UTILIZATION OF HERBAL MEDICINE AMONG CHILDREN UNDER 5 YEARS OF AGE IN THARAKA NITHI COUNTY, KENYA

BY

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FEBRUARY, 2016
DECLARATION

This thesis is my original work and has not been presented for purposes of an examination or any other award in any other institution or award.

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Kenyatta University
DEDICATION

This research is dedicated to my beloved parents, Samuel Nzuki Kiilu and Mary Mbithe Nzuki, my brother Dan and sisters Faith and Claris.
ACKNOWLEDGEMENT

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

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

My appreciation also goes to the Ministry of Science and Technology, the Medical Officer of Health Tharaka Nithi County, Kenyatta University Graduate School for granting me permission to do this work. I thank Kenyatta University Ethical Review Committee for granting ethical clearance for this study. I am grateful to the Department of Community Health and Kenyatta University for granting me the opportunity to go through this course.

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Lastly, I am very grateful to brother and sisters for their understanding and support during the course of my study.
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## ABBREVIATIONS AND ACRONYMS

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<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>APHRC</td>
<td>African Population and Health Research Center</td>
</tr>
<tr>
<td>KDHS</td>
<td>Kenya Demographic Health Survey</td>
</tr>
<tr>
<td>KEMRI</td>
<td>Kenya Medical Research Institute.</td>
</tr>
<tr>
<td>KNBS</td>
<td>Kenya National Bureau of Statistics</td>
</tr>
<tr>
<td>MDG</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>NACOSTI</td>
<td>National Commission of Science, Technology and Innovation</td>
</tr>
<tr>
<td>NCAPD</td>
<td>National Coordinating Agency for Population and Development</td>
</tr>
<tr>
<td>NHSSP II</td>
<td>National Health Sector Strategic Plan II</td>
</tr>
<tr>
<td>SPSS</td>
<td>Statistical Package for Social Sciences</td>
</tr>
<tr>
<td>TMs</td>
<td>Traditional medicines</td>
</tr>
<tr>
<td>U.S</td>
<td>United States</td>
</tr>
<tr>
<td>USSDFFDA</td>
<td>U.S. department of Health and Human services Food and Drug Administration</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</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.

Medicinal product: 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, correcting or modifying physiological functions in human beings or animals.

Herbalist: An herbalist is traditional medical practitioner whose specialization lies in the use of herbs to treat various ailments. S/he is supposed to be knowledgeable in the efficacy, toxicity, dosage, and compounding of herbs.
<table>
<thead>
<tr>
<th><strong>Herbal medicine:</strong></th>
<th>Herbal medicines include herbs, herbal materials, herbal preparations and finished herbal products.</th>
</tr>
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<tbody>
<tr>
<td><strong>Medicinal plant:</strong></td>
<td>A plant (wild or cultivated) used for medicinal purposes.</td>
</tr>
<tr>
<td><strong>Herbs:</strong></td>
<td>Crude plant materials such as leaves, flowers, fruit, seed, stems, wood, bark, roots, rhizomes or other parts.</td>
</tr>
<tr>
<td><strong>Herbal materials:</strong></td>
<td>Herbs, fresh juices, gums, fixed oils, essential oils, resins and powders</td>
</tr>
<tr>
<td><strong>Herbal preparation:</strong></td>
<td>Powdered herbal materials, extracts, tinctures and fatty oils of herbal materials.</td>
</tr>
<tr>
<td><strong>Herbal supplements:</strong></td>
<td>Non-pharmaceutical, non-food substances marketed to improve health.</td>
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</table>
ABSTRACT
The use of herbal medicine is on the rise globally, especially in developed countries. Indeed, over 80% of the populations in developing countries depend on herbal medicine. In Kenya herbal medicine is widely used, with 70% of the population having been reported to be dependent on it for primary health care. The World Health Organization (WHO) warns that growing use of traditional medicine, both in developed and developing nations, has been mirrored by an increasing number of reports of adverse effects and deaths. The indications are that there is increased child mortality due to herbal medicine use and concomitant use of herbal medicine and conventional medicine among under-five years of age. This study examined the utilization of herbal medicine among under-five years of age in Maara division, Tharaka Nithi County. The study was descriptive cross sectional in design and used structured interviews, questionnaires, and Focus Group Discussions (FGDs) Guide as instruments for collecting both quantitative and qualitative data. The study was located in Mwimbi Division in Tharaka Nithi County, an area covering 1570 square km with a population of 64,380 people. The instruments were pretested at Muthambi division in Tharaka Nithi County. A sample of 350 parents and guardians of under-five years of age children from five locations across the division were used for the study. In addition, 10 conventional health care practitioners were sampled through purposive sample. Data was analyzed using Statistical Package for Social Sciences (SPSS) version 17.0 software. Percentages, frequencies, cross tabulations, and pie charts were used to present the data. Chi-square test of independence was applied to identify the relationship between the basic socio-demographic characteristics and use of herbal medicine, with the level of significance at 0.05. The study revealed that herbal medicine use among under five years children is high (89.4%) in the county. Age of under-five children, education level, occupation, monthly income and location of residence of caregivers had significant relationship with the use of herbal medicine. The study revealed that herbal medicine were mostly used in the treatment of gastrointestinal diseases (26.2%), respiratory disorder (19.2%), skin diseases/trauma (16.4%) and Malaria (10.9%), the study also found that there is a strong belief in the potency of herbal medicine making its role in health care delivery significant. The most commonly used herbs were Erythrina abyssinica (35.1%) and Amaranthus hybridus (32.9%). Concomitant use of herbal medicines with conventional medication was reported by 50.2% of herbal users. Apart from treating illnesses, the need for supplement, growth improvement, and appetite improvement were other conditions contributing to the use of herbal medicines. Often, 70.2% of parents/guardians believed that since herbal medicines and supplements are promoted as natural, they are safe and less likely to cause side effects than prescription medication. The study recommends that the ministry of health should ensure that correct information on dangers of concomitant use of herbs with conventional medicine is disseminated to general public. Finally, the ministry of environmental and natural resources should ensure conservation of the very popular herbs for future generations.
CHAPTER ONE: INTRODUCTION

1.1 Background information

Long before the advent of conventional medicine in Africa, traditional medicines, including the use of herbs was the main remedy for nearly all ailments (WHO, 2008). Today, notwithstanding the increasing use of modern medicine in Kenya, herbal medicine use is also hugely practised and many continue to rely on it for their health care.

Herbal medicine has played a significant role in health care delivery. It is estimated that approximately 80% of the world’s population rely on traditional medicine, in one way or the other, for health care. Moreover, an estimated 80% of the people in developing countries and 80% of Africans rely on herbal medicine to meet their primary health care needs. The annual global market for herbal medicines in year 2000 was over US$60 billion and is growing steadily at a rate of fifteen to twenty five percent (WHO, 2008).

