UTILISATION OF HERBAL PRODUCTS AND CONCOMITANT USE WITH CONVENTIONAL MEDICINE IN GITHUNGURI DIVISION, KIAMBU COUNTY, KENYA.

BY

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A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF PUBLIC HEALTH IN THE SCHOOL OF PUBLIC HEALTH OF KENYATTA UNIVERSITY.

November 2014
DECLARATION

“This thesis is my original work and has not been presented for a degree or any other award in any other institution”.

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DEDICATION

This work is dedicated to my wife Nancy Njeri, my son Anthony Githinji and my daughter Karen Njeri.
ACKNOWLEDGEMENT

First, I thank God for giving me strength during my study.

I sincerely thank my supervisors Prof Nicholas Gikonyo and Dr Daniel Akunga both of Kenyatta University for their professional guidance and tireless effort in assisting me during the course of my study.

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May God bless you all of you.
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<td>ADRS</td>
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<td>CAM</td>
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<td>EU</td>
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<td>FMOH</td>
<td>Federal Ministry of Health</td>
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<td>GLPs</td>
<td>Good Laboratory Practices.</td>
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<td>HRH</td>
<td>Human Resource in Health.</td>
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<td>Institute of Research and Ethics Committee.</td>
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<td>KEMRI</td>
<td>Kenya Medical Research Institute.</td>
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<td>MoSCA</td>
<td>Ministry of Sports, Culture and the Arts</td>
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<td>NCAPD</td>
<td>National Co-ordinating Agency for Population and Development</td>
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<td>NACOSTI</td>
<td>National Commission of Science, Technology and Innovation</td>
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<td>PM</td>
<td>Plant Medicines</td>
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<td>SPSS</td>
<td>Statistical Package for Social Sciences</td>
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<td>TCM</td>
<td>Traditional Chinese Medicine</td>
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<td>THPs</td>
<td>Traditional Health Practitioners</td>
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<td>TMs</td>
<td>Traditional medicines</td>
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<td>US</td>
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<td>WHA</td>
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<td>SWAp</td>
<td>Sector Wide Approach</td>
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DEFINITION OF TERMS

Concomitant use of medicine: Refers to use of herbal products and conventional medicine concurrently. The drugs are either given on the same day or one after the other or to treat the same condition.

Conventional medicine: A system in which medical doctors and other healthcare professionals (such as nurses, pharmacists, and therapists) treat symptoms and diseases using drugs, radiation, or surgery. Conventional medicine is also called allopathic medicine, biomedicine, mainstream medicine, orthodox medicine, and Western medicine.

Finished herbal products: Herbal preparations made from one or more herbs.

Herbal Cosmetics: Products formulated, using various permissible cosmetic ingredients to form the base in which one or more herbal ingredients are used to provide defined cosmetic benefits.

Herbal materials: Herbs, fresh juices, gums, fixed oils, essential oils, resins and powders

Herbal medicine: Herbal medicines include herbs, herbal materials, herbal preparations and finished herbal products.
<table>
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<th><strong>Herbal preparation:</strong></th>
<th>Powdered herbal materials, extracts, tinctures and fatty oils of herbal materials.</th>
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<tr>
<td><strong>Herbal supplements:</strong></td>
<td>Non-pharmaceutical, non-food substances marketed to improve health.</td>
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<td><strong>Herbalist:</strong></td>
<td>An herbalist is traditional medical practitioner whose specialization lies in the use of herbs to treat various ailments. He/She is supposed to be knowledgeable in the efficacy, toxicity, dosage, and compounding of herbs.</td>
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<td><strong>Herbs:</strong></td>
<td>Crude plant materials such as leaves, flowers, fruit, seed, stems, wood, bark, roots, rhizomes or other parts.</td>
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<td><strong>Medicinal plant:</strong></td>
<td>A plant (wild or cultivated) used for medicinal purposes.</td>
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<td><strong>Medicinal product:</strong></td>
<td>Any substance or combination of substances presented for treating, or preventing disease in human beings or animals. It can also be defined as any substance or combination of substances that may be administered to human beings or animals with a view to making diagnosis or to restoring,</td>
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correcting or modifying physiological functions in human beings or animals.

**Tonic:** A herb used to help restore, tone, and invigorate systems in the body or promote general health and wellbeing.

**Traditional medical practitioner:** This is a person who is recognized by the community in which he/she lives as competent to provide health care by using plant, animal and mineral substances and certain other methods.

**Traditional Medicine:** Traditional medicine is interchangeably referred to as complementary, alternative or non-conventional medicine. It is the sum total of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health, as well as in the prevention, diagnosis, improvement or treatment of physical and mental illnesses.
ABSTRACT

The use of complementary and alternative medicines (CAM) is increasing globally, especially in developing countries. Indeed, over 80% of the population in developing countries depends on traditional medicine. In Kenya, traditional medicine especially herbal medicine is widely used with over 70% of population having been reported to be dependent on it for primary health care. The World Health Organization (WHO) warns that the growing use of traditional medicines, both in developed and developing nations, has been mirrored by an increasing number of reports of adverse effects. To understand the effectiveness, reliability, and quality of CAM and to provide standardization in its analysis, documentation on utilization of herbal medicine is important. This study sought to investigate the utilization of herbal medicine, amidst concern of adverse effects associated with concomitant use with conventional medicine, adulteration and toxicity. The main objective of this study was to investigate the utilization of herbal products and concomitant use of herbal medicines with conventional medicine in Githunguri Division, Kiambu County. The study was descriptive and cross sectional in design. Twenty herbal clinics and users of herbal products were randomly selected. Names of herbal clinics were assigned numbers and using the random number table, proportionate sample based on the number of clients who visit them were selected. Subjects who were 18 years and above were systematically recruited into the study. In this study 323 herbal users were recruited. Qualitative and quantitative data was collected using semi structured questionnaires. The instruments were pre-tested at Ikinu Division in Kiambu County. Chi-square was used to determine the association of predictor variables on concomitant use of herbal medicines with conventional medicine. The odd ratios were calculated to compare concomitant use with various variables. A total of 323 herbal users who completed the questionnaire were included in the analysis. Majority of herbal users were aged above 40 years and had high education. Most frequent health conditions for which herbs were used included both acute illnesses like malaria and chronic conditions like arthritis, allergy, gout, diabetes and high blood pressure. The most common used herbs were *Warbugia ugandensis* and *Citrus aurantifolia*. Chronic illnesses are the common diseases that elicit use of herbal products. Apart from treating illnesses, need for supplements and cosmetics, sleep improvement, appetite improvement and need for vitality were other non-medical conditions contributing to use of herbal medicines. Concomitant use of herbal medicines with conventional medication was reported by 42.5%. The study found people believe that since herbal medicines and supplements are promoted as natural, they are safe and less likely to cause side effects than prescription medication. Finally, herbalists need to understand the extent and patterns of concomitant herbal use with conventional medicine by patients and efforts to elicit information from patients about herbal use may be warranted to fight concomitant use. Further studies are needed to determine prevalence of adverse effect of concomitant use of specific herbs on specific conventional drug, develop effective interventions for primary health care professionals and patients to improve medication safety and efficacy. Also on how traditional medicine can integrated in western dominated health system.
CHAPTER ONE: INTRODUCTION

1.1 Background

Traditional medicine is defined as the sum total of knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures that are used to maintain health, as well as to prevent, diagnose, improve or treat physical and mental illnesses (Elujoba et al, 2005, WHO, 2003). Traditional medicine that has been adopted by other populations (outside its indigenous culture) is often termed alternative or complementary medicine (Wong, 2005).

According to the National Center for Complementary and Alternative Medicine (NCCAM) of United States of America (wai Fan, 2005), complementary and alternative medicine therapies can be classified into five broad categories: the first one is Alternative Medical Systems. These systems are built upon complete systems of theory and practice. Often, these systems have evolved apart from and earlier than the conventional medical approach used in the United States. Examples of alternative medical systems include: Acupuncture, Ayurveda, Homeopathy (Native American healing practices), Naturopathic medicine (Tibetan medicine), and Traditional Chinese medicine.

The second one is Mind-Body Interventions. Mind-body medicine uses a variety of techniques designed to enhance the mind's capacity to affect bodily function and symptoms. Some techniques that were considered alternative in the past have become mainstream (for example, patient support groups and cognitive-behavioral therapy).
Other mind-body techniques are still considered alternative, including: Art therapy, Biofeedback, Dance therapy, Guided imagery, Humor therapy, Hypnotherapy, Meditation, Music therapy, Prayer therapy, Yoga.

The third one is Biologically-Based Therapies. Biologically based therapies in complementary and alternative medicine use substances found in nature, such as herbs, foods, and vitamins. Some examples include: Diet, Dietary supplements, Herbal products, and Megavitamins. It also includes the use of other so-called natural but as yet scientifically unproven therapies (for example, using shark cartilage to treat cancer). Herbal medicines include herbs, herbal materials, herbal preparations and finished herbal products that contain parts of plants or other plant materials as active ingredients (WHO, 2000).

The fourth is Manipulative and Body-Based Methods. Manipulative and body-based methods in complementary and alternative medicine are based on manipulation and/or movement of one or more parts of the body. Some examples include: Acupressure, Alexander Technique, Chiropractic, Feldenkrais method, Massage therapy, osteopathy, Reflexology, Rolfing, Therapeutic Touch, and trager Approach.

The last method is Energy Therapies. Energy therapies involve the use of energy fields. They are of two types: Biofield therapies are intended to affect energy fields that purportedly surround and penetrate the human body. The existence of such fields has not
yet been scientifically proven. Some forms of energy therapy manipulate biofields by applying pressure and/or manipulating the body by placing the hands in, or through, these fields. Examples include: Qi gong, Reiki, Therapeutic touch. Bioelectromagnetic-based therapies involve the unconventional use of electromagnetic fields such as Pulsed fields, Magnetic fields and alternating-current or direct-current fields.

The use of complementary and alternative medicines is increasing globally, especially in developing countries (WHO, 2002). Indeed, over 80% of the population in developing countries depend on traditional healing modalities, including herbal remedies for health maintenance and therapeutic management of diseases (WHO, 2002).

In Kenya and elsewhere in Sub-Saharan Africa, traditional herbal medicines are commonly used to treat a range of diseases. Such practices are wide-spread in rural areas where access to modern health care facilities is limited and cost of modern pharmaceuticals is beyond the means of most people (Ochora, 2006). With the wide spread use of various herbal products which are often concomitantly used with pharmaceutical drugs, herbal – drug interactions have become an important issue in drug safety and clinical practice. Hence prevalence of the concomitant use in the population needs to be determined.

Traditional medicine is widely used in Kenya with majority of the population (70%) depending on it for primary health care (NCAPD, 2007). However, there is no legal
policy framework that regulates their use. It is nevertheless evident that the government attaches great importance to proper use of herbal medicine and has responded to its growing popularity by developing a national policy framework that will provide a sound base for both promoting and regulating its use (NCAPD, 2007). This policy framework is awaiting parliamentary approval.

Regulating traditional medicine products, practices and practitioners is difficult due to variations in definitions and categorisations of traditional medicines therapies. A single herbal product could be defined as a food, a dietary supplement or an herbal medicine depending on the country (WHO, 2003). This disparity in regulations at the National level has implications on international access and distribution of the products. Though a lot of medicinal plants have been documented, further research is needed in the interaction effects of herbs and conventional medicine. In recognition to these gaps vision 2030 in its second Medium Term Plan 2013-2017 will be addressing a number of issues under Natural Products Programme; (Flagship project). The flagship project to be implemented includes documentation, profiling and securing of indigenous knowledge, technologies and associated biological resources; scientific testing and validation (MoSCA, 2013).

Like in the rest of the country, the use of herbal remedies is on the increase in Githunguri division. However, there is lack of proper documentation regarding the utilization and concomitant use of herbal products with conventional medicine. This study sought to
investigate the prevalence of concomitant use of herbal products with conventional medicine. The study also determined whether there are reported adverse effects associated with the growing use of herbal medicine and herbs – drugs interaction.

1.2 Statement of the Problem

The use of herbal remedies continues to grow globally at an alarming rate without proper regulation (WHO, 2002). This has forced international health organizations to advise governments to formulate national guidelines for regulation of herbal remedies. The lack of regulation means there are just as many fake remedies and false practitioners as there are genuine treatments, a situation which has fatal consequences. The Kenyan Government in response to this has developed a sessional paper on traditional medicine of 2009 though it has not been debated by parliament (Hansard, 2009). While this sessional paper awaits adoption and enactment of requisite laws to regulate use of herbal medicine, the country has witnessed an unprecedented growth of herbal clinics whose professionalism is very much wanting. Use of herbal products concomitantly with conventional medicines is an issue of public health concern. Studies have documented adverse effects associated with concomitant use (Piscitelli et al 2002, Nyasha et al 2011). However, the extent to which concomitant use is happening locally has not been adequately documented. This is the case even in Githunguri Division, hence this study.
1.3 Research Questions

This study sought to address the following research questions;

i. What are demographic characteristics of herbal product users in Githunguri Division?

ii. Which herbs are frequently used in Githunguri division?

iii. Which are the health conditions that elicit use of herbs in Githunguri division?

iv. To what extent are herbal medicines used concomitantly with conventional medicines in Githunguri division?

1.4 Research Hypotheses

a) There is no difference in demographic characteristics among the herbal users in Githunguri division.

b) Herbal products are not concomitantly utilised with conventional medicine for treatment of various health conditions, in Githunguri division.

1.5 General Objective

The general objective of the study was to investigate the extent of concomitant use of herbal products together with conventional medicine for various health conditions in Githunguri Division, Kiambu County, Kenya.

