 0.397 and

weight and arthritis gives a value of 0.236 .

It can be deduced that there is stronger relationship between arthritis and age than arthritis and weight or arthritis and gender.

In conclusion age poses the most risk of getting arthritis among the three risk factors; gender, age and weight.

5.0.9 90 % confidence interval for the average age and weight of arthritis patients one can conclude with 90 % confidence that the average age of an arthritis patient in the Upper West Region is between 63 years and 66 years and the average weight is between 64 kg and 65 kg.

5.1.0 95 % confidence interval for the average age and weight of arthritis patients

One can conclude with 95 % confidence that the average age of arthritis patient is between 63 years and 66 years respectively. Also, one can conclude with 95 % confidence that the average weight of arthritis patient is between 64 kg and 67 kg.

5.1.1 99 % confidence interval for the average age and weight of arthritis patients

It can be concluded with 99 % confidence that the average age of an arthritis patient is between 63 years and 66 years and the average weight of an arthritis patient is between 63 kg and 67 kg (values rounded to the nearest whole number). Various research findings over the years give different value for the average age and average weight of arthritis patients. Kathleen Doheny (2011) reported that the average age of arthritis patients is 69 years in 1990 and 56 in 2011. Ware et.al reported 60 years 1999 and Young Woo et.al reported 62.3 years in 2010. Lars et.al (2005) reported 57 years for the average age and 69.4 kg for the average weight of arthritis patients whiles others reported 74 kg for the average weight.

5.1.2 Comparing the age distribution of males and females patients

Females are more likely to be affected by arthritis at an early than males.

CHAPTER SIX

RECOMMENDATIONS

This chapter suggests steps to be taken to mitigate the challenges facing the implementation and practice of evidence-based practice and arthritis management in Ghana.

Following the study conducted, I make the following recommendations:

1. A wireless internet service should be provided for each district hospital so that all workers can benefit from the opportunities that internet service presents.
2. Clinical decision support systems should be acquired for the diagnoses of arthritis in particular and other related diseases.
3. Nurses and support staff should be given training to improve their literature search skills and understanding of literature.
4. Computers in different departments of the hospital should be networked so that they can coordinate to streamline service delivery.
5. Physiotherapy department should be well-equip to contribute their quota in the management of arthritis.
6. Uniform guidelines for the management of arthritis should be adopted worldwide.
7. Electronic health record system should be provided. This could be embedded in the health insurance card so that when slotted into a machine the patient bio-data will be displayed just like the way the ATM card for banks works.
8. Ensure a speedy implementation of the core modules of the proposed hospital management information system.

9. More research should be directed at finding the actual cause of arthritis
10. Effective drugs should be included in the health insurance covered drugs
11. A regular programme should be set up to sensitize the public about arthritis
12. Leadership training should be provided on regular basis targeting at making leaders team leaders.

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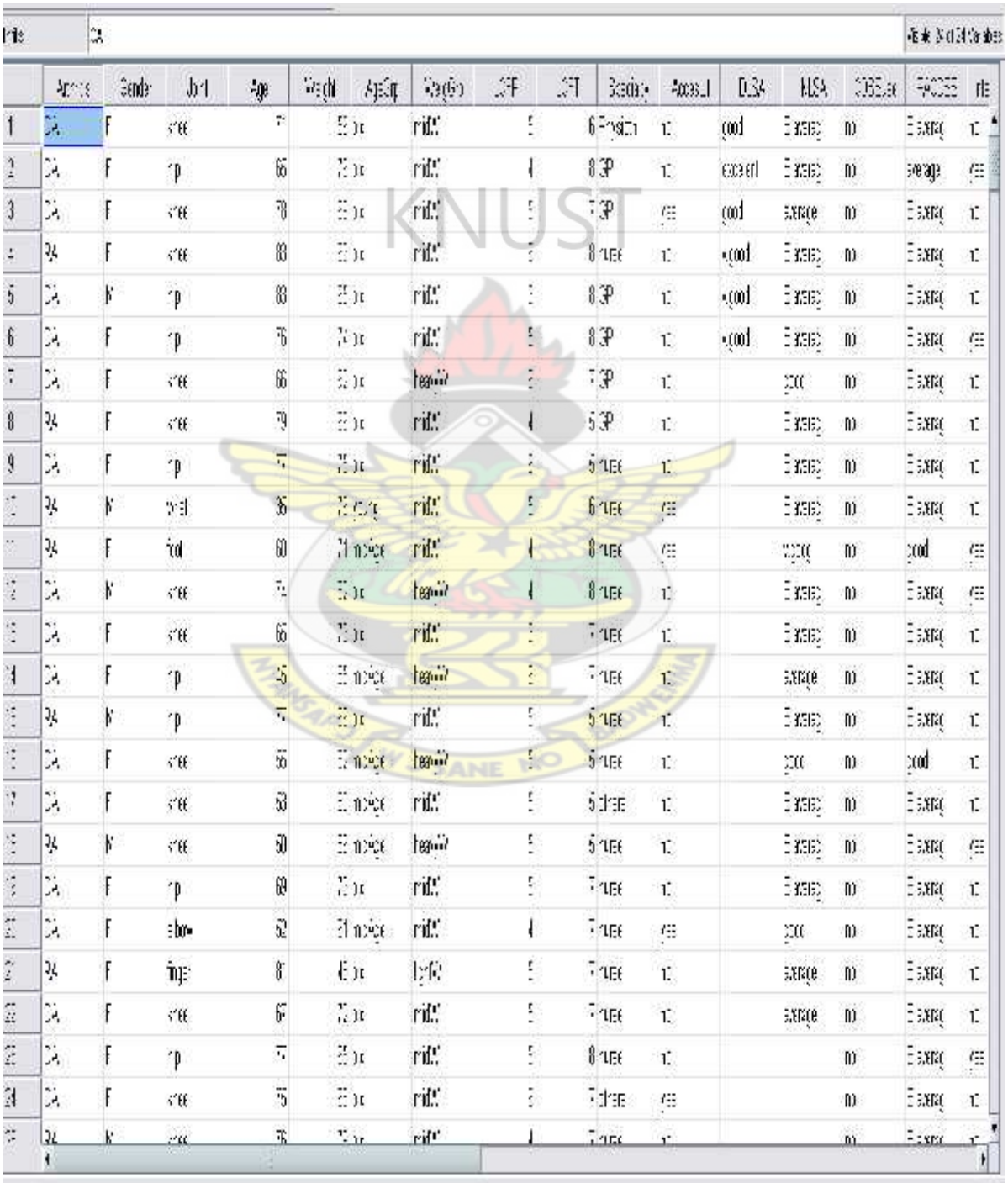
APPENDIX 1