Countries like China, India and Sri Lanka have achieved tremendous success in developing their herbal medicine sector. In these countries, herbal medicines are highly developed, well documented, and practiced not only at the family, community, and primary health care levels, but also in hospitals where they provide secondary and tertiary care. Again, herbal practices in these countries are based on systematic knowledge, comprehensive methodology, and rich clinical experiences (Verma and Singh, 2008; WHO, 2008).
In Kenya, about 70% to 75% of the population rely on herbal medicine for their primary health care. Also, herbal medicine is the first line of treatment for more than 60% of children with high fever resulting from malaria (WHO, 2008). There is, on average, one traditional medical practitioner for every 400 people, compared to one biomedical doctor to 12,000 people in Kenya (WHO 2008). Indeed, various researchers have found that herbal medicine is effective, more readily available, affordable, culturally acceptable, and is consistently being argued as an easily accessible health care system that can aid and complement government’s efforts at ensuring quality and equitable health care. In some rural communities, herbal medicine is the only form of health care that is available, affordable and accessible (Darko, 2009).

The Kenya Demographic Health Survey (KDHS) 2008/09 shows that the under five mortality rate stands at 74 per 1000 live births with cough, fever, diarrhea, skin problems and eye diseases, making up the top 5 causes of morbidity(APHRC, 2005). Though this is an improvement as compared to the 2003/2004 KDHS which was at 115 per 1000 live births, something needs to be done to accelerate the achievement of MDG 4 which aims at reducing child mortality by two thirds, between 1990 and 2015, the under-five mortality rate.

Herbal medicine is defined as medicine made exclusively from plants. It is used in many Kenyan societies and is indigenous to many cultures. It is becoming more mainstream as improvements in analysis and quality control along with advances in clinical research show the value of herbal medicine in treating and preventing disease.
According to Merritt-Charles et al (2009) use of herbal medicine is on the increase among the under-fives. Herbal medicines among the under-fives are used to treat many conditions, such as asthma, eczema, pneumonia, malaria, colds, cough and cancer, among others.

The Kenyan Government launched a Child Survival and development Strategy that was budgeted in 2009 as an effort to accelerate child survival and provide a framework to improve indicators for children. The strategy is guided by the National Health Sector Strategic Plan II (NHSSP II) and the Vision 2030 Medium Term Plan that aims at reducing inequalities in the health care services and improve on the child health indicators.

A study by the National Council for population and Development 2005 has reported a widespread use of herbal medicine. Some herbal therapies have potentially harmful side effects as well as adverse interactions with conventional medications. Data is lacking in the use in children and caregiver understanding of these products. It is for this reason that action is needed to look into the use, safety, efficacy, quality and standardization – to protect heritage and to preserve traditional knowledge. In developing nations, access to essential conventional medicines is severely restricted by lack of resources and poverty (NCPD, 2005).

There lacks proper documentation regarding the underlying factors leading to increased utilization of herbal medicines. This study seeks to establish the use of herbal medicine among the under-five years in Mwimbi division Tharaka Nithi County.
1.2 Statement of the Problem

Given the increased use of herbal medicines, possibilities that would ensure their successful integration into a public health framework should be explored. Child mortality has been on the increase with a large number of children dying from diseases like diarrhea, pneumonia, malaria and other infections (Kabi, 2004). This is compounded by the fact that health services are expensive, especially to the poor Kenyans who are the majority (Kabi, 2004). Most people have resorted to the use of traditional medicine and especially in the Tharaka Nithi County community.

Reports have indicated that patients/guardians do not disclose to their physician their previous usage of herbal medicine (Eisenberg et al, 2010). Buck and Michel (2010) express that “health care providers can play an important role in educating patients and their parents about the potential risks of herbal therapies and the need to closely monitor any use in children.” The more knowledge healthcare professionals acquire on herbal medicine therapies, such as herbal use, the better they can empower caregivers to make informed decisions on whether herbal usage is appropriate for their children. By providing an open atmosphere, caregivers will likely be more receptive to advice on important issues surrounding herbal usage such as safety, risks and benefits.

However, a number of herbs could cause adverse effects due to adulteration, plant and drug interactions, and effects that are sometimes life threatening or lethal thus contributing to high child mortality evidenced in Africa. In Nigeria, a mortality of 9.1% among children who had been given herbal medicine has been reported (Opaneye,
2008). This led international health organizations to advise governments to initiate National guidelines for regulations of herbal remedies. The Kenya government in response to this developed a session paper on traditional medicine, 2009 though it has not been debated by parliament (Vongo, 2009).

The Kenya Constitution (2010) also laid emphasis on the importance of culture as the foundation of the Nation and the role of indigenous technologies and science in national development. The broad roadmap provided by the revitalized National Industrialization Policy which lists several sub-sectors selected for harnessing to contribute to the national industrialization agenda, and the objectives of the Kenya Vision 2030 provide more impetus for identifying additional priority drivers for socio-economic development. While the global market of natural products is quite colossal and rapidly growing, the potential of this sub-sector remains un-tapped in Kenya and the region, despite being well endowed in cultural and natural resources.

The absence of a supportive policy environment is key among the impending factors (Natural Product Industry Policy Draft, 2012). In spite of the fact that Kenya is aware of their lack of quality, many patients still throng these facilities in search of health care. A survey conducted by the WHO roll back malaria program in 2008, showed that Ghana, Mali, Nigeria and Zambia, more than 60% of children with high fever are treated at home with herbal medicines. One of the key reasons cited for this was the ready accessibility of herbal medicines in rural areas (Diarra, 2009).
The study area for the research is the Mwimbi division of Tharaka Nithi County of Maara district. The division was chosen because of its peculiar challenges in health care delivery which include lack of hospitals/clinics, poor access to conventional health care, and inadequate healthcare professionals, inadequate modern diagnostic and surgical equipment. In addition there is no documented data on the use of herbal medicine among children under five years of age. Given the limited resources and time, focusing on all the communities in the county would be practically impossible.

Therefore, respondents were selected from five different communities in the division, namely Chogoria, Murugi, Maara, Ganga and Kiera. These are deprived and marginalized communities with serious socioeconomic problems, especially with respect to health care. These problems seriously impair health delivery, hence calling for the use of herbal remedies for primary health care.

1.3 Research Questions

This study sought to address the following research questions;

i. What is the prevalence of herbal Medicine use among the under-five years of age in Mwimbi Division, Tharaka Nithi County?

ii. What ways do demographic characteristics of parents/guardians influence the use of herbal medicine among under-five years of age in Mwimbi Division, Tharaka Nithi County?

iii. What specific herbs and for which health conditions are they frequently used for in Mwimbi Division, Tharaka Nithi County?
iv. To what extent are herbal medicines used concomitantly with conventional medicines?

1.4 Research Hypothesis

Children under the age of five years do not use herbal medicine in Mwimbi Division, Tharaka Nithi County.