1.6 Specific Objectives

The specific objectives of this study were;

i. To determine the demographic characteristics of persons using herbal products in Githunguri division.
i. To establish which herbs are commonly used in Githunguri division.

iii. To establish the common diseases and conditions for which herbal medicine is used in Githunguri division.

iv. To determine the prevalence of concomitant use of herbal medicines with conventional medicines for similar conditions by herbal products users in Githunguri division.

1.7 Justification of the study

To maximize the potential of CAM as a source of health care, a number of issues must first be tackled. They relate to policy, safety, efficacy, quality, access and rational use. These cannot be tackled without adequate data on growing utilization of herbal medicine; hence this study. The study was expected to reveal the level of concomitant use of herbal products with conventional medicine, whether the concomitant use of herbal products with conventional medicine use has any demographic inclination. The widespread use of various herbal products which are often concomitantly used with conventional medicine, have become an important issue in drug safety and clinical practice (Fugh-Berman, 2002, Izzo et al, 2009). The findings of this study are expected to aid in predicting the risk of adverse herbal products – conventional medicine interactions. These will also provide awareness among policy makers responsible for the design of appropriate conventional medicine vigilance system in the country. Awareness within the medical community and those monitoring adversities would serve well to mitigate risks from potential conventional medicine – herbal products interactions. The results of this study would form the basis for future research since most indigenous herbs are not well investigated
and this could point to the needs for biomedical investigation to assess safety and efficacy of popular medical herbs.

1.8 Conceptual Framework

The conceptual framework for this study was based on the Health Belief Model (HBM) which postulates that “health-seeking behavior is influenced by a person’s perception of a threat posed by a health problem and the value associated with actions aimed at reducing the threat” (Becker, 1978). In this model, the ultimate outcomes—“health-seeking behaviour” and “the likelihood of taking recommended preventive health action”—include the following components:

1. “Individual perceptions”, which, in turn, are composed of perceived susceptibility to threat; that is, illness or disease and perceived seriousness or severity of the threat.

2. “Likelihood of action” composed of perceived benefits of preventative action minus perceived barriers to preventive action.

3. “Cues to action”, which include motivations to avoid threat, and

4. “Modifying factors”, composed of demographic, psychosocial, and structural variables.
The conceptual framework for this study is described in Figure 1.1

Perceived susceptibility to threat (e.g. illness, seriousness of illness and duration of illness).

Likelihood of action, perceived benefits of preventative action.

Cue to action (motivation to avoid threat, advice from family or friends and mass media).

Other conditions that are not illness (e.g. cosmetics, Supplements etc.).

Demographic variables (e.g. age, gender, residence, income, education, Religion, occupation)

Concomitant use of herbal products and conventional medicines

Cost, accessibility,

Source: (adapted from Becker, 1978)

Figure 1.1 Conceptual framework of the study
2.0 CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Even with modern medical advances, herbal products (HPs), which have been used as traditional medicine over thousands of years, continue to be widely used for health maintenance, disease prevention, and even disease treatment (WHO, 2011). Furthermore, in many developed countries, HPs are becoming increasingly popular, and the world expenditure on HPs is not only large but also growing rapidly (WHO, 2011). Therefore, a HP and a conventional drug are likely used concurrently. Recent studies have indicated that the majority of people do not tell their physicians about the co-utilization of conventional drugs and HPs (Casey et al, 2008). The concurrent use of conventional drugs and HPs will increase the risk of potential herb-drug interactions occurring due to the interference in the pharmacokinetics of the first drug.

2.2 Use of complementary and alternative medicine.

Complementary and alternative medicine (CAM) is common in both developing and developed countries (Goldbeck-Wood et al, 1996). CAM use increased from 34% to 42% between 1990-1997 in the United States (Eisenberg et al, 1998). Each year two thirds of the German population and one fifth of British population (Ernst et al, 2000) try at least one form of CAM. The frequency of CAM use has been estimated at 10% in Denmark (Rasmussen et al, 1990) 33% in Finland (Eisenberg and Davis et al, 1998), and 19% in Israel (Kitai et al, 1998). Example of usage of herbal medicine in other parts of the world where high prevalence has been recorded include: Trinidad, where use...
of herbal remedy was reported to be 86% among surgical out-patients on the island (Merrit et al., 2003). Other studies in the U.S.A reveal high use among the diabetics (Leonard et al., 2002) and asthmatics (Clement et al., 2005). More surprising was the 40% prevalence of use among public health sector physicians in Trinidad, where most indicated favourable outcomes (Clement and Williams’ et.al, 2005). According to the WHO up to 80% of developing countries populations use traditional medicine as their primary source of health care albeit with an increasing number of reports of adverse effects. On the contrary, knowledge on the prevalence of CAM use and the factors influencing CAM use is limited in some countries, Kenya included.

The factors influencing CAM use can differ from country to country (Aydin et al., 2008). The common use of CAM in developing countries is thought to be due to the efficiency and economic availability of the method (Aydin et al., 2008). In addition, religious beliefs can have an effect on CAM use. In many developed countries, increased use of CAM indicates that factors other than tradition and cost are at work. Concern about the adverse effects (ADRS) of chemical drugs, questioning of the approaches and assumptions of the allopathic medicine, greater public access to health information, changing values and reduced tolerance of the paternalism are just some of them (Jonas, 1998). At the same time, longer life expectancy has brought with it an increased risk of developing chronic, debilitating diseases such as heart diseases, cancer, diabetes and mental disorders (WHO, 2000). Although allopathic treatments and technologies are abundant, some patients have found that these have not provided a satisfactory solution. Treatment and technologies
have not been sufficiently effective or have caused ADRS. A national survey in the United States (USA) showed that the majority of CAM users do not in fact perceive CAM as “alternative” but rather as “complementary to” allopathic medicine (Astin, 1998).

As the use of CAM increases, the need for evidence showing its reliability, quality and efficacy rises (WHO, 2002). Many countries do not include regulations about CAM methods in their medical policies. The need of regulations is very important not only for efficacy, quality and reliability of the resources but also for education of the population (WHA, 2003).

Because CAM applications differ from culture to culture, it is not easy to standardize an analysis of CAM methods. This subject is especially important for herbal medicine, because its efficiency and quality are prone to many factors (WHO, 2002). In order to standardize the quality of CAM, the prevalence and factors affecting its use in the population have to be identified. On the other hand, as primary care physicians are the ‘gate keeper’ of health care, they can play a very important role in the use of CAM. Most physicians generally do not discuss CAM therapies with their patients, and most patients do not inform their physicians that they are using CAM therapy (Wetzel et al, 1998). In this setting, the knowledge and attitudes of physicians impact on the doctor-patient relationship and affect the overall quality of healthcare delivery with issues such as possible adverse herbs effects and herb conventional medicine interactions.
2.3 Accessibility and affordability of herbal medicines in developing countries

In some developing countries, traditional medicine (TM) is much more available than allopathic medicine. In Tanzania, Uganda and Zambia, researchers have found a ratio of TM practitioners to population of 1:200-1:400. This contrasts starkly with the availability of allopathic practitioners, where the ratio is typically 1:20,000 or less (Mhame, 2000, Spry-leverton, 2000). A 1991 survey by the US Agency for international development found that in sub-Saharan Africa, traditional practitioners outnumber allopathic practitioners by 100 to 1 (Vongo, 1999). Moreover allopathic practitioners are located primarily in cities or other urban areas. So for many rural populations TM is the only available source of health care. Survey conducted by the WHO Roll Back Malaria programme in 1998, showed that in Ghana, Mali, Nigeria and Zambia, more than 60% of children with high fever are treated at home with herbal medicines (Diarra, 1999). One of the key reasons cited for this was the ready accessibility of herbal medicines in rural areas. TM is sometimes the only affordable source of health care especially for the poorest patients. In Ghana, Kenya and Mali, research has shown that a course of artemether/lumefantrine antimalarial can cost several dollars. Yet total out of pocket health expenditure in Ghana and Kenya is only around US$ 6 per capita per year. In other words, some populations simply cannot afford chemical drugs (WHO, 2000). On the other hand, herbal medicines may not be only relatively cheap but payable in kind and or according to the ‘wealth’ of the client.
Greater accessibility to TM practitioners and confidence in their ability to manage debilitating and incurable diseases, probably explain why most Africans living with HIV/AIDS use traditional herbal medicines to obtain symptomatic relief and to manage opportunistic infections (WHO, 2000). Frequently, TM practitioners are well known in their communities for their expertise in health care and prevention of many diseases. At the same time, TM is often embedded in wide belief systems and continues to be an integral and important part of many people’s lives.

2.4 Safety, Efficacy and Quality

The growth of TM/ CAM therapies have been influenced by the culture and historical conditions within which they first evolved (WHO, 2002). Their common basis is a holistic to life, equilibrium between the mind, body and their environment, and an emphasis on health rather than disease. This more complex approach to health care makes TM/CAM very attractive to many. But it also makes evaluation highly difficult since so many factors must be taken into account. Few programs have been established to study the safety and efficacy of herbal medicines as originally proposed by the WHO guidelines for the assessment of herbal medicines (Eskinazi et al, 1999).

Few herbal drugs have been studied adequately and well-controlled double-blind clinical trials to prove their safety and efficacy have been lacking. However, a large number of clinical trials have been performed with some herbal drugs, including the extract of Ginkgo biloba (used for the treatment of CNS and Cardiovascular disorders among others.) (Ernst and Rand et al, 1998). Although they have been evaluated in different
clinical trials, additional well-controlled and appropriate randomized clinical trials are still needed in order to prove their efficacy (Armstrong and Ernst, 1999).

The general idea that herbal drugs are very safe and free from side effects is false. Plants have hundreds of constituents and some are very toxic. However, the adverse effects of most herbal drugs are relatively less frequent when the drugs are used properly compared with synthetic drugs (Drew and Myers, 1997). Two kinds of side effects have been reported for herbal medicines. The first, considered to be intrinsic to herbal drugs themselves, is normally related to predictable toxicity, over dosage and interaction with conventional drugs. On the other hand, most of the known side effects reported for herbal drugs are extrinsic to the preparation and are related to several manufacturing problems such as misidentification of plants, lack of standardization, failure in good manufacturing practice, contamination, substitution and adulteration of plants, incorrect preparations and or dosage (Keller, 1996). The main problem facing the use of traditional medicines is the proof requirement that the active components contained in medicinal plants are useful, safe and efficacious. The proofs of pharmacology activity that are available at present are mostly based on empirical experience. The scientific proof then becomes the most important thing, in order to eliminate the concern of using medicinal plants as drugs for alternative treatment. Reasons for the lack of research data involve not only policy problems, but also research methodology for evaluating traditional medicines. How to evaluate traditional medicine, what kinds of academic research approaches and methods may be used to evaluate the safety and efficacy of traditional medicine are a challenge.
Plants have been used for medicinal purpose for thousands of years. Plants, which formed the basis of sophisticated traditional medicine systems for thousands of years, were originally instrumental to early pharmaceutical drug discovery and industry. Hence, the history of drugs discovery and even drug chemistry is inexorably bound to the plant kingdom and the process of deriving drugs from plant sources is certainly not new (Elujoba et al., 2005). For example, the medicinal uses of Foxglove (*Digitalis purpurea*) which gave rise to digoxin, a cardiac drug, while Ergot of rye (*Claviceps purpurea*) was discovered as natural uterine stimulants. Ephedrine from *Ephedra sinica* was discovered for asthma from Traditional Chinese Medicines, among others. There is therefore little or no doubt that ethanographic research can provide important clues leading to new drugs for the modern pharmacies. Herbs are also appealing to those who perceive nature as benevolent and healing. Kenya does not have institutions that train traditional medicinal practitioners (TMPs). However, the number of TMPs is on the increase and so are the users.

2.5 Regulatory aspects and approval of herbal drugs

The legal process of regulation and legislation of herbal medicines changes from country to country. The reason for this involves mainly cultural aspects and also the fact that herbal medicines are rarely studied scientifically. Thus, few herbal preparations have been tested for safety and efficacy. The WHO has published guidelines in order to define basic criteria for evaluating the quality, safety and efficacy of herbal medicines aimed at assisting national regulatory authorities, scientific organizations and manufacturers in this particular area (WHO, 2005).
2.6 Concomitant use of herbal remedies with conventional medicines

With the widespread use of various herbal products which are often concomitantly used with pharmaceutical drugs, herb-drug interactions have become an important issue in drug safety and clinical practice (Wai Fan, 2005). It is well documented that concomitant use of herbal medicine with conventional drug treatment can alter pharmacokinetic profiles of many classes of pharmaceutical drugs, including psychotropic agents, anticoagulants, oral contraceptives, immunosuppressant drugs, cardiovascular drugs, anti-HIV, anti-cancer agents and antiepileptic drugs (Piscitelli and et al, 2002).

A study in Western Uganda found that 38% of HIV positive patients used traditional medicines and antiretroviral drugs at the same time for the management of HIV infection (Langlois et al, 2007) and the major reasons for use of traditional medicines were perceived additional efficacy, improvement in quality of life, and a feeling of control over the disease. Even though traditional herbal remedies have been used as complementary in the treatment of some common ailments such as diarrhea, headaches, colds and flu many studies have identified adverse effects associated with this concomitant use (Nyasha et al, 2011). In Sweden, the most common adverse reactions attributed to use of complementary medicines were skin rashes (urticaria, exanthema, and dermatitis (Jacobsson et al, 2009).