Primary Data Analysis



APPENDIX 2

QUESTIONNAIRE

This survey is required by the Computer Science Department of the Kwame Nkrumah University Science and Technology as part of thesis research work. The data will not be used for any other purpose. The confidentiality of respondents is assured and names of respondents will not be required.

Date: ……

1. What is your specific field of work?

A. Rheumatologist B. Physiotherapist C. General practitioner D. Nurse E. Others

2. Do you have access to literature (research evidence)?

   A. Yes B. No

3. Do you use clinical decision support systems (CDSS) in your field?

   A. Yes B. No

4. What are they?

   ……

   ……

   ……

5. Do you have a specialized CDSS for arthritis

   A. Yes B. No

6. What is the name of the CDSS in 7 above

   ……

7. How do you rate patient awareness of CDSS? A. Poor B Good C. Very good D. Excellent
8. Do you have access to internet at your work place? A. Yes B. No
9. How do you rate your literature search ability and understanding?

   A. Bellow average B. Average Good C. Very Good D. Excellent
10. Do you have inter-departmental network of computers? A. Yes B. No
11. What problems do you face in implementing evidence-based practice?

    .....

    .....

    .....

    .....

    ……
12. Suggest ways to overcome these problems.

    ……

    ……

    ……

    ……

    ……
13. What challenges do you face in applying current and up-to-date evidence (best practice) in managing arthritis?

    ……

    ……

……

……

14. Suggest solutions to overcome the challenges in 13 above.

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15. How often do you have in-service training in your field of work? A. Monthly B. Quarterly C. Annually D. No regular programme. E. State others……..

16. How many times do these trainings include evidence-based practice?

17. How often do you sensitize the public about arthritis and its management?

    A. Monthly B. Quarterly C. Annually D. No regular Programme

18. Do you think there is enough public education on arthritis? A. Yes B. No

19. On a scale of 1 to 9. How will you rate the following in you facility?

    A. Leadership's concern for people. …….

    B. Leadership's concern for task (the job) …….

20. How do you rate leadership's effort in respect of implementing evidence-based practice?

    A. Poor B. Good C. Very good D. Excellent

FOR MEDICAL PRACTITIONER/ SYSTEM ANALYST ONLY

(This section concern's information management systems)

21. The core modules in the hospital management information system are; A. patient billing software B. pharmacy software C. laboratory software. E. order entry software. F. patient records software G. admissions, discharge and transfers software. Tick the software systems that have been implemented in your hospital as part of the proposed nationwide hospital management information system.

APPENDIX 3

Secondary Data Collection Form

This survey is required by the Computer Science Department of the Kwame Nkrumah University Science and Technology as part of thesis research work. The data will not be used for any other purpose. The confidentiality of respondents is assured and names of respondents will not be required.

INFORMATION ON ARTHRITIS PATIENTS

(One form to be filled for each patient)

Date……

Type of arthritis……...

Affected joint……..

Age……...

Gender……..

Weight……..