1.5 General Objective

The general objective of the study is to assess the use of herbal medicine among children under-five years of age in Mwimbi Division, Tharaka Nithi County, Kenya.

1.6 Specific Objectives

The specific objectives of this study were;

i. To determine the prevalence of herbal medicine use among the under-five years of age in Mwimbi Division, Tharaka Nithi County

ii. To determine the demographic characteristics of parents/guardians that influence use of herbal medicine among under-five years of age in Mwimbi Division, Tharaka Nithi County.

iii. To establish the herbs used and the health conditions they are used for among children under-five years of age in Mwimbi Division Tharaka Nithi County.

iv. To determine the level of concomitant use of herbal medicine and conventional medicines
1.7 Justification of the study

This study was about Tharaka Nithi County and how they use herbal medicine, if at all, to promote and manage their own health. The study is significant to research because it will contribute to the understanding and knowledge of Mwimbi division and their use of herbal medicine. The results of this study may contribute to researcher’s knowledge base, specifically contributing to information about rural people.

It is well studied and documented that herbal medicine use is occurring (Eisenberg et al., 2010). It is also known that about 73% of patients, according to one study, do not disclose herbal medicine use to their health care providers (Ayuk-Egbe et al., 2010). This knowledge will bring with it concerns about safety. Drug interactions could occur. Skewed laboratory results could slow diagnosis and treatment. Researcher will uncover information that otherwise might be missed if they specifically ask about herbal medicine. This study may confirm and strengthen the proposal that researcher and other health care providers ask about herbal medicine in assessments and histories. This would increase safety for both patients and providers. The quality of care improves and satisfying patient outcomes increase when providers are armed with more knowledge and insight.

Since no documentation on Mwimbi divisions’ use of herbal medicine among under 5 years of age is uncovered in reviewing the literature, this study will serve as a stimulus for further research. This study will contribute to developing further knowledge about herbal medicine among under 5 years of age. Knowledge of Mwimbi divisions’ herbal
medicine use among under 5 years of age will help health workers gain increased understanding of the people they serve.

1.8 Conceptual Framework

Figure 1 lays the conceptual framework for this study. Two groups of variables are used to examine factors influencing the extent of use of herbal medicine. The independent variables, which influence the use of herbal medication, are subdivided into three sets, which include important demographic factors, health seeking behavior, and the third group of independent variables is the reasons leading to the use of herbal medicine. For this particular study, one dependent variable was considered (herbal medicine use).

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>dependent variable</th>
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<tbody>
<tr>
<td><strong>Demographic characteristics</strong></td>
<td>Herbal medicine use</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
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<tr>
<td>Location of residence</td>
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<tr>
<td>Monthly income of caregivers</td>
<td></td>
</tr>
<tr>
<td><strong>Health seeking behavior</strong></td>
<td></td>
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<tr>
<td>No. of people using herbs</td>
<td></td>
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<tr>
<td>Perceived cause and type of illness</td>
<td></td>
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<tr>
<td>Community perception</td>
<td></td>
</tr>
<tr>
<td><strong>Reasons leading to the use</strong></td>
<td></td>
</tr>
<tr>
<td>Affordability</td>
<td></td>
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<tr>
<td>Accessibility-proximity to facilities</td>
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(Adopted from Rosen et al, 2006)

Figure 1: The Conceptual Model
CHAPTER TWO: LITERATURE REVIEW

2.1 Use of Herbal medicine among the under-five years of age

Herbal medicine has been defined differently by various people. According to Kamboj (2008), “herbal drugs constitute only those traditional medicines which primarily use medicinal plant preparations for their therapy”. Lucas (2010) also defines herbal medicine as the use of plant products to treat or prevent a disease”. Nsowah-Nuamah et al, (2004) suggest that the treatment of herbal practitioners usually “takes the form of herbs, plant preparations, and prayers.

The World Health Organization (WHO) defines herbal medicine as “a plant-derived material or preparation with therapeutic or other human health benefits which contains either raw or processed ingredients from one or more plants (WHO, 2008). However, the WHO Regional Office for Africa (2004) uses the term “traditional medicine” as a synonym for herbal medicine and defines it as the use of indigenous medicinal and aromatic plants, animal parts, or organic and inorganic materials for preventive and therapeutic purposes. Traditional and herbal medicine has taken the new name, complementary and alternative medicine (CAM). CAM refers to those therapeutic and diagnostic disciplines that exist largely outside the institutions where orthodox or conventional health care is provided (Shaikh and Hatcher, 2005).

On the other hand, the University of Maryland Medical Center (2010) gave a definition of herbal medicine as “plant’s seeds, berries, roots, leaves, bark, or flowers for medicinal purposes.” This general definition of herbal medicine by the
University of Maryland Medical Center is adopted for this study, because this research basically deals with the material aspect of herbal medicine.

Herbs that are used for medicinal purposes come in a variety of forms. Active parts of a plant may include leaves, flowers, stems, roots, seeds, and berries (Woolf, 2003). They may be taken internally as pills or powders, dissolved into tinctures or syrups, or brewed in teas and concoctions.

There has been increased attention and interest in the use of herbal medicine globally since the 1970s. People have been turning, in increasing numbers, to the use of herbal medicine as both an alternative and complementary to modern medicine (Lucas, 2010). Studies by Darko (2009) have also shown that many people use both herbal and conventional medicines, both in the developing and developed countries.

Herbal medicine treatments are the most popular form of traditional medicine, and are highly lucrative on the international market (WHO, 2008). Herbal Medicines have been used in both developed and developing countries, though the main reasons for use vary from country to country. Altogether it is estimated that 80% of the total population of the world rely on herbal medicine, one way or the other for their health. According to the WHO (2008), 80% of the developing world’s population still depends on herbal medicine. Herbal medicine has been in use in Kenya since long time ago. However, it started being incorporated into Kenya’s national policy framework in the late 1970s. Kenya’s Development plan 1989-1993
recognized herbal medicine and made a commitment to supporting the welfare of herbal medicine practitioners (Kemper, 2010).

Current published estimates of herbal medicine use among the under 5 children range in Africa from 8% to 15% (Jensen, 2009). Unfortunately, most of these studies involved children who may not be reflective of the general population of children in Africa. Many of the studies were conducted in countries other than Kenya, where attitudes toward unconventional therapies may be different. Additionally, most studies measure herbal medicine use in children who have chronic conditions or who were sampled at health care facilities (Jensen, 2009). A 2009 report of children from Australia, New Zealand, and Canada with juvenile arthritis examined the use of copper bands, diet, chiropractic therapy, acupuncture, and skin creams for rheumatologic complaints and showed that they effectively cured rheumatologic complaints completely (Southwood et al., 2009). It has been shown that a child with certain chronic or terminal diseases (e.g., Arthritis or cancer) is more likely to seek herbal methods of treatment (Eisenberg, 2008). This may also be true among children, especially those with conditions for which conventional medical treatment proves inadequate.