2.7 Selected traditional medicine practices

2.7.1 Traditional Chinese Medicine

Traditional Chinese medicine (TCM), which encompasses many different practices, is rooted in the ancient philosophy of Taoism and dates back more than 5,000 years. Today,
TCM is practiced side by side with western medicine in many of China’s hospitals and clinics. TCM is practiced in other countries such as USA, Europe and Africa including Kenya; for example, in the USA TCM is widely used although the exact number of people who use TCM in the United States is unknown. According to the 2007 national Health interview survey, which included questions on use of various CAM therapies, an estimated 3.1 million U.S adult had used acupuncture in the previous year (Barnes et al, 2008). In addition, according to this same survey, approximately 17 percent of adults use natural products including herbs making it the most commonly used therapy. In another survey, more than one third of the patients at six large acupuncture clinics said they also received Chinese herbal treatments at the clinics.

Underlying the practice of TCM is a unique view of the world and human body that is different from western concepts. This view is based on the ancient Chinese perception of humans as microcosms of the large, surrounding Universe – interconnected with nature and subject to its forces, the human body is regarded as an organic entity in which the various organs, tissues, and other parts have distinct functions but are all interdependent. In this view, health and disease relate to balance of the functions (Birdee et al, 2009).

The theoretical framework of TCM has a number of key components (O'Brien, 2003): First is the Yin-yang theory, a concept of two opposing yet, complementary, forces that shape the world and all life is central to TCM.

Secondly, a vital energy or life force called qi circulates in the body through a system of pathways called meridians. Health is an ongoing process of maintaining balance and harmony in the circulation of qi.
Lastly, the TCM approach uses eight principles to analyze symptoms and categorize conditions: cold/heat, interior/exterior, excess deficiency and yin/yang (the chief principles). TCM also uses the theory of five elements –fire, earth, metal, water and wood to explain the body works; these elements correspond to particular organs and tissues in the body.

TCM emphasizes individualized treatment. Practitioners traditionally used four methods to evaluate a patient’s condition, observing (especially the tongue) hearing/smelling, asking/interviewing, and touching/ palpating especially the pulse). TCM practitioners use a variety of therapies in an effort to promote health and treat diseases. The most commonly used are Chinese herbal medicine and acupuncture.

**Chinese herbal medicine:** The Chinese materia medica (a pharmacological reference book used by TCM practitioners contains hundreds of medicinal substances primarily plants, but also some minerals and animal products, classified by their perceived action in the body. Different parts of plants such as the leaves, roots, stems, flowers and seeds are used. Usually, herbs are combined in formulas and given as tea, capsules, tinctures or powders.

**Acupuncture:** By stimulating specific points on the body, most often by inserting thin metal needles through the skin, practitioners seek to remove blockages in the flow of qi. Other TCM therapies include moxibustion (burning moxa- a cone or stick of dried herbs, usually mugwort on or near the skin, sometimes in conjunction with acupuncture.
cupping; that is, applying a heated cup to the skin to create a slight suction, Chinese massage; mind-body therapies such as qi gong and tai chi and dietary therapy.

In spite of the widespread use of TCM in China and its use in the west, scientific evidence of its effectiveness is for the most part limited. TCM’s complexity and underlying conceptual foundations present challenges for researchers seeking evidence on whether and how it works. Most research has focused on specific modalities, primarily acupuncture and Chinese herbal remedies.

Acupuncture research has produced a large body of scientific evidence. Studies suggest that it may be useful for a number of different conditions but additional research is still needed.

2.7.2 African traditional medicine

Many countries do not have national herbal pharmacopoeias. Although countries such as Burkina faso, Cote d’ivoire, Guinea, Mali and Senegal, have some documented evidence of proper use of their medicinal plants through research and development of national monographs, only Ghana (Ghana, 2007) and Nigeria (FMOH,2008) have national herbal pharmacopoeias. Since their publication, these pharmacopoeias have helped substantiate the ethnomedical uses of many African medicinal plants. However, information on properly controlled clinical trials is almost non-existent.
2.7.2.1 Regulation of traditional medicine in Africa

The long term use of traditional medicine is not a guarantee of its safety as any medicine whether traditional or conventional can cause health risk.

It has been observed that a lot of the problems associated with the use of TM’s arise mainly from the classification of many traditional medicine products as foods, dietary supplements or herbal medicines in some countries (WHO-AFRO, 2010). In these countries, evidence of quality, efficiency and safety of TM’s is not required before marketing. Quality tests and production standards tend to be less vigorous or controlled and in some cases, traditional medical practitioners (TMPs) may not be certified or licensed. Some of the problems may also be due to lack of expertise of THP’s or inappropriate preparation or production of traditional medicines. The safety of traditional and herbal medicines has therefore become a major concern to both national health authorities and general public.

Owing to the complexity of herbs in particular, it is essential that they are subjected to vigorous scientific evaluation like conventional medicine in order to guarantee their safety, quality and efficiency.

In considering the role of regulating traditional medicine in countries of WHO African Region, three areas need to be addressed within the context of a policy framework. These areas are the regulation of THP’s, the regulation of the practice of TM and the regulation of traditional medicines.

The lack of regulation in many countries means there are just as many fake remedies and false practitioners as there are genuine treatments a situation which can have fatal
consequences. Generally, the use of herbal medicines in the Region is based on oral tradition within a family or a community. As a result, most herbal medicines which claim to provide “effective cures” for various diseases lack scientific evidence for safety, efficacy or quality requirements for medicines. Yet, they are openly sold in markets, stores, homes and even in pharmacies as over-the-counter medicines and dietary supplements with little, if any, advice offered on their use. Consumers may often be unaware of how and when herbal medicines may be safely taken or of their potential side effects. Despite this, most countries in the Region have not established safety – monitoring mechanisms for imported and locally produced traditional medicines (WHO-AFRO, 2010). This would seem to reflect the inadequacy of facilities for researchers in the region for assessing the quality, safety and efficiency of traditional medicines whose composition is usually complex.

2.7.2.2 Assessment of quality, safety and efficacy in Africa.

The establishment of quality is an indispensable process in the production of any therapeutic agent. Proper identification of a medicinal plant material is fundamental to the quality control process. It must be established unequivocally that the source of the plant material is authentic. Ethnobotany and pharmacognosy are effective tools for achieving this. Following this, microbial contamination; both fungal and bacterial, must be checked during the stages of processing of the material. Chemical, pharmacological and toxicological evaluations, conducted according to the principles of good laboratory practices (GLPs), will certify the bioactive properties of material undergoing processing
(WHO, 2009). These tests also are often the predictors of safety of the products manufactured.

Clinical safety and efficacy will need to be established through exhaustive and usually lengthy trials during the early stages of the development of a therapeutic agent. After that, so long as the standard operating procedures are adhered to, then the unit dosage forms produced will be considered safe. Notwithstanding this, quality assurance procedures must be instituted so that the products being produced are of good quality, safety and efficacious.

2.8 Traditional medical practices and medicinal plant in Kenya and East Africa

As in many other countries in sub-Saharan Africa, Kenya is experiencing a crisis in Human Resources in Health (HRH), which disproportionately impacts the poor. There is also evidence that even when health workers are present, the poor still have disproportionate access to health services. According to Kenya health statistic, the prevalence and incidence of sickness for the country’s 40 million people are similar for the poor and the non-poor (Lambert et al, 2011). However, the response to sickness is markedly different across different social-economic groups. An estimated 23 percent of the sick do not seek conventional medical care. Further research is required to link such findings to a number of potential factors: the lack of available allopathic providers, discrimination in the provision of services, the inability of the poor to afford services, or the lack of trust in conventional health workers.
In Kenya, the number of studies based on screening medicinal plants has increased drastically. This has led to formulation of improved botanical preparations from indigenous medicinal plants which are stimulating commercialization of these products. Data from the Ministry of Gender, Sports, Culture and Social Services reveals that the number of traditional medical practitioners registering their commercial enterprises or herbal clinics (usually in urban areas) is on the increase (Njoroge, 2011).

Furthermore, the number of patients being treated in these herbal clinics is on the increase sometimes reaching well over 500 patients per month (Njoroge, 2006). Although Kenya’s herbal industry is perceived to be growing, status of plant species involved on the urban markets has not been studied.

In Kenya, herbs are traditionally consumed in various ways, most commonly in the form of infusion or decoction prepared from the dried plant material. In this case, the only testimony of efficacy and safety is the prolonged and apparently uneventful use. Research and evaluations to guarantee the availability of safe, effective and standardized products is in progress in the various institutions in Kenya (Orwa, 2002) dealing with natural products. The many and various forms of herbal medicine have evolved against widely different ethnological, cultural, climatic, geographic and philosophical background. The evaluation of these products ensuring their safety and efficacy through registration and regulation present important challenge. There are several types of evidence that are desirable before therapy is advocated. The evidence of safety and efficacy is the most critical. Evidence that a therapy has few, if any, significant adverse
effects and will not cause harm must be considered important in all medicines including herbal medicine. The evidence for the efficacy of herbal medicine is mixed, many herbs have established activities while other do not; among those which are active many are claimed to have numerous other actions for which evidence is lacking. Problems sometimes arise when a mixture of herbs are used (Lamber et al, 2011). Even when these have proven efficacy, it may be difficult to standardize and control. More research is needed on the efficacy of most herbal remedies, and indeed institutions in Kenya dealing with natural products continue to carry out research in order to build up an evidence base.

2.9 Trade in herbal medicine Kenya

Studies have shown that people in developing countries depend on wild resources for meeting their livelihood needs (Pimentel et al, 1997). The incomes obtained from such wild resources contribute to achievements of International Development Targets (IDTS) objectives especially poverty reduction (Poole, 2004). The use and commercialization of non-timber forest products which include medicinal plants has been found to be an important livelihood strategy in developing countries where rural people are economically vulnerable (Belcher & Schreckenberg, 2007, Schackleton et al, 2009). This brings about incomes and living standards. (Mbuvi and Boon, 2008.)

According to draft policy on traditional medicine and medicinal plants, there is a lack of data demonstrating the social –economic importance of medicinal plants and traditional medicine practice to the rural livelihoods of majority of Kenyans. There are presently poor or non-existent marketing channels for medicinal plants or traditional medical
practices. This has led to exploitation of farmers and gatherers by middle men and those already established in business. There has been an inadequate inventory and prioritization to date on the resources base, users, current technologies and social-economic value of medicinal plants. Products of traditional medicine have a low appeal; hence low demand due to poor processing, presentation and packaging. Traditional medical practitioners and those knowledgeable about medicinal plants typically have poor access to credit and micro-finance essential to facilitate commercial production.

The use of traditional medicine and traditional medical practitioners is not included in health care utilization data, which only measure the conventional health system. The strong cultural association with traditional forms of health care is certainly a factor that decreases utilization of the conventional system, though the trade off is that many people continue to be satisfied with traditional services. Nevertheless there are clear risks associated with relying on traditional medicine for serious medical conditions, and little documented research has been done to measure the efficacy of traditional treatment strategies (Wamai, 2009). There is a need for traditional medicine to be integrated into the National health system, in a way that would foster improved regulation and safety standards. This will enable this widespread practice to have a legitimate role in Kenyans overall health strategy.

2.10 Access to health care in Kenya
The two most significant barriers to entry in the Kenya health system are the cost of care, and the availability of suitable care within a reasonable distance; that is, geographical
barriers. According to National Health Sector Strategic Plan (NHSSPII), (2005-2010) “the physical (health) infrastructure in some regions of the country has coverage of one facility per 50-200 kilometers”, making the availability of health resources to those who are sick virtually nonexistent in certain cases (NHSSP II). One of the ongoing goals of the health system in Kenya is to ensure that every Kenyan lives within 4 kilometers of a health facility (Dustin, 2010) a feat that would significantly improve access to care for many Kenyans. It is important to note, however, that distance from a health center can also be a subjective measurement. While some citizen might be 15 kilometers from a well-equipped hospital on a tarmac road, many other might indeed be only 4km from a health facility, but it may be a limited facility like a dispensary with few resources, no doctors, and accessibility only by foot or bicycle. In this scenario, it is easy to see only someone might make a journey once and never again thereafter.

Another major issue affecting access to care is the uneven distribution of health workers between urban and rural areas (Dustin, 2010). In order for an individual to access health services, they must have both physical access to a health facility and the health facility must also be able to provide service. The high prevalence of traditional medicine, which is sometimes viewed as at odds with the adoption of a more modern health system, should be viewed as an opportunity to reach a wider portion of the population, if only this practice can be brought into the overall health strategy and even integrated with the current Sector Wide Approach (SWAP).
3.0 CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter explains the methodology that was used in the entire study. The chapter gives research design, study variables, location of the study, target population and study population, inclusion criteria, exclusion criteria, sampling technique, sample size determination, pre-testing, data collection, data analysis and presentation and ethical consideration.

3.2 Research Design

A cross-sectional study was undertaken on randomly selected herbal clinics throughout Githunguri Division. The phenomenon investigated was concomitant use of herbal medicine with conventional medicine. In a cross-sectional study no attempt is made to change behavior or conditions (Thomas and Nelson, 1996). Things were measured as they are.

3.3 Study variable

3.3.1 Dependent variable

The dependent variable in this study was concomitant use of herbal medicine with conventional medicine.
3.3.2 Independent variables.

The independent variables were age, income, education level, length of illness, religion and gender, conditions for which herbs products are used for and other conditions that are not illnesses.

3.4 Location of the study.

The study was located in Githunguri Division of Kiambu County as shown in Fig 3.1 and Fig 3.2. The area was approximately 36.6 square kilometers and is predominantly rural.
Figure 3.1: Map of Kenya showing the location of Kiambu County (KNBS, 2012)

Figure 3.2: Map of Githunguri Division (KNBS, 2012)
3.5 **Target population and study population**

The population of the division is 58,771 people as per 2009 census (KNBS, 2010). Target population was all persons using herbal medicine or herbal products and traditional medical practitioners in Githunguri Division, Kiambu County.

The populations for this study were persons attending herbal clinics for treatment and traditional medical practitioners of those clinics.

3.5.1 **Inclusion Criteria**

Patients over 18 years of age attending selected herbal clinics in Githunguri Division were included. Herbalists of selected herbal clinics were also included in the study. Persons attending herbal clinics for treatment or to pick herbal products for non-illness condition who consented to participate.

3.5.2 **Exclusion Criteria**

People who would otherwise be included but for one reason or the other they were not due to certain reasons for example, significance distress rendering the subject unable to sit for an interview or language barrier and those who did not consent to participate in the study.

3.6 **Sample size determination.**

Sample size of herbal product users was arrived at by calculation using the standard formula by Kothari (2003).

\[ n = \frac{z^2pq}{d^2} \]
Where:

- \( n \) = the desired sample size (if the target population is greater than 10,000)
- \( Z \) = the standard normal deviate 1.96 at 95% confidence interval.

The sample size calculation is based on the assumption that 70% of Kenyan population use traditional medicine (NCAPD, 2007). Therefore:

- \( P \) = prevalence. (0.7)
- \( q = 1-p \) (0.3)
- \( d = 1 \) level of statistical significance, 0.05

\[
\begin{align*}
n &= \frac{Z^2 \times P \times (1 - P)}{d^2} \\
   &= \frac{1.96^2 \times 0.7 \times (1 - 0.7)}{(0.05)^2} \\
   &= 322.69 \\
   &= 323
\end{align*}
\]

All 323 participants were recruited even though not all responded to all questions asked.

### 3.7 Sampling Technique

Cluster sampling method was used to select representative study sites. Sub-locations were used as the clusters. Out of six sub-locations three were sampled (Table 3.1). Cluster sampling was chosen because it reduces costs per interview given a fixed budget and increases the efficiency (Kerry and Bland, 1998). Herbal clinics were chosen proportionate to the number of clients who visited them as obtained from the table below.
Table 3.1 Representative study sites and selected sample.

<table>
<thead>
<tr>
<th>Sub-location</th>
<th>Sub-locations sampled</th>
<th>No. of clinics</th>
<th>No. sampled</th>
<th>No. of patients sampled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Githunguri</td>
<td>Githunguri</td>
<td>15</td>
<td>9</td>
<td>139</td>
</tr>
<tr>
<td>Giathieko</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kanjai</td>
<td>Kanjai</td>
<td>9</td>
<td>5</td>
<td>83</td>
</tr>
<tr>
<td>Kiairia</td>
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<td>Kimathi</td>
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<tr>
<td>Nyaga</td>
<td>Nyaga</td>
<td>11</td>
<td>6</td>
<td>101</td>
</tr>
</tbody>
</table>

A list of all the herbal clinics was obtained from the Department of Culture and Social Services. All the herbal clinics in each cluster were assigned random numbers. To select the sample, a random starting point on random number table was selected, the first two digits of the first random number was matched with the assigned number of herbal clinic on the list of herbal clinics. After picking the first herbal clinic to be included in the sample the rest were picked by proceeding on the random number table from left to right. This was repeated until the required twenty clinics were obtained. To determine how many participants were to be selected in each clinic the herbalist was asked to give on average how many patients are seen in the clinic per month. This average was used to determine the number of participants to be selected per clinic. The selection was done proportionate to number of patients treated in each clinic. In the clinic participants to be interviewed were selected in order of their visit. The
patients visiting the clinic would be assigned numbers in order in which they arrived. Those that were assigned odd numbers would be recruited for interview until the required number was achieved. The herbal medicine users were recruited within the clinic then followed for an interview elsewhere. The herbalists were interviewed within the herbal clinics.

3.8 Pre-testing

The data collection instruments were pre-tested using people with similar characteristics in Ikinu Division. Pre-tested instruments were then corrected and used in the actual study. The research assistants were recruited, trained and participated in pre-testing. The research assistants were people with medical background (a nurse and laboratory technologist), who understood the local language and were able to translate the questions from English to Kikuyu.

3.9 Data collection

All the respondents filled a letter of consent (Appendix I) indicating their willingness to participate in this study. They were assured of confidentiality, the purpose of study, the potential benefits and possible risks associated with participation explained to them. Two questionnaires were used including a questionnaire for herbalists and herbal users. The questionnaire used in this study was a modified version of a questionnaire used in Japan. Some additional questions were quoted from previously published articles (Yuri et al, 2007, Delgoda et al, 2010). The questionnaire was developed through a systematic literature review and discussions with my supervisors. The questionnaire was composed of the following two parts: background of the patients (age, sex, daily living activity, marital status, monthly income,
location of residence, educational level, religion), kind of herbs products used, diseases treated, concomitant use of conventional medicine and herbal products, reason for concomitant use herbal products with conventional medicine, method of obtaining information about the herbal products used, contentment with treatment offered by herbalists, perception on effectiveness or ineffectiveness, perception on cost of herbal medicine compared to conventional medicine, and whether concomitant use was revealed to physicians or herbalists.

The questionnaire for herbalists (Appendix II) was interview-administered and was to capture the most frequently used herbs. Level of training of the herbalists, the most common diseases to which herbs are used and the quality issues on herbs preparations. The questionnaire for participants (Appendix III) was interview administered for those who were not literate and self-administered for those who were literate. This questionnaire was used to elicit level of education, gender, age, and level of income, herb used and other health conditions that elicit use of herbs apart from illnesses. The list of herbs was developed through the guidance of people knowledgeable in herbs including herbalist in Githunguri the herbs were identified in KU by systemic botanist. It was also used to determine concomitant use of herbal medicines and conventional medicines, reasons for herbal medicines use, other conditions that elicit herbal medicine use, and the rating of herbal medicines compared with conventional medicines.

3.10 Data Analysis and Presentation

Data analysis was undertaken using descriptive statistics, including the frequencies of herbs used, diseases eliciting use of herbal medicine, use of herbs concomitantly with conventional
medicine, reasons of concomitant use, rating herbs in comparison to conventional medicine, and cost ratings. These were stratified by respondent’s age, gender, income, marital status, religion, education level, occupation and location of residence. Statistical analysis of the broad categories of diseases (acute and chronic) was also carried out to compare the characteristics between herb users alone and those who combined herbs and conventional medicine. The logistic regression method was used to estimate the odd ratios (ORS) for herbs users alone and herbs combined with conventional medicine groups.

A software program called Statistical Package for the Social Sciences (SPSS) was employed for this study’s data analysis. Frequencies for each variable were generated and organized into tables using SPSS. A chi-square test was used to determine the association between concomitant use of herbal products and conventional medicines use and each of the independent variables related to demographic characteristics; a P value ≤ 0.05 was considered to be statistically significant.

3.11 Ethical Consideration

Authority to carry out this research was sought from Kenyatta University (KU) Graduate School, KU Ethics Review Committee and National commission for Science, Technology and Innovation (NACOSTI). Informed consent (Appendix I) from subjects was sought and confidentiality was assured to the participants.
4.0 CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Introduction to Data Analysis

This chapter presents major findings of the study, interpretation and implication. The raw data from the field was entered, screened, cleaned and analyzed both quantitatively and qualitatively based on the objectives and questions of this study. The results are presented by use of tables and charts.

4.2 Demographic characteristics of participants

Table 4.2.1 presents demographic characteristics of the respondents which include: age, education level, monthly level of income, location of residence, marital status and religion.

Three hundred and twenty three agreed to enter the study (323). Out of the total sample only 320 participants revealed their age, the participants were more likely to be above 40 years (58.4%) of age. This is similar to a study carried out in Brunei Darussalem (Singapore) on the use of traditional remedies where the usage was highest in the 31-45 years age category (Kifli et al, 2007).

Participants were more likely to have acquired high school level of education and above (69.5 %). Marital status was among the variables considered in this study. Out of the total sample of 314 respondents, the majority (56.4%) of the respondents came from a
monogamous family, while 14.0% were single. A few (10.2%) of the participants were divorced. When the respondents were categorized according to their religion it was noted that majority (63.5%) were Christians from protestant churches. About (33.1%) of the respondents were Christians of Catholic faith and the rest 3.4% of the participants declined to reveal their faith. The findings also shows that 52.3% of the respondents were males while the rest 47.7% of the participants were females. The findings in the table below shows that majority of the respondents (42.1%) were farmers. This could be expected in this division as many were living in rural areas. Business persons were (20.3%), while 11.7% of the respondents were teachers. The monthly income of the participants most likely to be below Ksh 19,999 (51.6 %), with those earning 9,999 shillings or less at 24.0%, those who had a monthly income of more than Ksh 20,000 were 48.4%. The location of residence was categorized into three: rural, sub urban and urban. The great majority of the participants (69.7%) were from the rural set up, (15.8%) were from urban areas while the rest 14.6% were from sub urban areas.
## Table 4.2.1 Demographic characteristics of respondents

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>No. of respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>≤30</td>
<td>33</td>
<td>10.3</td>
</tr>
<tr>
<td></td>
<td>31-40</td>
<td>100</td>
<td>31.3</td>
</tr>
<tr>
<td></td>
<td>41-50</td>
<td>105</td>
<td>32.8</td>
</tr>
<tr>
<td></td>
<td>&gt;50</td>
<td>82</td>
<td>25.6</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>320</td>
<td>100</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td>No formal Education</td>
<td>42</td>
<td>13.5</td>
</tr>
<tr>
<td></td>
<td>Primary school</td>
<td>53</td>
<td>17.0</td>
</tr>
<tr>
<td></td>
<td>High school</td>
<td>167</td>
<td>53.5</td>
</tr>
<tr>
<td></td>
<td>Tertiary Education</td>
<td>50</td>
<td>16.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>312</td>
<td>100</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td>Single</td>
<td>44</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td>Divorced</td>
<td>38</td>
<td>12.1</td>
</tr>
<tr>
<td></td>
<td>Monogamous</td>
<td>177</td>
<td>56.4</td>
</tr>
<tr>
<td></td>
<td>Polygamous</td>
<td>22</td>
<td>7.0</td>
</tr>
<tr>
<td></td>
<td>Widow/Widower</td>
<td>33</td>
<td>10.5</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>314</td>
<td>100</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td>Christian (catholic)</td>
<td>107</td>
<td>34.3</td>
</tr>
<tr>
<td></td>
<td>Christian (protestant)</td>
<td>205</td>
<td>65.7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>312</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td>Teachers</td>
<td>37</td>
<td>11.7</td>
</tr>
<tr>
<td></td>
<td>Casual labourers</td>
<td>82</td>
<td>25.9</td>
</tr>
<tr>
<td></td>
<td>Business persons</td>
<td>64</td>
<td>20.3</td>
</tr>
<tr>
<td></td>
<td>Farmers</td>
<td>133</td>
<td>42.1</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>316</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Monthly income level</strong></td>
<td>≤9,999</td>
<td>75</td>
<td>24.0</td>
</tr>
<tr>
<td></td>
<td>10,000-19,999</td>
<td>86</td>
<td>27.6</td>
</tr>
<tr>
<td></td>
<td>20,000-29,999</td>
<td>77</td>
<td>24.7</td>
</tr>
<tr>
<td></td>
<td>&gt;30,000</td>
<td>74</td>
<td>23.7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>312</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td>Male</td>
<td>169</td>
<td>52.3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>154</td>
<td>47.7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>323</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Location of residence</strong></td>
<td>Urban</td>
<td>51</td>
<td>15.8</td>
</tr>
<tr>
<td></td>
<td>sub urban</td>
<td>47</td>
<td>14.6</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>225</td>
<td>69.7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>323</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* Not all respondents reported on a given variable.
4.3. Herbs used for different diseases

Table 4.3.1 shows the herbs that are used to treat different diseases. The table combines responses from herbalist and patients as most of the patients could not tell what herb is used for what condition(s). Most of the herbs are used to cure different conditions as shown in the table. Different herbs are used for the same condition which is due to the fact that most herbs are normally used in combination. This is also a multiple response table hence the number of respondents is beyond sample size of 323. This is accounted for by the fact that one individual could report more than one herb used on her/him for treatment.
Table 4.3.1 Common medicinal plants and their ethnobotanical use.