2.2 Accessibility and affordability of herbal medicines in developing countries

There are several reasons for the use of herbal medicine and these vary from country to country (Shaikh and Hatcher, 2005). The most common reasons for the continued use of herbal medicine are that, it is more accessible, more affordable, culturally acceptable, and above all effective (Darko, 2009).
In developing countries, major use of herbal medicine is often attributed to its availability and physical accessibility (WHO, 2002). Herbal medicine is more readily accessible and available to many people, especially rural areas (Otieno, 2010). According to Otieno (2010) herbal medicine is more easily accessible to the rural populace, who constitute a greater proportion of the total population of the country, especially in the northern and eastern regions of Kenya where modern medical facilities are barely adequate. According to Sawyer et al. (2008), access to essential medicines is severely restricted by lack of resources and poverty. Herbal remedies, often closely resembling or forming the basis for alternative remedies, may comprise primary health care or be integrated into the healthcare system. In Africa, and Kenya in particular herbal medicine is used for 80% of primary health care, and in developing nations as a whole over one-third of the population lack access to essential medicines (Sawyer et al., 2008)

Another important reason for the increasing use of herbal medicine is its relative affordability. In some communities it is the only available health care system that is affordable to the poor (Darko, 2009). This is because, compared to the modern health care, herbal medicine is less expensive and herbal practitioners are more willing to accept delayed payment, payment in kind, such as fowls, goats, palm oil, salt, or palm wine, or in some cases patients can negotiate the amount (Darko, 2009).

Therefore, to achieve “health for all” there is the need to integrate it into the modern health care system.
2.3 Safety, efficacy and quality of herbal medicine

The central idea about the efficacy of a medicine is the measure of its ability to improve health and well-being. Thus, Darko (2009), comments that, the functional scope of each medical system is largely determined by its ability to get results in specific cases of illness.

Although many studies identified the increasing prevalence of herbal medicine use throughout the world, only a few reported on how patients perceived the efficacy of this healthcare modality in specific diseases (Clement et al., 2007). According to Clement et al. (2007), the major factor contributing to the increasing popularity of herbs in developed countries and their sustained use in developing countries is the perception that herbal remedies are efficacious, and in some cases more so than allopathic medicines. This favorable level of perceived efficacy supports their continued use, and in a significant number of patients, concomitant use with conventional medicines. In a study on how users of primary health care in Trinidad perceived herbal medicine, Clement et al. (2007) discovered that 86.6% believed that herbal remedies were equally or more efficacious than orthodox/conventional medicines for specific ailments and diseases.

According to Mensah (2008), the potency and effectiveness of herbal medicine have been proven through research. Herbal therapies have shown remarkable success in healing acute as well as chronic diseases (Shaikh and Hatcher, 2005). Buor (2008), for instance discovered that there is a kind of psychological security in
the medical approaches of the herbal medicine man which is able to relieve a patient of strong psychic pressure. Herbal medicine provides more effective treatments to certain health problems such as boils, tuberculosis, stroke, arthritis, epilepsy, asthma, infertility, hernia, hypertension, diabetes, malaria, depression, mental illness and disease prevention as well as for the ageing population, where modern medicine has either failed to produce equally good results or has simply ignored the need for systematic attention and research (Darko, 2009). Also, in cases of sexually transmitted diseases, typhoid fever, yellow fever, menstrual and fertility problems, herbal medicines are considered effective (Shaikh and Hatcher, 2005).

Herbal medicines have also shown a wide range of efficacy in the treatment of various diseases such as breast, cervical and prostate cancers, skin infections, jaundice, scabies, eczema, typhoid, erectile dysfunctions, snakebite, gastric ulcer, cardiovascular disorders and managing HIV/AIDS (Verma and Singh, 2008).

Significantly, it is evident that some herbal medicines have been recognized internationally for the treatment of certain diseases (IUPAC, 2008). Herbs remain the foundation for a large amount of commercial medications used today for the treatment of heart disease, blood pressure regulation, pain remedies, asthma and other health problems (IUPAC, 2008). For instance, Artemisinin which is extracted from the Chinese herbal wormwood plant, Artemisia annua’ is the basis of most effective antimalarial drugs the world has ever known (WHO, 2008). Western researchers learned of the plant, for the first time, in the 1980s, but had been used in China for almost 2000 years to treat malaria. However, due to skepticism
surrounding the drug, it was only until 2004 that WHO approved of it for use internationally (IUPAC, 2008). Artemisinin is also effective in combating other diseases and has demonstrated significant potential for the treatment of cancer and schistosomiasis (Baidoo, 2009; IUPAC, 2008).

Moreover, the Neem tree (Azadirachta indica), which is indigenous to West Africa, is effective in the treatment of several diseases. The bark of the Neem tree is perceived to be effective in the treatment of malaria (Davies, 2004). In addition to this, Davies (2004), accounts that East Indians use it to make a strong soap that cures skin diseases. Africans also chew it to clean their teeth and it works as well as brushing with toothpaste, and supposed to be healthier for the gums. More so, the plant Curcuma Longa is perceived to be effective in the treatment of scabies, itches, boils, abscesses, eczema and eye diseases (Okigbo and Mmeka, 2006; Davies, 2004).

Furthermore, a growing body of research has demonstrated that the commonly used herbs and spices such as garlic (Allium sativum), black cumin (Bunium persicum), cloves (Syzygium aromaticum), cinnamon (Cinnamomum zeylanicum), thyme (Thymus vulgaris), bay leaves (Laurus nobilis), mustard (Brassica juncea), and rosemary (Rosmarinus officinallis), possess antimicrobial properties that, in some cases, can be used therapeutically. Others, such as saffron (Crocus sativus), turmeric (Curcuma longa), tea (Camellia sinensis) and flaxseed (Linum usitatissimum) provide significant protection against cancer (Lucas, 2010). For example, thyme and garlic contain certain antibiotic substances that prevent
bacteria growth in the mucus, and are of great benefit to the respiratory system, and helps reduce cholesterol levels and high blood pressure (Okigbo and Mmeka, 2006). Herbal medicines are good dietary supplements, which are nutritive and replenish the body. For example, sunflower seed (*Helianthus annuus*) and Moringa provides vitamin B6 (Pyridoxine) (Okigbo and Mmeka, 2006). Several well-known orthodox medicines like morphine, taxol, colchicine, digoxin, artesunate, guanidine, ephedrine, reserpine, vincristine, atropine, and codein could trace their sources to herbs (IUPAC, 2008).

### 2.4 Regulatory aspects and approval of herbal drugs

For safe and effective use of herbal drugs, consistency in composition and biological activity are essential requirements. However, herbal drugs frequently fail to meet this standard, as there are problems such as, difficulties in identification of plants, genetic variability, variations in growing conditions, diversity in harvesting procedures and processing of extracts, and the lack of information about active pharmacological principles (Marcus *et al*, 2002).

The use of chromatographic techniques and marker compounds for the standardization of herbal products can ensure batch-to-batch consistency; however, this does not ensure consistent pharmacological activity or stability. With herbal medicines what is on the label and what is in the bottle may differ considerably. In a study of ginseng preparations, the amount of ginsenosides varied from 11.9-327.7% of the label claim. Medical letter cautions, “Their (herbal medicines) potency may vary and their purity is
suspect," (Straus, 2008). Australian medicines regulatory body the Therapeutic Goods Administration, suspended the production license of Pan Pharmaceuticals after an audit, which revealed problems with company's quality control standards (Ladha and Bagga, 2000). The lack of standardization of herbal drugs would be a serious problem for a researcher as he would not be able to rely on commercially available herbal products for his research studies.

There is no registration system for herbal medicines and they are not included on the essential drug list (WHO, 2008). A post marketing surveillance system is in development (Straus, 2008). However, herbal medicines in Kenya are sold without restriction (WHO, 2015).

Most patients believe that the government oversees the safety of herbal products, but the fact is that the only requirement is for the manufacturer to send a copy of the product label to the Kenya Bureau of Standards (WHO, 2008). A new dietary supplement or new formulation can be introduced and marketed overnight, without significant restriction, despite containing new, experimental, and unregulated herbal ingredients (WHO, 2008). Unfortunately, many of these supplements contain ingredients or contaminants with adverse effects or interactions. If these supplements were subject to pre-market safety testing, many would no doubt be banned (Straus, 2008).

The general public regards herbal products as natural. Thus, there is a widespread yet a false perception that herbal products are safe. According to a 2002 nationwide Harris interactive poll of more than 1,000 adults, 60% of respondents believed that
supplements were approved by a governmental agency before they could be sold, that warning labels were required to list potential side effects, and that supplement manufacturers could not make safety claims without solid scientific evidence (Harris, 2008).

The legal process of regulation and legislation of herbal medicine changes from country to country. The reason for this involves mainly the cultural aspects and also the fact that herbal medicines are rarely examined 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, 2010).

2.5 Concomitant use of herbal remedies with conventional medicines

In the last two decades, there has been a considerable increase in the herbal remedy market (Messina, 2006). Interactions between herbal remedies and drugs have been put on the agenda and received increased attention (Yang et al, 2010). Both serious and less serious adverse interactions have been reported e.g. between the drug cyclosporine and St. Johns wort (Hypericum perforatum), and between drugs like warfarin or aspirin, which are reported to interact with a range of herbs like garlic (Allium sativum), cranberry (Vaccinium oxycoccus), Ginkgo Biloba, ginger (Zingiber officinale) and grapefruit (Citrus paradisi) (Mannel, 2004; Williamson, 2005). Concomittant use of herbs and conventional drugs might alter the drug’s pharmacokinetics and/or
pharmacodynamics, hence causing unexpected adverse effects of the drug (Cohen and Ernst, 2010).

Studies have reported extensive use (40-56%) of herbs in the general population (Martin et al, 2002). The 2007 National Health Interview Survey, USA, reported that nearly 20% of the general population was using herbs. The typical herb user was female, aged 30 to 69 years, with higher education or hospitalized in the last year. Forty-one per cent of USA adults reported the use of herbal remedies to self-treat before seeking medical care from a physician (Martin et al, 2002).

Only 50% of herb users inform their physician about it (Martin et al, 2002). In addition, the health care professionals rarely ask the patients about the use of herbs or other types of complementary and alternative medicine (Giveon et al, 2004) “The doctor did not ask” is the common phrase explaining the lack of communication (Saw et al, 2006). The general practitioners (GPs) also tend to underestimate the use (Giveon et al, 2004). It is therefore important to have knowledge about the characteristics of herb users in general and co-users in particular to make health professionals more aware.

It is reported that up to 40% in various patient groups co-administer herbal remedies and drugs (Smith et al, 2010). One study found that 40% of pregnant women used herbal remedies and about 85% of these co-used conventional drugs (Nordeng et al, 2011). The use of herbal remedies among adults with cancer is reported to be between 30-55% (Molassiotis et al, 2005) and one study found that almost 40% co-use herbal remedies and chemotherapy (Engdal et al, 2008). Elderly patients have more poly-
pharmacy problems and are more vulnerable to interactions because of altered pharmacokinetics and decreased health in general (Loya et al, 2009). Considering that 13-47% of elderly patients report to consume herbs (Raji et al, 2005) and 31-75% of these co-use herbs and prescribed conventional drugs (Engdal et al, 2008), the risk of adverse interactions might be high. More than half (50%) of the general population has one or more chronic conditions and as the elderly, they have a high cure rate and polypharmacy (50%) (Schoen et al, 2007). They also tend to use more herbal remedies, which increase the possibility of herb-drug interactions (Ravyen et al, 2011).

Despite the large reported use of herbs and co-use of herbs and conventional drugs in the general population and in various patient groups, few studies have been performed among patients in primary care and general practice in particular. About 40% of the patients in primary care clinics in the USA believed that taking prescription medications and herbal remedies together was more effective than taking either alone and nearly 50% of the herb users co-used drugs (Kuo et al, 2004). An Israeli study of co-use among patients in general practitioner’s offices, reported 36% of herbal use and approximately 30% were co-users (Giveon et al, 2004). GPs are the first medical contact within the health care system, dealing with all health problems, both acute and chronic (Giveon et al, 2004). Given the nature of general practice, the few studies are somewhat surprising.
CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter describes how field work was carried out. It entails study design, study location, target population, study variables, sample size determination, sampling procedure, inclusion and exclusion criteria, research instruments, pre-testing of tools, data analysis and ethical consideration.

3.2 Research Design

A cross-sectional study was undertaken on parents/guardian of under-five years of age and healthcare professionals of Mwimbi division of conventional health facilities. The phenomenon investigated was the use of herbal medicine among children under-five years of age. In a cross-sectional study no attempt is made to change behavior or conditions (Thomas and Nelson, 1996). Things were measured as. The study design also enables one to obtain information about the situation at hand at one specific time. It shows the current situation of the condition under study in the desired population.

3.3 Study variable

The independent variables in the study were age and gender of both caregivers and under-five years of age children; income, education level and religion of caregivers; length of illness of the children, conditions for which herbal products were used for. The dependent variable was herbal medicine use among under-five year of age children.
3.4 Location of the study

The study was carried out at Mwimbi division located in Tharaka Nithi County covering an area of approximately 36.8 square kilometers as shown in Appendix I. It borders Meru county to the north and northeast, Kitui County to the east and south east, Embu County to the south and southwest. The division lies between latitudes 0° 15’ 0” and longitudes 37° 1’ 45”.

3.5 Target population

The target population in this study was all parents/guardians with under 5 years of age children and Healthcare providers of Mwimbi division.

3.6 Study population

The study population in this study was parents/guardians of children aged below 5 years of age and Healthcare providers from selected health facilities who were from Mwimbi division during the period of study.