<table>
<thead>
<tr>
<th>Herb Family</th>
<th>Botanical name</th>
<th>Common name</th>
<th>Local name</th>
<th>No. of respondents</th>
<th>Percent</th>
<th>Diseases treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamiaceae</td>
<td>Ajuga remota</td>
<td>Blue bungle</td>
<td>Wanjiru wa rurii</td>
<td>26</td>
<td>4.1%</td>
<td>Malaria, typhoid</td>
</tr>
<tr>
<td>Apocynaceae</td>
<td>Carissa edulis</td>
<td>Arabian num-num</td>
<td>Mukawa</td>
<td>7</td>
<td>1.1%</td>
<td>Joints pain</td>
</tr>
<tr>
<td>Ruckceae</td>
<td>Citrus aurantiifolia</td>
<td>Bitter lemon</td>
<td>Ndimu</td>
<td>104</td>
<td>16.5%</td>
<td>Weight loss, common cold,</td>
</tr>
<tr>
<td>Meliaceae</td>
<td>Melia azadirachta</td>
<td>Neem</td>
<td>Muarubaine</td>
<td>47</td>
<td>7.4%</td>
<td>Malaria, joints pain, amoeba, typhoid</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Ricinus communis</td>
<td>Castor</td>
<td>Mubariki</td>
<td>22</td>
<td>3.5%</td>
<td>Ulcers, backache</td>
</tr>
<tr>
<td></td>
<td>Urtica mossica</td>
<td>Stinging nettle</td>
<td>Thabai</td>
<td>64</td>
<td>10.1%</td>
<td>High blood pressure, diabetes, detoxifying, anemia</td>
</tr>
<tr>
<td></td>
<td>Crinum macananii</td>
<td>Poison bulb</td>
<td>Gitunguru kia ngoma</td>
<td>14</td>
<td>2.2%</td>
<td>Respiratory problems</td>
</tr>
<tr>
<td>Myrtales</td>
<td>Eucalyptus saligna</td>
<td>Sydney blue gum</td>
<td>Mubau</td>
<td>50</td>
<td>7.9%</td>
<td>Typhoid, common cold, chest congestion</td>
</tr>
<tr>
<td>canellaceae</td>
<td>Warbugia ugandensis</td>
<td>East Africa green heart</td>
<td>Muthiga</td>
<td>149</td>
<td>23.6%</td>
<td>Malaria, allergies, pneumonia</td>
</tr>
<tr>
<td>Asteraceae</td>
<td>Bidens pilosa</td>
<td>Black jack</td>
<td>Mucege</td>
<td>18</td>
<td>2.8%</td>
<td>Allergy, liver problem, diabetes</td>
</tr>
<tr>
<td></td>
<td>Neobotania macrocalyx</td>
<td>-</td>
<td>Mutundu</td>
<td>30</td>
<td>4.7%</td>
<td>Open wounds, STDs</td>
</tr>
<tr>
<td></td>
<td>Euphorbia joyae</td>
<td>Spurge</td>
<td>Kariaria</td>
<td>4</td>
<td>0.6%</td>
<td>Wounds</td>
</tr>
<tr>
<td>Xanthorrhoeaceae</td>
<td>Aloe kedongensis</td>
<td>Aloes</td>
<td>Mugwanugu</td>
<td>97</td>
<td>15.3%</td>
<td>Superficial wounds/cuts, Skin purifier, Peptic ulcer, constipation</td>
</tr>
</tbody>
</table>
Table 4.3.1 also shows the different herbs recorded by the herbal medicine users. The most used herb was *Warbugia ugandensis* recorded by 23.6% of the respondents, indicating its ethnobotanical usefulness in the management of malaria, allergies and pneumonia. *Citrus aurantiifolia* was the next most commonly used herbal at 16.5%; mainly it was used to treat common cold which is a respiratory infection. The least used herb at 0.6% of the respondents was *Euphorbia joyae* which is used to treat wounds.

4.3.1 Known activity of some herbs

Plants are known as a major source of modern medicines. From ancient times, human have utilized plants for treatment and prevention of diseases, leading to the dawn of traditional medicine. Scientific investigations have been carried out on some herbs to validate their medicinal properties. Some of the herbs listed in Table 4.3.1 have been found to contain the medicinal properties as outlined below:

*Ajuga remota*

*Ajuga remota* is the most frequently used medicinal herb for malaria treatment in Kenya. It has three known isolates ajugarin-1, ergosterol-5, 8-endoperoxide and a new isolate 8-O-acetylharpagide. Ajugarin-1 has moderate activity on *plasmodium* while Ergosterol-5,8-endoperoxide is about three times potent as compared to chloroquine while 8-O-acetylharpagide is inactive (Hilaly *et al*, 2004).
**Carrisa edulis**

*Carrisa edulis* herbal extract has potent anti-viral agents against herpes simplex viruses (Tolo et al, 2008). The decoction of the root bark of *Carrisa edulis* is used traditionally for treatment of malaria and other ailments. *Plasmodium falciparum* in vitro drug sensitive study showed methanolic extract of the root bark of *carissa edulis* has anti-plasmodial activity against the chloroquin-sensitive (D6) strains of *plasmodium falciparum* parasite with IC$_{50}$ value of 1.95 µg/ml. From this extract, a lignan compound nortrachelogenin was isolated and showed anti-plasmodium activity of 14.50 µg/ml (Kirira et al, 2006).

The Kemri study also isolated other compounds from the herb, including *oleuropein*, an immune booster, and lupeol. Lupeol, according to researchers from the University of Wisconsin, US, was found to act against cancerous cells in mice (Kituyi, 2012). A study at the Addis Ababa University in Ethiopia found the herb was a powerful diuretic (Kituyi, 2012). It is found in many parts of the country and is used to treat headache, rheumatism, gonorrhoea, syphilis and rabies, among other diseases.

**Citrus aurantifolia**

Weight Reduction / Decreased Food Intake / Limonene: Study investigated the effects of lime (Citrus aurantifolia) essential oils in reducing body weight, alone or in combination
with ketotifen, an antihistamine drug that causes weight gain. Lime essential oil treatment displayed a reduction of body weight and food consumption in mice. In combination with ketotifen, there was significant suppression of weight gain, as well as decreased body weight. Oil analysis yielded 22 main components, with limonene (28.27%) as the principal one (Asnaashari et al, 2010).

Antiproliferative / Anti-cancer: Study of in vitro effects of several concentrations of lime juice (CLJ) showed significant inhibition of proliferation of human breast carcinoma cell line and assumes that protein components of the CLJ extract may have anti-proliferative effects on tumor cell lines (Gharagozloo et al, 2002).

Antimicrobial: Study investigating the antibacterial effects of two plants extracts showed Citrus aurantifolia showing promising broad spectrum antibacterial effects on human pathogens (Taiwo et al, 2007).

Antiproliferative / Colon Cancer Prevention: Study of the lime volatile oil of CA yielded 22 compounds, D-limonene, D-dihydrocarvone among the major compounds. The oil showed 78% inhibition of human colon cancer cells, DNA fragmentation and apoptosis induction, results that suggested potential antiproliferative benefits in colon cancer prevention (Food chemistry, 2009).

Cardiovascular Effects / Fruits: Study evaluated the antihypertensive effect on three experimental hypertensive models in rats. Results showed the methanol extract of C. aurantifolia produces hypotensive and anti-hypertensive effect (Sumera, 2013).
Biological activity of Neem compounds

Neem plant has been demonstrated to have the following biological activity:

Anti-inflammatory; Antiarthritic; Antipyretic; Hypoglycaemic; Antigastric ulcer;
Spermicidal; Antifungal; Antibacterial; Diuretic; Antimalarial; Antitumour;
Immunomodulatory (Agrawa, 2002).

More than 135 compounds have been isolated from different parts of neem and several reviews have also been published on the chemistry and structural diversity of these compounds. The compounds have been divided into two major classes: isoprenoids (like diterpenoids and triterpenoids containing protomeliacins, limonoids, azadirone and its derivatives, gedunin and its derivatives, vilasinin type of compounds and C-secomeliacins such as nimbin, salanin and azadirachtin ) and non-isoprenoids, which are proteins (amino acids) and carbohydrates (polysaccharides), sulphurous compounds, polyphenolics such as flavonoids and their glycosides, dihydrochalcone, coumarin and tannins, aliphatic compounds (Agrawa, 2002).
**Biden pilosa**

**Phytochemicals**

Around 116 publications have documented the exploitation and medical use of *B. pilosa*. To date, 201 compounds comprising 70 aliphatics, 60 flavonoids, 25 terpenoids, 19 phenylpropanoids, 13 aromatics, 8 porphyrins, and 6 other compounds, have been identified from this plant (Silva et al, 2011).

**Pharmacological Properties**

Different preparations of its whole plant and/or parts have been purported to treat over 40 categories of illnesses. Scientific studies, although not extensive, have demonstrated that *B. pilosa* extracts and/or compounds have antitumor (Wu et al, 2007), antiinflammatory (Seelinger et al, 2008, Pereira et al, 1999), antidiabetic and antihyperglycemic (Chien et al, 2009), antioxidant (Muchuweti et al, 2007), immunomodulatory (Chiang et al, 2007, Chang et al, 2007), antimalarial (Tobinaga et al, 2009, Kumari et al, 2009) antibacterial (Deba et al, 2008), antifungal (Ashafa et al, 2009) antihypertensive, vasodilatory (Nguelefack, et al, 2005) and antiulcerative (Tan et al, 2000) activities.

**Eucalyptus saligna**

Eucalyptus – base medicines often have a potent anti-inflammatory action that has generally been attributed to 1,8-cineole (eucalyptol)- which also has analgesic properties
(Cheryll, 2011). The eucalyptus also has antispasmodic and antibacterial qualities. These qualities make it perfectly suited for respiratory conditions (Cheryll, 2011).

**W. ugandensis**

Extracts of *W. ugandensis* have been reported to show some antimalarial, antifungal, and antibacterial properties *in vitro* or in animal models (Olila, 2001, Were et al, 2010). A scientific study has also demonstrated the potential of this plant in treatment of leishmaniasis (Ngure et al, 2009).

### 4.4 Enumerated diseases that elicit use of herbs.

**Table 4.4.1 Diseases that elicit use of herbal medicine**

The diseases were defined as those which the patients were given herbal medicine at the clinic by herbalists. The table 4.4.1 is presented in a multiple response format. This is due to the fact that one respondent could have more than one condition eliciting the use of the herbal medicine.

Most frequent conditions for which herbs were used included both acute and chronic conditions like arthritis, allergy, gout, diabetes, high blood pressure and asthma. The most common conditions for which respondents reported use of herbs include malaria (23.3%), arthritis (10.7%) and allergy (10.2%). These conditions could broadly be classified into acute and chronic conditions. A high proportion (55.4%) reported presence
of chronic condition as a reason for seeking herbal treatment. This implies that in Githunguri having chronic conditions is likely to elicit use herbal products.
### Table 4.4.1 Diseases that elicit use of herbal medicine

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Responses</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No of respondents</td>
<td>Percent</td>
<td></td>
</tr>
<tr>
<td><strong>Chronic</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>57</td>
<td>9.3%</td>
<td></td>
</tr>
<tr>
<td>High blood pressure</td>
<td>50</td>
<td>8.1%</td>
<td></td>
</tr>
<tr>
<td>Gout</td>
<td>60</td>
<td>9.8%</td>
<td></td>
</tr>
<tr>
<td>Cancer</td>
<td>11</td>
<td>1.8%</td>
<td></td>
</tr>
<tr>
<td>Allergy</td>
<td>63</td>
<td>10.2%</td>
<td></td>
</tr>
<tr>
<td>Arthritis</td>
<td>66</td>
<td>10.7%</td>
<td></td>
</tr>
<tr>
<td>Asthma</td>
<td>27</td>
<td>4.4%</td>
<td></td>
</tr>
<tr>
<td>Renal disease</td>
<td>7</td>
<td>1.1%</td>
<td></td>
</tr>
<tr>
<td><strong>Acute</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td>143</td>
<td>23.3%</td>
<td></td>
</tr>
<tr>
<td>Skin disease</td>
<td>53</td>
<td>8.6%</td>
<td></td>
</tr>
<tr>
<td>Others (e.g. Cosmetics)</td>
<td>41</td>
<td>6.7%</td>
<td></td>
</tr>
<tr>
<td>Keeping healthy</td>
<td>12</td>
<td>2.0%</td>
<td></td>
</tr>
</tbody>
</table>

The diseases reported in Table 4.4.1 were broadly classified as chronic and acute diseases. These two categories were cross tabulated to find out the extent to which they influence concomitant use of herbal medicine with conventional medicines.
Table 4.4.2 Influence of a disease on concomitant use of herbal medicine with conventional medicine.

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute</td>
<td>34.3</td>
</tr>
<tr>
<td>Chronic</td>
<td>63.9</td>
</tr>
</tbody>
</table>

It was found that 63.9% of respondents with chronic condition(s) were likely to concomitantly use herbal medicines with conventional medicines as compared with 34.3% of those who had acute illnesses. It is worth noting that some respondents with both categories of the diseases reported concomitant use of herbal medicines with conventional medicines. Therefore it was difficult to tell which category lead to their concomitant use of herbal medicine and conventional medicine. When this group of respondent was omitted in the analysis and only those who either had chronic or acute disease compared the result in Table 4.4.3 was obtained.

Table 4.4.3 Respondent who had chronic or acute condition who concomitantly used herbal medicine with conventional medicine.

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute</td>
<td>27.8</td>
</tr>
<tr>
<td>Chronic</td>
<td>84.3</td>
</tr>
</tbody>
</table>
A high proportion (84.3%) of respondent with chronic conditions reported using herbal medicine concomitantly with conventional medicine. Those that had acute conditions only 27.8% reported using herbs concomitantly with convention medicine. With regards to whether conditions for which the patient used herbs elicited concomitant use with conventional medicine, the results show that chronic conditions were more likely to elicit concomitant use than acute condition.

Table 4.4.4 Comparison of odds of patients with chronic illness being a concomitant user and those of patient with acute illness.

<table>
<thead>
<tr>
<th></th>
<th>Concomitant users</th>
<th>Non-concomitant users</th>
<th>Odds</th>
<th>Odd ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute</td>
<td>27.8</td>
<td>72.2</td>
<td>0.39</td>
<td></td>
</tr>
<tr>
<td>Chronic</td>
<td>84.3</td>
<td>15.7</td>
<td>15.7</td>
<td>13.8</td>
</tr>
</tbody>
</table>

The odds of patients with chronic illness being a concomitant user are 13.8 times greater than the odds of patients with acute illness being a concomitant user. This could imply chronic illness may predict concomitant use of herbs with conventional medicine.

4.5 Concomitant use of herbal medicine with conventional medicine

Data was collected on the use of herbal medicine with conventional medicine. Each of the demographic variables was analyzed whether it predicted concomitant use of the two kinds, herbal and conventional medicines. The purpose of this investigation was to
identify the proportion of participants who were using both conventional and herbal medicine concomitantly. Table 4.5.1 shows the respondents who used herbs concomitantly with conventional medicine and those who did not.