3.6.1 Inclusion Criteria

Parents/Guardians of children under-five years of age resident of Mwimbi division for at least 6 months. Healthcare providers of Mwimbi division from selected health facilities were included in the study. All those persons above who consented to participate in the study.
3.6.2 Exclusion Criteria

Parents/Guardians of children under-five years of age who did not consent to participate in the study were excluded.

3.7 Sample size determination

Sample size was determined according to Fisher’s formula (1998) as follows:

\[ n = \frac{z^2 \times p \times q}{d^2} \]

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)
- \( d = 0.05 \) - which is the level of significance at 95% or acceptable margin of error

\[ n = \frac{1.96^2 \times 0.7 \times (1-0.7)}{(0.05)^2} = 322.69 \]

323 parents/guardians. To allow for non-respondents, a sample of 350 parents/guardians was selected.

3.8 Pre-testing

Pre-testing of research tools was conducted in Muthambi Division 17 km from Mwimbi division. This was done on 35 (10%) parents/guardian with children under 5 years of
This was done to ensure validity and reliability of research instruments. Corrections were made where necessary in order to make sure the questions asked provided the required information.

### 3.9 Data collection

Research assistants were recruited, trained and participated in pre-testing. The research assistants were people with medical backgrounds who understood the local language. In this study data gathering method included a semi-structured questionnaire for parents/guardians of under-five years of age, (Appendix III and healthcare professionals Appendix IV).

All the respondents signed the consent form (Appendix II) 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 parents/guardian of under-five years of age and healthcare professionals of Mwimbi division of conventional health facilities.

The questionnaire for participants (Appendix III) was used to show level of education, gender, age, and level of income, herbs used and other health conditions that elicit use of herbs apart from illnesses. 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 perception of herbal medicines compared with conventional medicines.
A standardized questionnaire for conventional healthcare practitioners of Mwimbi division (Appendix IV) was self-administered. This questionnaire was used to determine concomitant use of herbal medicines and conventional medicines, reported adverse effects of herbal medicines use, use of herbal medicines by conventional health care practitioners and their perception concerning herbal medicines

3.10 Sampling Technique

Multistage Cluster sampling method was used to select representative study sites. The five (5) locations (Table 3.1) were used as the clusters. Cluster sampling was chosen because it reduces costs per interview and increases the efficiency (Kerry and Bland, 2008). The number of under 5 years old children within each stratum (location) was identified. Conventional medical clinics were chosen proportionate to the number of clients who visited them. To select the sample, Systematic random sampling was used to select the study samples (households). A table of random sampling was then used to identify the start point and rural acquaintances were contacted to assist in seeking people who consented to be interviewed. For conventional health facilities a list of all facilities was prepared for all clusters. They were assigned numbers and random number table was used to select ten clinics proportionate to number of clinics per cluster. The clinician’s in-charge of each facility was given the questionnaire to fill after consenting. The process included first introduction to the respondents and then explain the theme of the study. If in acceptance if the head of the family/guardian would consent. If not available the mother or guardian would consent. The research was done
daily in the homestead talking to house head with the help of research team. The research process took advantage of the chief baraza which took place during the same time during my study.

A table below shows the population of under 5 years of age and households in each location in the area of study: A list of all the households and under 5 years of age children in each location was obtained from sub-county administrative offices

**Table 1: population of under 5 years of age and households in the study area**

<table>
<thead>
<tr>
<th>Locations</th>
<th>Number of households</th>
<th>Number of children under 5 years of age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chogoria</td>
<td>4817</td>
<td>17906</td>
</tr>
<tr>
<td>Murugi</td>
<td>3261</td>
<td>14583</td>
</tr>
<tr>
<td>Maara</td>
<td>3058</td>
<td>13887</td>
</tr>
<tr>
<td>Ganga</td>
<td>4508</td>
<td>17549</td>
</tr>
<tr>
<td>Kiera</td>
<td>2845</td>
<td>9875</td>
</tr>
<tr>
<td>Total</td>
<td>18489</td>
<td>73800</td>
</tr>
</tbody>
</table>
**Table 2: Sampling technique table**

<table>
<thead>
<tr>
<th>Stage one:</th>
<th>Chogoria</th>
<th>Murugi</th>
<th>Maara</th>
<th>Ganga</th>
<th>Kiera</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stratify the division into locations:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Chogoria</td>
<td>17906</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Murugi</td>
<td>14583</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Maara</td>
<td>13887</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ganga</td>
<td>17549</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Kiera</td>
<td>9875</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Selected</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Stage two:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 350 children will be sampled from all the strata</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Proportionate to size sampling will be applied to determine the number of children (under 5 years of age) will be selected</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Systematic sampling technique will be used to determine household to be selected for recruitment of children into the study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>17906×350</td>
<td>14583×350</td>
<td>13887×350</td>
<td>17549×350</td>
<td>9875×350</td>
<td>73800</td>
</tr>
<tr>
<td></td>
<td>73800</td>
<td>73800</td>
<td>73800</td>
<td>73800</td>
<td>73800</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To the nearest whole number:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>85 parents</td>
<td>69 patients</td>
<td>66 parents</td>
<td>83 parents</td>
<td>47 parents</td>
<td></td>
</tr>
<tr>
<td><strong>Stage three:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 350 children will be selected from the division</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- A table of random sampling to identify the start point Rural acquaintances contacted to assist in seeking people</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>85 parents</td>
<td>69 patients</td>
<td>66 parents</td>
<td>83 parents</td>
<td>47 parents</td>
<td></td>
</tr>
<tr>
<td></td>
<td>350 parents/guardians of under 5 years of age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.11 Data Analysis and Presentation

Statistical analysis is essential for making sense of quantitative information. Statistics are either descriptive or inferential. Descriptive statistics, generated in the course of data analysis in the present study, have been used to describe and synthesize the data. The software program Statistical Package for the Social Sciences (SPSS) was employed for 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 herbal medicine use and each of the independent variables related to demographic characteristics; a P value < 0.05 was considered to be statistically significant.

3.12 Ethical Consideration

This research was approved by Kenyatta University Graduate School. Ethical approval was obtained from the Kenyatta University Ethics Review Committee (KU-ERC), Ref No. KU/R/COMM/51/280. Thereafter, a research permit was obtained from the National Council for Science and Technology (Ref No.: NACOSTI/P/14/7715/47) prior to the study. Administrative authorization to carry out the study was sought from the County administration (Commissioner and the County Director of Education, Tharaka Nithi County). Informed consent was obtained from study participants prior to their enrollment into the study. Participation in the study was voluntary. Confidentiality of the information from the study participants was maintained throughout the study. In addition, codes were used to maintain anonymity of all participants and keep their information confidential.
CHAPTER FOUR: RESULTS

4.0 Introduction

This chapter presents the data analysis, interpretation and discussion of research findings. The findings are mainly quantitative and therefore descriptive statistics were used.