Table 4.5.1. Use of herbal and conventional medicine for the same condition

<table>
<thead>
<tr>
<th>Concomitant use</th>
<th>No. of respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herbs + conventional medicine</td>
<td>137</td>
<td>42.5</td>
</tr>
<tr>
<td>Herbs alone</td>
<td>185</td>
<td>57.5</td>
</tr>
<tr>
<td>Total</td>
<td>322</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* 1 Respondents did not respond

The concomitant use of conventional and herbal medicines was found to be at 42.5%, while those not using them concomitantly were at 57.5%.

Table 4.5.2 presents the levels of concomitant use of herbal and conventional medicine.

The table shows that age, ($\chi^2 = 72.06; \text{df} = 3; p = 0.001$), education ($\chi^2 = 46.03; \text{df} = 3; p = 0.001$), sex ($\chi^2 = 17.20; \text{df} = 1; p = 0.001$) and location of residence ($\chi^2 = 15.93; \text{df} = 2; p = 0.001$) are significantly associated with concomitant use of herbal products with conventional medicine. The table shows the concomitant use of herbal medicine with conventional medicine prevalent levels among the various respondents’ age groups. It was most prevalent (61.9%) among those aged 41-50 years. Concomitant use was noted to be lowest (13.9%) among those aged below 30 years.
Table 4. 5. 2. Concomitant use of herbal products with conventional medicine among herbal users and herbs use alone in Githunguri division.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>No. of respondents who use concomitantly</th>
<th>Percentage Of concomitant use</th>
<th>P value</th>
<th>Herbs users only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>≤30</td>
<td>5</td>
<td>13.9</td>
<td></td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>31-40</td>
<td>18</td>
<td>18</td>
<td></td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>41 – 50</td>
<td>65</td>
<td>61.9</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>&gt;50</td>
<td>50</td>
<td>61.0</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>138</td>
<td>50.0</td>
<td></td>
<td>185</td>
</tr>
<tr>
<td>Education level</td>
<td>No. formal education</td>
<td>32</td>
<td>76.2</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Primary school</td>
<td>15</td>
<td>28.3</td>
<td></td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>High school</td>
<td>64</td>
<td>38.3</td>
<td></td>
<td>103</td>
</tr>
<tr>
<td></td>
<td>Tertiary education</td>
<td>19</td>
<td>38.0</td>
<td></td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>130</td>
<td>51.1</td>
<td></td>
<td>182</td>
</tr>
<tr>
<td>Marital status</td>
<td>Single</td>
<td>17</td>
<td>38.6</td>
<td></td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Divorced /widowed</td>
<td>23</td>
<td>32.4</td>
<td></td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Monogamous</td>
<td>93</td>
<td>52.5</td>
<td></td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>Polygamous</td>
<td>5</td>
<td>21.7</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>137</td>
<td>51.1</td>
<td></td>
<td>176</td>
</tr>
<tr>
<td>Religion</td>
<td>Christian (Catholic)</td>
<td>44</td>
<td>41.1</td>
<td></td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Christian (protestants)</td>
<td>86</td>
<td>42.0</td>
<td></td>
<td>119</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>130</td>
<td>58.9</td>
<td></td>
<td>182</td>
</tr>
<tr>
<td>Occupation</td>
<td>Teachers</td>
<td>12</td>
<td>32.4</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Casual laborers</td>
<td>35</td>
<td>42.7</td>
<td></td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Business persons</td>
<td>31</td>
<td>48.4</td>
<td></td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Farmers</td>
<td>54</td>
<td>40.6</td>
<td></td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>132</td>
<td>59.4</td>
<td></td>
<td>184</td>
</tr>
<tr>
<td>Monthly income</td>
<td>≤ 9,999</td>
<td>31</td>
<td>41.3</td>
<td></td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>10,000-19,999</td>
<td>36</td>
<td>41.9</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>20,000-29,999</td>
<td>36</td>
<td>46.8</td>
<td></td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>≥30,000</td>
<td>27</td>
<td>36.5</td>
<td></td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>130</td>
<td>58.7</td>
<td></td>
<td>182</td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>51</td>
<td>30.2</td>
<td></td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>86</td>
<td>55.8</td>
<td></td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>137</td>
<td>69.8</td>
<td></td>
<td>186</td>
</tr>
<tr>
<td>Location of residence</td>
<td>Urban</td>
<td>33</td>
<td>64.7</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Sub urban</td>
<td>9</td>
<td>19.1</td>
<td></td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>107</td>
<td>47.6</td>
<td></td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>137</td>
<td>52.4</td>
<td></td>
<td>186</td>
</tr>
</tbody>
</table>
The findings above show that concomitant use was overwhelmingly prevalent (76.2%) among the respondents with no formal education. Those with secondary education (38.3%) were using the two medicines concomitantly. It was least found (28.3%) among those who had primary level of education.

An analysis of the percentage distribution of 323 users of herbal products show concomitant use of herbal medicine and conventional medicine was highest (46.8%) among the respondents with income level of less than 20,000 – 29,999 shillings. Concomitant use was least prevalent in those with income level of above 30,000. Those with income of more than 30,000 shillings had 47.4% of concomitant use.

The findings show that concomitant use of herbal medicine and conventional was highly prevalent (64.7%) among the urban dwellers and least prevalent (19.1%) among the suburban dwellers. It was expected to be most prevalent among the rural dwellers due to proximity of herbs but this was not the case.

4.5.1 Comparison of contentment level of those who concomitantly used herbs with conventional medicine and those who used herbs alone for treatments offered by Herbalists

Contentment level measured participant’s satisfaction with herbs administered in relieving conditions for which treatment was sought. This was mainly measured according to the result they get after the use of herbs given.
Table 4.5.3 Odds and odd ratios of contentment for herbal products users alone and herbal users concomitantly with herbal products given by herbalist

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Herbs + conventional drugs odds</th>
<th>Herbs alone odds</th>
<th>Odd ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>11.0</td>
<td>4.9</td>
<td>0.45</td>
</tr>
<tr>
<td>Sub-Urban</td>
<td>1.0</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Rural</td>
<td>0.59</td>
<td>13.0</td>
<td>22.0</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>0.6</td>
<td>6.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Divorced</td>
<td>1.0</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>Monogamous</td>
<td>4.0</td>
<td>10.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Polygamous</td>
<td>0.6</td>
<td>1.9</td>
<td>3.16</td>
</tr>
<tr>
<td>Widowed</td>
<td>0.9</td>
<td>2.1</td>
<td>2.3</td>
</tr>
<tr>
<td>Education Level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No formal education</td>
<td>0.77</td>
<td>0.52</td>
<td>0.68</td>
</tr>
<tr>
<td>Primary School</td>
<td>2.75</td>
<td>6.2</td>
<td>2.25</td>
</tr>
<tr>
<td>High School</td>
<td>0.48</td>
<td>10.29</td>
<td>21.4</td>
</tr>
<tr>
<td>Tertiary Education</td>
<td>3.75</td>
<td>5.5</td>
<td>1.47</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>11.0</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Casual Worker</td>
<td>0.35</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Business Person</td>
<td>0.93</td>
<td>28.0</td>
<td>30.1</td>
</tr>
<tr>
<td>Farmer</td>
<td>1.35</td>
<td>5.2</td>
<td>3.9</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;30</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>30-40</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>41-50</td>
<td>1.8</td>
<td>1.3</td>
<td>0.72</td>
</tr>
<tr>
<td>&gt;50</td>
<td>0.85</td>
<td>0.7</td>
<td>0.82</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>11.75</td>
<td>13.33</td>
<td>1.13</td>
</tr>
<tr>
<td>Female</td>
<td>0.315</td>
<td>9.2</td>
<td>29.2</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catholic</td>
<td>3.2</td>
<td>20.0</td>
<td>6.3</td>
</tr>
<tr>
<td>Protestants</td>
<td>0.48</td>
<td>9.6</td>
<td>20.0</td>
</tr>
<tr>
<td>Monthly income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤9,999</td>
<td>1.58</td>
<td>5.3</td>
<td>3.4</td>
</tr>
<tr>
<td>10,000 -19,999</td>
<td>0.33</td>
<td>12.67</td>
<td>38.4</td>
</tr>
<tr>
<td>20,000 – 29,999</td>
<td>1.13</td>
<td>5.5</td>
<td>4.9</td>
</tr>
<tr>
<td>≥30,000</td>
<td>1.08</td>
<td>14.0</td>
<td>0.08</td>
</tr>
</tbody>
</table>
Table 4.5.3 shows the odds and odd ratios of contentment of those who were using herbs concomitantly with conventional medicine compared with those who were using herbs alone. Location of residence (urban, OR 0.45), education level (no formal education, OR = 0.68), and age (41-50, OR = 0.72, >50, OR = 0.82) had low contentment of the treatment they were receiving from the herbalist. This could be linked to their concomitant use of herbs with conventional medicines.

4.5.2 Reason for using herbal remedy

The respondents outlined the reasons why they use herbs concomitantly with conventional medicine.

![Figure 4.5.2 Reason for using herbal remedy](image-url)
The Figure 4.5.2 above show the different reasons given by those who were using herbs. As expected most (59.8%) recorded lack of side effects as the major reason why they used the herbal medicine. Those who considered herbal medicine healthier compared to hospital medicine were 20.1%, while 17.3% believed that herbal medicines are natural. Very few, 0.6% had other reasons why they preferred herbal medicines. The reasons for preferring herbal medicines included; they were cheaper, readily available and efficacious.

4.5.3 Source of knowledge for use of herbal medicine

The table below presents the source from which the respondents learnt of the herbal use. This includes the people who may have significantly influenced the participants to opt for herbal use. There was a good response rate for only 3.1% of the respondents did not respond.

<table>
<thead>
<tr>
<th>Source of knowledge for use of herbal medicine</th>
<th>No. of respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended by family members or friends</td>
<td>211</td>
<td>67.4</td>
</tr>
<tr>
<td>Personal free will</td>
<td>78</td>
<td>24.9</td>
</tr>
<tr>
<td>Recommended by others e.g. media</td>
<td>24</td>
<td>7.6</td>
</tr>
<tr>
<td>Total</td>
<td>313</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*10 participants did not disclose source of knowledge
Table 4.5.4 shows how the participants started using the herbal medicines. Majority (67.4%) were recommended by their family members or friends. Those that started using herbal medicines on their own volition were 24.9%. Few, 7.6% said they were influenced by other things such as media.

4.5.4 Perception of herbal medicine with regard to conventional medicine

Table 4.5.5 Perception of herbal medicine with regard to conventional medicine

<table>
<thead>
<tr>
<th>Herbal medicine is superior</th>
<th>Herbs alone</th>
<th>Herbs + conventional medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>15.2</td>
<td>13.9</td>
</tr>
<tr>
<td>No</td>
<td>5.1</td>
<td>49.6</td>
</tr>
<tr>
<td>Sometimes</td>
<td>79.7</td>
<td>36.5</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*7 participants did not disclose their perceptions

The results in Table 4.5.5 show respondent’s perception of herbal medicine in comparison with conventional medicine. Majority of herb users alone (15.2%, 79.7%) believed that the herbal medicine is superior or is sometimes superior to the conventional medicine respectively. While those who were concomitantly using herbs with conventional medicine (13.9%, 36.5%) believed that herbs are superior or are sometime superior respectively. Those who felt herbal medicine is not superior were 5.1% of herbs user alone and 49.6% of concomitant users.
4.5.5 The cost of the herbal medicine

The cost of the herbal medicine was based on the perception of respondents when they compared with conventional medicines. They were to say whether herbal medicines were cheaper or expensive based on their prices only and not inclusive of other associated costs.

Figure 4.5.3 the participant’s perception on the cost of the herbal medicine

Figure 4.5.3 shows the respondents view on the cost of herbal medicine compared with the hospital medicine. Majority of herbs users alone (87.1%) believed that the herbal medicine is cheaper while those using herbs concomitantly (43.8%) consider them to be
cheaper than conventional medicine. Majority (56.2%) of the concomitant users believe herbs to be expensive compared to only (12.9) of those who use herbs alone.

4.5.6 **Respondent revealing the concomitant use to the herbalists**

The respondents who were concomitantly using herbs with conventional medicine were requested to state whether they informed the herbalist about it.

| **Table 4.5.6 Respondents revealing the concomitant use to the Herbalist** |
|-----------------|------------------|-----------|
| **Reveal**      | **No of respondents** | **Percentage** |
| Yes             | 46               | 34.3      |
| No              | 88               | 65.7      |
| Total           | 134              | 100.0     |

The results in Table 4.5.6 show how the herbal users revealed the concomitant use to the herbalist when they went for treatment. Majority, 65.7%, did not reveal to their herbalist while 34.3% recorded that they usually revealed their concomitant use to their herbalist.

4.6 **Other conditions that elicit use of herbs by participants**

4.6.1 **Non-medical conditions that elicits use of herbal medicine**

These are other non-illness conditions that contribute to the use of herbal medicine apart from the diseases shown in Table 4.4.1.
Table 4.6.1 Non-medical conditions that elicits use of herbal medicine

<table>
<thead>
<tr>
<th>Additional use of herbs</th>
<th>Responses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Vitality</td>
<td>57</td>
<td>1</td>
</tr>
<tr>
<td>Body growth booster</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>Supplements</td>
<td>65</td>
<td>79</td>
</tr>
<tr>
<td>Cosmetics</td>
<td>31</td>
<td>84</td>
</tr>
<tr>
<td>Slimming</td>
<td>8</td>
<td>45</td>
</tr>
<tr>
<td>Teeth whitener</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Improve sleep</td>
<td>53</td>
<td>0</td>
</tr>
<tr>
<td>Relaxation</td>
<td>43</td>
<td>4</td>
</tr>
<tr>
<td>Improve appetite</td>
<td>55</td>
<td>11</td>
</tr>
<tr>
<td>Incense</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>Bath</td>
<td>38</td>
<td>3</td>
</tr>
<tr>
<td>Teas</td>
<td>36</td>
<td>3</td>
</tr>
<tr>
<td>Magic</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Ritual oils</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4.6.1 represents the other conditions the respondents used herbal products for. Supplements, cosmetics, appetite improvement, vitality, slimming, and sleep improvement were other conditions contributing to use of herbal products apart from treatment of illnesses. The condition which the herbal products was most used for was
supplements by 144 of the respondents. This was followed by cosmetic at 115 respondents. Few respondents 9 were using herbal products for magic and very few (4) for rituals. It can also be noted that majority using these as supplements (79) and cosmetics (84) are females. Males mainly reported additional use of herbs as vitality (57).