The chapter examines the categories and tabulates the evidence so as to address the study’s research questions. The study sample comprised of 350 respondents, 10 key informants and Focus Group Discussions. The broad objective of the study was to assess the utilization of herbal medicine among children under-five years of age in Mwimbi Division, Tharaka Nithi County, Kenya.

Participants were requested to provide descriptive data on herbal usage by their children.

4.1 Social demographic characteristics of respondents

The demographic characteristics of the respondents (parents/guardians) and their under-five years of age children which include: sex, age, education level, religion, occupation, monthly level of income, location of residence, marital status and religion were presented in table 3. Ages of the respondents were recorded in years and the age was grouped into categories as shown in the table.

Literacy was assessed by the highest level of education attained. No formal education meant that these individuals never went to school at all. The location of residence was
categorized into two groups which were town and rural dwellers as indicated. The individual’s religion was expected to influence the use of herbal medicine and even conventional medicine. The respondents were categorized according to their occupation which included Civil servants, Casual laborers, Business persons and Farmers. The income distribution of the respondents was the monthly average of the total income the respondents earned given in Kenyan Shillings.

Out of the 350 participants who revealed their age, majority of parents/guardians and children were 271(77.4%) aged 40 years and below and 256(73.1%) 41 months old and below respectively. Majority of parents/guardians 326(93.1%) were female while majority of under-five years of age children 187(53.4%) were female. Most of the respondents 204(58.3%) had primary school education and below. Many of the respondents 190(54.3%) were Christians from protestant churches. Few 13(3.7%) of the respondents were Muslim. Majority of the respondents 140(40.0%) were farmers. This could be expected in this division as many were living in rural areas. The occupation of many people was casual laborers with 111(31.7%) of the total respondents. Business persons were 59(16.9%), while 50(14.2%) of the respondents were civil servants.

The results of this study also shows that majority 203(58.0%) of the respondents had a monthly income of 15,000 shillings or less while. Majority of the participants 272(77.7%) were from rural area, while the rest 78(22.3%) were resident in town.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>No. of respondents (n=350)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of children under five years of age in months</td>
<td>6 – 18 months</td>
<td>18</td>
<td>5.1</td>
</tr>
<tr>
<td></td>
<td>18 – 30 months</td>
<td>130</td>
<td>37.1</td>
</tr>
<tr>
<td></td>
<td>30 – 42 months</td>
<td>108</td>
<td>30.8</td>
</tr>
<tr>
<td></td>
<td>42 – 54 months</td>
<td>53</td>
<td>15.2</td>
</tr>
<tr>
<td></td>
<td>54 - 60 months</td>
<td>41</td>
<td>11.7</td>
</tr>
<tr>
<td>Sex of the under five years of age</td>
<td>Male</td>
<td>163</td>
<td>46.6</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>187</td>
<td>53.4</td>
</tr>
<tr>
<td>Age of the caregivers</td>
<td>below 20 years</td>
<td>25</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td>20 years – 30 years</td>
<td>145</td>
<td>41.4</td>
</tr>
<tr>
<td></td>
<td>30 years – 40 years</td>
<td>101</td>
<td>28.9</td>
</tr>
<tr>
<td></td>
<td>40 years and above</td>
<td>79</td>
<td>22.6</td>
</tr>
<tr>
<td>Education level of the caregivers</td>
<td>No formal</td>
<td>44</td>
<td>12.6</td>
</tr>
<tr>
<td></td>
<td>Primary school</td>
<td>160</td>
<td>45.7</td>
</tr>
<tr>
<td></td>
<td>High school</td>
<td>119</td>
<td>34.0</td>
</tr>
<tr>
<td></td>
<td>Tertiary Education</td>
<td>27</td>
<td>7.7</td>
</tr>
<tr>
<td>Religion of the caregivers</td>
<td>Christian (catholic)</td>
<td>147</td>
<td>42.0</td>
</tr>
<tr>
<td></td>
<td>Muslim</td>
<td>13</td>
<td>3.7</td>
</tr>
<tr>
<td></td>
<td>Christian</td>
<td>190</td>
<td>54.3</td>
</tr>
<tr>
<td>Occupation of caregivers</td>
<td>Civil servants</td>
<td>50</td>
<td>14.2</td>
</tr>
<tr>
<td></td>
<td>Casual laborers</td>
<td>111</td>
<td>31.7</td>
</tr>
<tr>
<td></td>
<td>Business persons</td>
<td>59</td>
<td>16.9</td>
</tr>
<tr>
<td></td>
<td>Farmers</td>
<td>140</td>
<td>40.0</td>
</tr>
<tr>
<td>Monthly income level of the caregivers</td>
<td>≤5000</td>
<td>63</td>
<td>18.0</td>
</tr>
<tr>
<td></td>
<td>5,001-10,000</td>
<td>71</td>
<td>20.3</td>
</tr>
<tr>
<td></td>
<td>10,001-15,000</td>
<td>69</td>
<td>13.7</td>
</tr>
<tr>
<td></td>
<td>15,001-20,000</td>
<td>66</td>
<td>9.4</td>
</tr>
<tr>
<td></td>
<td>20,001-25,000</td>
<td>48</td>
<td>19.7</td>
</tr>
<tr>
<td></td>
<td>≥25,000</td>
<td>33</td>
<td>18.9</td>
</tr>
<tr>
<td>Sex of the caregivers</td>
<td>Male</td>
<td>24</td>
<td>6.9</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>326</td>
<td>93.1</td>
</tr>
<tr>
<td>Location of residence of the caregivers</td>
<td>Town</td>
<td>78</td>
<td>22.3</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>272</td>
<td>77.7</td>
</tr>
</tbody>
</table>

Total sample size, n = 350. Data shown are frequencies (n) of subjects and proportions (%).
4.2 Prevalence of herbal use in under-five years of age children

According to Merritt-Charles *et al.* (2009) use of herbal medicine is on the increase among the under-fives. Table 4 shows past and present herbal medicine usage among children that participated in the study.

**Table 4: Prevalence of herbal use in children under five years of age**

<table>
<thead>
<tr>
<th>Prevalence of herbal use</th>
<th>No. of respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>313</td>
<td>89.4</td>
</tr>
<tr>
<td>No</td>
<td>37</td>
<td>10.6</td>
</tr>
<tr>
<td>Total</td>
<td>350</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Total sample size, n = 350. Data are presented as number (n) of subjects and proportions (%).

Majority of the respondents’ reported of past or present herbal use of herbal medicine on their children under five years of age 313(89.4%). About 37(10.6%) reported not to have used herbal medicine in life.