4.7 Discussion

4.7.1 Demographic characteristics of herbal users

The study found that herbal users generally tended to be persons aged above 30 years (89.7%), had high school or higher education (69.5%), confessed protestant faith (68.8%) and were likely to be males (52.3%). In agreement with other studies, (Kelly et al, 2005, Chong et al, 2008) the older age group and having high school education or greater had higher prevalence of CAM use, especially the traditional remedies for treating ailments, whereas the younger group used more dietary supplements for the maintenance of health. This study also disagreed with these studies because male had high prevalence of herbal use in contrast to what these studies reported. This study also differed with a study done in Singapore (Lim, et al, 2005) which found that those who tended to use CAM had lower education level. Attaining a higher education positively influence the decision to use herbs this study suggest that in the absence of traditional knowledge regarding the medicinal use of herbs for, a higher educational level may predispose an individual to greater access to general knowledge, especially with greater exposure to the internet and other sources of information, and this could be a factor in positively influencing the individual's decision to use medicinal herbs. The availability of scientific evidence-based
information on the efficacy of herbs for diverse healthcare problems may be particularly significant in patients with the resources to avail themselves to such information, particularly those with higher educational and income levels. As expected a higher prevalence of herbal use in individuals living in rural areas was reported. Githunguri is mainly rural and rural areas are depots for traditional knowledge as was reported in Jamaica where rural respondents used a larger variety of herbs than those living in urban areas (Michi, 2010).

4.7.2 Commonly used herbs

In this study the most commonly used herbs were Warbugia ugandensis (23.6%), against malaria, allergies and pneumonia, Citrus aurantiifolia (16.5%), which used to treat common cold which is a respiratory infection and Melia azadirachta (10.1%) used to treat malaria, joint pains, amoeba, typhoid, ulcers and backache. This is similar to a study (Kereru et al, 2007) done in Embu and Mbeere in which W. ugadensis was identified as third most used herb. In Kareru’s 2007 study, malaria was identified as the most common disease that elicited use of herbal medicine (Kareru, et al, 2007). For this reason this plant and others should be conserved through cultivation. In addition, proper methods of harvesting should be used as a means of conservation of such multi-purpose medicinal plants.
4.7.3 Common diseases

This study found that the most common diseases that elicit the use of herbs were chronic diseases (55.4%). Studies have shown that certain factors such as presence of chronic illness may be predict CAM use (Lee et al, 2004). In another study in Malaysia (Hassan et al, 2009) patients with chronic illnesses reported high frequency of CAM use. The popularity of CAM indicated the patient’s preference towards holistic approach to health care.

4.7.4 Concomitant use of herbal medicine with conventional medicine

The concomitant use of conventional and herbal medicines was found to be at 42.5%. Majority of those concomitantly using herbs with conventional medicines had chronic illness. The contentment level of concomitant users was found to be low among the urban dwellers, those with no formal education and aged 41 years or more. Their perception on herbal medicine was lower compared to those who were using herbs alone. In addition majority believed that herbs were expensive and rarely revealed their concomitant use to their herbalist. This lack of communication about herbal use is an area of concern because of the potential for medication errors and untoward reactions to herb-drug interactions. Adverse drug-herb interactions pose a great danger for patients. For example, ginkgo biloba, garlic, and ginseng all may interact with Coumardin (warfarin sodium) and cause an increase in bleeding time (Miller, 1998, Norred, et al, 2001). Echinacea, an immunostimulant, can counteract the action of the immunosuppressants (e.g., the corticosteroids prednisone, methotrexate, and cyclosporine) used to treat
immune disorders (Parnhan, 1996, Wagner, 1988). The interaction between St. John's wort and cyclosporine—which is used to treat rheumatoid arthritis and psoriasis and to prevent the rejection of a transplanted organ—could result in decreased availability of cyclosporine and, consequently, to the worsening of arthritis or psoriasis or the rejection of a transplanted organ (Barone et al, 2001, Bredenbach et al, 2000 Ruschifzka et al, 2000).

Results from this study reveal that respondents, who had no schooling, were aged 41 years or older, were females (55.8%) demonstrated a greater tendency to practice concomitant herb–drug use. This contrasts with findings in the population of pharmaceutical drug users (Delgoda et al., 2010) where concomitant herb–drug use, amongst those with no schooling, was comparable to those with tertiary education and was not found to be linked significantly with employment status or age. Concomitant herb–drug use in the elderly raises particular concern about possible adverse drug reactions (ADRs) resulting from herb–drug interactions

This study also noted that majority of those who used herbal medicine concomitantly with conventional medicine believed that herbs do not have side effect (59.8%), while the rest believed that they are healthier or natural. This study proposes that this perception could further consolidate the perception that this potentially dangerous practice is safe and encourage further 'uninformed' herb-drug concomitant use. Elsewhere (Eisenberg et
patients indicated that concomitant herb-drug use was more beneficial than when either herb(s) or drug(s) were used alone.

4.7.5 Non-medical condition that lead to use of herbal medicines

Non-medical condition that mainly contributed to use of herbs included supplements and cosmetic. Often, people believe (Heller, et al, 2006) that since herbal medications and supplements are promoted as natural, they are safer and less likely to cause side effects than prescription medications. This is not always the case. The fact is that 30% of all modern conventional medicines are derived from plants, and herbal supplements often have significant medicinal activity, as well as potential for adverse effects and drug interaction (Heller, et al, 2006). The concept of beauty and cosmetics is as ancient as mankind and civilization. Women, and these days some men, are obsessed with looking beautiful. So, they use various beauty products that have herbs to look charming and young. Herbal formulations always have attracted considerable attention probably because they are promoted as having lesser or nil side effects compared with synthetic drugs. It is known that one traditional medicine product may be classified as foods in one region or dietary supplements or herbal medicines in some other region(s) (WHO-AFRO, 2010). This indicates the need of standardization.
CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS.

5.1 Overview of summary, conclusions and recommendations.
This chapter sums up the findings of the research, outlines implications of the study findings, conclusions based on the research findings, recommendations and suggestions for further research.

5.2 Conclusions
The study set up to establish concomitant use of herbal products in Githunguri Division, Kiambu County. In the study, concomitant use of the herbal remedies was calculated for various social demographic factors including gender, age, marital status, residence, income, occupation and education level. The following conclusions can therefore be made from the results discussed above.

1) Majority of herbal users were aged above 40 years and had high education.

2) The most commonly used herb was Warbugia ugadensis and Citrus aurantiifolia, which were mainly used to treat malaria, allergies, pneumonia and typhoid. This is similar to a study done in Embu and Mbeere in which Warbugia ugadensis was identified as third most used. In this study, malaria also was identified as the most common disease that elicited use of herbal medicine (Kareru, et al., 2007).

3) The most frequent conditions for which herbs were concomitantly used were chronic conditions like arthritis, allergy, gout, diabetes, high blood pressure and asthma. Most of the chronic illnesses set in at age of 40 years and above and this could be the reason why majority of those using herbal medicine were found to be above 40 years.
4) Supplements and cosmetics are other conditions mainly contributing to use of herbs apart from treating illnesses. Herbal formulations always have attracted considerable attention probably because they are promoted as having lesser or nil side effects compared with synthetic drugs.

5) Concomitant use of herbal medicine with conventional medication was highly prevalent (42.5%). This is important because concomitant use of herbal medicine with conventional medicine will likely place these patients at risks for possible adverse interactions. Numerous studies have shown that herbal medicines interact with conventional medication (Valli and Giardina, 2002). Most of the participants used herbal medicines based on advice and information obtained from relatives, friends or through the media. Often, these kinds of advice or recommendations were unsubstantiated and persons were not informed of any potential adverse effects.

5.3 Recommendations

From the conclusions above, the following recommendations can be made.

1) The ministry of health should ensure that correct information on dangers of concomitant use of herbs with conventional medicine is disseminated to general public and is readily accessible in language which most people can understand. This will enable people to make informed choice on use of herbs concomitantly with conventional medicine.

2) Strategies should be set to minimize the potential drug-herb interactions especially for patients with chronic illnesses.
3) The popular and ubiquitous use of herbal medicines is a reality that the Ministry Of Health cannot afford to ignore; it prompts a re-evaluation of the issue of optimal integration of herbal medicines with the western dominated health care systems.

4) As the same kind of herbal medicine may be classified as dietary supplement or food or medicine depending on a country, the question of standardisation should be addressed.

5.4 Suggestion for further research

1) Further studies are needed determine prevalence of adverse effect on those who concomitantly use herbs with conventional medicine.

2) Further studies are needed to develop effective interventions for primary health care professionals and patients to improve medication safety by eliminating potential adverse herb drug interactions and medication errors.

3) More research is needed on the efficacy of most herbal remedies.

4) Further studies are needed to establish how traditional medicine can be brought into the fold of the Kenya health system, in a way that would foster improved regulation and safety standards while also enabling this widespread practice to have a legitimate role in Kenyans overall health strategy going forward.

5) It is worth investigating reasons why respondents do not inform their health provider their concomitant use of herbs with conventional medicines. This is of concern because of the potential for medication error and untoward reactions to herb- drug interactions.
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APPENDICIES

APPENDIX I

INFORMED CONSENT

Name…………………………………….. (Investigator) is a student at Kenyatta University requesting your participation in a research study whose purpose is to determine factors driving concomitant utilization of herbal medicine in Githunguri Division. Your participation will involve answering questions to provide information relevant to the research. The research does not involve any experimental aspect. The expected duration of participation is one hour. There are no foreseeable risks or discomforts if you agree to participate in the study. The research has no possible direct benefits to your participation but the society may benefit in future should the results of this study be found applicable. The results of this research study may be published, but the name or identity of participants or their place of work will not be revealed. The investigator will maintain independence from possible attempts by interested parties/bodies to bias results. Security of data during and after completion of the research will be ensured. The participants will not be compensated for their participation. A copy of the final results will be donated to the sub-chief should you wish to know the outcome of the study. Any question you may have concerning the research study of your participation in it, before or after your consent, will be answered by:

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1. Francis N. Githinji (investigator), Tel No. 0724274083 or
2. Prof Nicholas Gikonyo Tel No 0722763186 or
3. Dr Daniel Akunga Tel No 0722552157,

all of Kenyatta University School of Health Sciences Department of Pharmacy and alternative medicine and public health respectively.

“I have read the above information. The nature, demands, risks and benefits of the project have been explained to me. I knowingly assume the risks involved and understand that I may withdraw my consent and discontinue participation at any time without penalty or loss of benefit to myself. In signing this consent form, I am not waiving any legal claims, rights or remedies. A copy of this consent form will be given to me”.

Participant’s
signature……………………………………………………………Date…………………

I certify that I have explained to the above individual the nature and purpose, the potential benefits, and possible risks associated with participation in this research study and I have answered any questions that may have been raised and I have witnessed the above sign. I have also provided the participant with a copy of this signed consent document”.

Investigator     Francis N. Githinji

Signature………………………………………………………………………………..Date…………………
SEHEMU YA I
RHUSA YA KUFANYA UTAFITI

Jina .................................................................(mtafiti) ni mwanafunzi wa Chuo Kiku Cha Kenyatta ambaye anaomba kushiriki kwenu katika utafiti ambao lengo lake ni kujua mambo ambayo yanachangia kuongezeka kwa matumizi ya dawa za kienyenji kwa wakati mmoja na dawa za hospitali taarafa ya Githunguri. Kushiriki kwenu kutajumuisha kujibu maswali ambayo yataonyesha hoja kuhushu utafiti.


Takwimu zote zitakayokuzwa zitalidwa vilivyotatsuma na baada ya utafiti. Washiriki hawatalipwa fidia kwa kushiriki kwao. Nakala moja ya matooke itapatiwa na kazi la hospitali na chifu ili uweze kutazama matooke ukita.

Ukiwa una swali lolote kuhusu utafiti huu au kuhusu kushiriki kwako unaweza kuwasiliana na:

1. Francis N. Githinji (mtafiti) simu: 0724274083
2. Prof. Nicholas Gikonyo simu: 0722763186
3. Dkt Daniel Akunga, simu: 0722552157
au Shule ya Sayansi ya Afya Chuoni Kenyatta.

“Nimesoma habari hiyo ilivyo, mahitaji, madhara na manufaa ya utafiti huu nimeelezwa, ninajua madhara yanayohusika na ninaelewa ya kwamba nina uhuru wa kutoendelea kushiriki wakati wowote bila kuadhibiwa au kupoteza faida zangu. Ninatia sahihi fomu hii ya ruhusa bila kulegeza malalamishi yoyote rasmi, haki na ukarabati. Nitapatiwa nakala ya fomu ya ruhusa.

Mushiriki

Sahihi

……………………………………………………………………………………………………………………

tarehe

……………………………………………………………………………………………………………………

“Ninakubali nimemweleza mshiriki umbo na maana, faida zilizoko na madhara yanayotarajiwa katika kushiriki utafiti. Nimejibu maswali yote yaliyoulizwa na nimeshuhudia sahihi ilio hapo juu.”

“nimempatia mshiriki nakala ya fomu hii iliyotiwa sahihi.”

Mtafiti: Francis N. Githinji.

Sahihi ……………………………………… Tarehe ………………………

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APPENDIX II

QUESTIONNAIRE FOR HERBALIST

Data collection instrument

This questionnaire is an information collecting tool for a study whose objective is to establish the factors driving the utilization of herbal medicines in Githunguri Division, Kiambu County and will be used for purpose of this study only. All information volunteered will be treated with utmost confidentiality

1. Name of the herbal clinic…………………………………………………

2. The sex of the Herbalist.

   Male         [ ]

   Female       [ ]

3. How old are you?  ----------- Years old.

4. What is your current marital status?

   Monogamous Marriage    [ ]

   Polygamous marriage    [ ]

   Divorced              [ ]

   Widowed               [ ]

   Single/unmarried       [ ]
5. Religion of the respondent
   - Christian (Catholic) [ ]
   - Christian (protestant) [ ]
   - Muslim [ ]
   - Other (specify) ...........................................

6. What highest level of formal education did you attain?
   - Primary [ ]
   - High school (O-level) [ ]
   - College training [ ]
   - University [ ]
   - No formal education [ ]

7. How did you learn to treat using herbs?
   (i) Learnt from parent [ ]
   (ii) Learnt from relatives other than parents [ ]
   (iii) Learnt from other healers [ ]
   (v) Other source(s) (specify) .................................................................

8. For how long have you practised this trade? --------- years

9. How do you package herbal medicine? (Please tick whatever is appropriate)
   - Plastic paper [ ]
   - Newspaper [ ]
   - Plastic bottle [ ]
   - Glass bottle [ ]
   - Others (specify) .................................................................

10. Do you give instructions for storage of prescribed herbal materials?
    Yes [ ]
    No [ ]
    Not sure
11. Which diseases do you treat? (Check all that apply)

High blood pressure [ ] Diabetes [ ] Gout [ ] Cancer [ ] HIV/AIDS [ ]
Malaria [ ] Arthritis [ ] skin diseases [ ] common Cold [ ]

Others (specify) ………………………………………………………………………………………………………………………

12. Of the herb or herbal product you have treated with, please indicate which of the herbs listed below you used and specify why you used them (check all that apply)

Herbal/Herbal products: Why did you use it to treat?

- *Ajuga remota* (Wanjiru wa rurii) [ ]
- *Carissa edulis* (mukawa). [ ]
- *Citrus aurantiifolia* (Ndimu). [ ]
- *Melia azadirachta* (Muarubaine) [ ]
- *Ricinus communis* (Mubariki) [ ]
- *Urtica mossaica* (Thabai) [ ]
- *Crinum macananii* (Gitunguru kia ngoma) [ ]
- *Eucalyptus saligna* (Mubau) [ ]
- *Warbugia ugadensis* (Muiri) [ ]
- *Bidens pilosa* (Mucege). [ ]
- *Neobotania macrocalyx* (Mutundu) [ ]
- *Euphobia joyae* (Kariaria) [ ]

Other (specify below) Why did you use it (specify below).

13. For the diseases you have ticked/ listed (11) above, do you use one herb to treat each disease or a combination of herbs? ………………………………………………….
14. How do you ensure that the herbs you use in combination do not interact to cause harm to the patient?

- Herbs do not react with each other.
- Carry out test in advance.
- No caution is taken
- Any other, specify……………………………………………………………………

15. Do the patients you treat use conventional medicine for the condition they seek herbal treatment? Yes [ ] No [ ]

16. Other than treating illnesses, what other conditions do you apply herbs for? (please tick where appropriate. Check all that apply).

- Vitality [ ] Hip booster [ ] Supplements [ ] [ ] cosmetics
- Slimming [ ] Tooth whitener [ ] improve sleep [ ] relaxation [ ]
- Improve appetite [ ] Incense [ ] Bath [ ] teas [ ]
- Magic Oils for Rituals [ ]
- Other (specify)……………………………………………………………………

Thank you for your cooperation
APPENDIX III

QUESTIONNAIRE FOR PARTICIPANTS

Data collection instrument

This questionnaire is an information collecting tool for a study whose objective is to establish the factors driving the utilization of herbal medicines in Githunguri Division, Kiambu County and will be used for purpose of this study only. All information volunteered will be treated with utmost confidentiality

1. Name of herbal clinic attended………………………………………………………………………………

2. Sex of the subject.

   Male [ ]
   Female [ ]

3. a) Where do you live?
   b) Location of residence.
      • Urban [ ]
      • Suburban [ ]
      • Rural. [ ]

4. How old are you?  --------- Years old.

5. What is your current marital status? Single/never married [ ]
   Divorced/separated [ ] monogamous Marriage [ ] polygamous [ ]
   marriage [ ] Windowed [ ]
6. What faith do you profess?
   Christian (Catholic) [ ]
   Christian (protestant) [ ]
   Muslim [ ]
   Other (specify) ………………………………………………………

7. What is the highest level of formal education did you attain?
   Primary School [ ] High School (O level) [ ] College [ ]
   University [ ] No formal education [ ]

8. What is your current occupation? Teacher [ ] Casual laborer [ ]
   businessman [ ] contractor [ ]
   Other (specify) ……………………………………………………………

9. What is your total income in Kenya shillings in a month?
   • <2,000 [ ]
   • 2,001 – 9,999 [ ]
   • 10,000 – 19,999 [ ]
   • 20,000 – 29,999 [ ]
   • >30,000 [ ]

10. How would you rate your current state of health?
    Excellent [ ] Good [ ] Fair [ ] Poor [ ] Very poor [ ]

11. Which disease do you use herbal medicine for? Diabetes [ ]
    High blood pressure [ ] gout [ ] Cancer [ ] HIV/AIDS [ ]
    Malaria [ ] Skin diseases [ ] Allergy [ ] Arthritis [ ]
Asthma [ ]  Renal disease [ ]  Heart disease [ ]  Depression [ ]

Others (specify) …………………………………………………………………

12. Of the herb or herbal product you have used to alleviate your illness with (please indicate which of the herbs listed below you used and specify why you used them. Check all that apply)

Herbal/Herbal products:  Why did you use it to treat?

- *Ajuga remota* (Wanjiru wa rurii) [ ]
- *Carissa edulis* (mukawa). [ ]
- *Citrus aurantiifolia* (Ndimu). [ ]
- *Melia azadirachta* (Muarubaine) [ ]
- *Ricinus communis* (Mubariki) [ ]
- *Urtica mossaiica* (Thabai) [ ]
- *Crinum macananii* (Gitunguru kia ngoma) [ ]
- *Eucalyptus saligna* (Mubau) [ ]
- *Warbugia ugadensis* (Muiri) [ ]
- *Bidens pilosa* (Mucege). [ ]
- *Neobotania macrocalyx* (Mutundu) [ ]
- *Euphobia joyae* (Kariaria) [ ]

Other (specify) …………………………………………………………………

Why did you use it (specify) ……………………………………………………

13. a). Are there times you use conventional medicines for the disease you have mentioned in (12) above?  Yes [ ]  No [ ]
b). If (13a) is yes, do you use the conventional medicines together with herbal medicine or at different times? Together [ ] different times [ ]

c) Are you contented with the treatment you receive?

   Yes [ ] No [ ]

14. Why do you use herbal remedies?

   Natural [ ]

   Healthy [ ]

   No side effect [ ]

   Other (specify) ……………………………………………………………………………………………………….

   ……………………………………………………………………………………………………………………………

15. When did you start using herbal medicines?

   Year …………… month ………

16. Why did you start using herbal medicine?

   Recommended by family members or friends. [ ]

   Your own free will [ ]

   Recommended from a physician [ ]

   Others ………………………………………………………………………………………………………

17. In your opinion, is herbal medicine superior to CM?

   Yes [ ]

   No [ ]

   Sometimes [ ]

   95
18. Are you treated by a specific herbalist or several?

Specific [ ]        Several [ ]

19. Are herbal remedies alone sufficient to relieve symptomatic episodes?

Yes [ ]         No [ ]

20. Do you consider herbal medicine expensive or cheap?

Expensive [ ]       Cheap [ ]

21. Where do you obtain your herbs or medicinal plants from?

- Backyard [ ]
- Supermarkets [ ]
- Herbal clinic [ ]

22. For how long have you suffered this disease you have been using herbal treatment?

- 1 Year and below [ ]
- 2 Years – 6 Years [ ]
- 7 Years – 11 Years [ ]
- 12 Years – 16 Years [ ]
- Over 16 years [ ]

23. From the initial stages you were diagnosed with the disease, have you been using herbal medicines or you started with conventional medicines?

- Used herbal medicine from the start [ ]
- Started using herbal medicine at some stage of the disease. [ ]
- Used both hospital and herbal from the beginning. [ ]
24. If your answer in (23) above is started using herbal medicine at some stage of the Disease, which drugs were you using initially?

- Conventional medicine
- None

Any other (Specify) ..............................................................

25. If you were using conventional medicine from the beginning, what caused you to switch to herbal medicine?

- Side effects of hospital medicine
- Hospital medicine was not yielding relief
- Got bored with long use of hospital medicine
- Desperation to get cured

26. Do you follow the doctor’s prescription faithfully?

Yes [ ] No [ ]

27. If you use herbal medicine and conventional medicine to treat this disease at the same time, do you reveal to your herbal use to the doctor?

Yes [ ] No [ ]

28. When you compare conventional medicine and herbal medicine, which of the two relieves you much?

- Hospital medicine
- Herbal Medicine
- A combination of both
29. Other than taking herbal products to cure illnesses, which other conditions do you use the herbs for? (Please tick where appropriate, check all that apply).

Vitality  Hip booster  Supplements  cosmetics
Slimming  Tooth whitener  improve sleep  relaxation
Improve appetite  Incense  Bath  teas  Magic
Oils for Rituals

Other (specify)………………………………………………………………………………

Thank you for your cooperation
SEHEMU YA II

Hojaji

Ukusanyaji data.


1. Jina la kliniki

2. Jinsia ya

Mwanamume [ ]
Mwanamke [ ]

3. Una umri wa miaka mingapi? ......................

4. Eleza hadhi yako ya ndoa.

Ndoa ya mke/mume mmoja [ ]
Mitala [ ]
Talikiwa [ ]
Mjane [ ]
Mseja/sijaoa/sijaolewa [ ]
5. Dini ya mhojiwa.

Mkristo (mkatoliki). [  ]
Mkristo (mprotestanti) [  ]
Mwislamu [  ]
Nyingineo (itaje). [  ]


Shule ya msingi [  ]
Shule ya upili [  ]
Vyuo [  ]
Chuo kikuu [  ]
Hujasoma [  ]

7. Ulijifunzaje kutibu kwa tiba za kienyeji

Kwa mzazi [  ]
Jamaa yangu [  ]
Waponyaji [  ]

Wengineo (wataje)

8. Umefanya hii biashara ya tiba za kienyeji kwa miaka mingapi? ---------


Mfuko wa nailoni [  ] Gazeti [  ] chupa za plastiki [  ] Chupa ya glasi [  ]

Nyinginezo (zitaje) ........................................................................................................

10. Unatoa maelezo au maagizo kuhusu jinsi ya kuhifadhi dawa za kienyeji?

Ndio [  ] Hapana [  ] Sina uhakika [  ]

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Shinikizo ya damu [ ] kisukari [ ] Saratani [ ] Ukimwi [ ] Homa ya 
malaria[ ] Magojwa ya ngozi [ ] Mafua [ ]

Menginezo (Taja).................................................................

12. Kwa dawa za kienyeji unazotumia kutibu, tafadhali taja mimea kati ya 
iliyoorodheshwa ni ipi uliyotumia na kwa kutibu nini?

<table>
<thead>
<tr>
<th>Miti ya kienyeji/Herbal products:</th>
<th>ulitumia kutibu nini?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ajuga remota (Wanjiru wa rurii)</td>
<td>[ ]</td>
</tr>
<tr>
<td>Carissa edulis (mukawa).</td>
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<tr>
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<tr>
<td>Melia azadirachta (Muarubaine)</td>
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<td>Ricinus communis (Mubariki)</td>
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<td>Bidens pilosa (Mucege).</td>
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<tr>
<td>Neobotania macrocalyx (Mutundu)</td>
<td>[ ]</td>
</tr>
<tr>
<td>Euphobia joyae (Kariaria)</td>
<td>[ ]</td>
</tr>
<tr>
<td>mingine (taja)</td>
<td>kutibu nini (taja).</td>
</tr>
</tbody>
</table>

13. Katika maradhi uliochagua au kuadika katika swali la (11) unatumia mimea tofauti 
au ni mmea mmoja kutibu.
14. Ni vipi una hakikisha ya kuwa dawa za kienyeji unazotumia hazisababishi madhara yoyote kwa mgonjwa?

Viungo vya mimea ya dawa vinavyokinza. [ ]
Fanya majaribio kwanza. [ ]
Hakuna tahadhari iliyochukuliwa [ ]
Taja nyingineo kama kunayo. [ ]

15. Mgonjwa unayetibu huwa anatumia dawa za hospitali kwa ugonjwa huo?

Ndio [ ] La [ ]


Kuongeza nguvu za kiume [ ] kunenepesha kiweo [ ] Dawa za [ ]
kutimiliza [ ] vipodozi [ ] kupunguza unene [ ] kufanya meno
meupe [ ] kuwezesha kulala [ ] Pumzisha [ ] Kuongeza haja ya
chakula [ ] Fukiza [ ] Kuoga [ ] Kwa chai [ ]
Uganga [ ] Mafuta ya kutakaza [ ] Mengine (taja)

Asante kwa kushiriki