4.2.1 Socio-demographic and other characteristics associated with herbal medicine use among under five years of age children

The second objective of the study was to determine demographic characteristics of parents/guardians that influence herbal medicine use among under five years of age. These characteristics were; age, sex, employment status, location of the household, religious affiliation and the distance to the nearest health facility.
Table 5: Socio-demographic and other characteristics of parents/guardian of children under-five years of age

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Category</th>
<th>HERBAL USE</th>
<th>χ² Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Used herbs (N=313)</td>
<td>Not used herbs (N=37)</td>
</tr>
<tr>
<td>Age of caregivers in years</td>
<td>&lt; 20 years</td>
<td>22</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>20-30 years</td>
<td>130</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>30-40 years</td>
<td>90</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>≥40 years</td>
<td>71</td>
<td>8</td>
</tr>
<tr>
<td>Age of under fives</td>
<td>6-18 months</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>18-30 months</td>
<td>116</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>30-42 months</td>
<td>98</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>42-54 months</td>
<td>49</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>54-60 months</td>
<td>38</td>
<td>3</td>
</tr>
<tr>
<td>Education level</td>
<td>No formal Education</td>
<td>42</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Primary school</td>
<td>143</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>High school</td>
<td>110</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Tertiary Education</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>Sex of the under five</td>
<td>Male</td>
<td>146</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>167</td>
<td>20</td>
</tr>
<tr>
<td>Sex of caregivers</td>
<td>Male</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>292</td>
<td>34</td>
</tr>
<tr>
<td>Religion</td>
<td>Christian (catholic)</td>
<td>131</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Muslim</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Christian (protestant)</td>
<td>170</td>
<td>20</td>
</tr>
<tr>
<td>Occupation of caregivers</td>
<td>Civil servants</td>
<td>38</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Casual laborers</td>
<td>97</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Business persons</td>
<td>53</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Farmers</td>
<td>125</td>
<td>15</td>
</tr>
<tr>
<td>Monthly income</td>
<td>≤5,000</td>
<td>56</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>5,001-10,000</td>
<td>63</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>10,001-15,000</td>
<td>62</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>15,001-20,000</td>
<td>59</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>20,001-25,000</td>
<td>43</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>≥25,000</td>
<td>30</td>
<td>3</td>
</tr>
<tr>
<td>Location of residence</td>
<td>Rural</td>
<td>267</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Town</td>
<td>46</td>
<td>32</td>
</tr>
</tbody>
</table>

Data shown are frequencies (n) of subjects and proportions (%), df, degrees of freedom $\chi^2$, Pearson’s chi-square, values in bold are significant $P$-values.

The study compared herbal medicine use among under-five years of age and demographic characteristics of the respondents and the results were presented in the
table 5 above. Age of the respondents and under-five of age children were important factor to consider. There was a significant statistical difference (p= 0.026) between age of under-five years children and use of herbal medicine. However, there was no significant statistical association (p = 0.993) between age of caregivers and use of herbal medicine (Table 5).

Education level, location of residence, monthly income, occupation and religion were considered in regard to use of herbal medicine. Results showed that there was a statistical relationship between education level (p = 0.001) and herbal medicine use. Respondents with no formal education and primary education were more likely to use herbal medicine. There was a significant statistical relationship between location of residence and use of herbal medicine (p =0.006). Respondents who were rural dwellers were more likely to use herbal medicine more that those who were urban dwellers. There was statistical significance between monthly income (p = 0.0403) and herbal medicine use. Respondents with monthly income of less than 15000 were more likely to use herbal medicine. There was statistical significance between occupation (p = 0.003) and herbal medicine use. Respondents who were farmers were more likely to use herbal medicine. However, there was no significant statistical relationship between religion (p= 0.93724) and herbal medicine use. Respondents who were Christians (Protestants) were more likely to use herbal medicine (Table 5).
4.3 Herbal medicine used and the health conditions they are used for among children under-five years of age

4.3.1 Reasons given by respondents for using herbal medicine

There are several reasons for the use of herbal medicine and these vary from country to country. Figure 2 below presents the reasons why caregivers use herbal medicine on their children in the study area.

**Figure 2: Reasons given by respondents for using herbal medicine.** Total sample size, n = 313. NCCI, there was no conventional cure for my illness. HBC, herbal medicine was better than conventional medicine. CMW, conventional medicine was not working. HFF, the health facility was so far. NND, could not get the necessary drugs at the health care facility. NNS, could not get services at the health care facility. NAH, could not afford to go to hospital.
Slightly more than a quarter 84 (26.8%) of the respondents indicated that conventional medicine was not working. Whereas 80 (25.6%) reported that they could not get the necessary drugs at the health care facility, 76 (24.3%) preferred herbal medicine to conventional medicine. Only 30 (9.6%) indicated that they could not afford to go to the doctor.

Healthcare professionals emphasized on evidence-based approach towards use of herbal medicine in order to provide the best care to the children. According to a key informant, more than two-thirds of the caregivers they encounter use herbal medicine. A majority of the caregivers emphasized a quick relieve of their children as their principal motive for using herbal medicine.

Other important reason into why respondents used herbal medicine was conditions which took time to heal with conventional medicine. Majority of the respondents in the focused group discussion reported that some conditions took long time before the child got well with the conventional medicine. Other conditions were known to respond so well with herbal medicine than conventional medicine.

4.3.2 Distance in kilometers from the nearest health facility

According to Tharaka County government health report (2015), Tharaka Nithi County has Chuka Level 4 hospital as the County referral hospital. A majority of the population access health services from level two hospitals as well as mission hospitals. Figure below 3 shows the distance of the respondents travelled to their nearest facility.
Figure 3: Distance in kilometers from the nearest health facility

Majority of the respondents 148 (42%) travelled 5-10 kilometers to a health facility while only 78 (22%) of the respondents those who travelled less 5 kilometers.

Table 6: Distribution of herbal medicine use by distance from the nearest health facility

<table>
<thead>
<tr>
<th>Factor</th>
<th>Herbal use</th>
<th>χ² Results</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Used herbs</td>
<td>Not used herbs</td>
<td></td>
</tr>
<tr>
<td>Distance from nearest facility (km)</td>
<td>Frequency (N=313) (%)</td>
<td>Frequency (N=37) (%)</td>
<td></td>
</tr>
<tr>
<td>&lt;5</td>
<td>60 (76.9)</td>
<td>18 (23.1)</td>
<td>$\chi^2 = 16.7$</td>
</tr>
<tr>
<td>5-10</td>
<td>137 (92.6)</td>
<td>11 (7.4)</td>
<td></td>
</tr>
<tr>
<td>&gt;10</td>
<td>116 (93.5)</td>
<td>8 (6.5)</td>
<td></td>
</tr>
</tbody>
</table>

Data shown are frequencies (n) of subjects and proportions (%). df, degrees of freedom $\chi^2$, Pearson’s chi-square. Value in bold is significant P-values. Km, kilometers

Use of herbal medicine seems to increase with the increase in the distance to the health facility ($\chi^2 = 16.7$, df =2 P = <0.001). A majority 137(92.6%) of those who travelled between 5-10 kilometers reported using herbal medicine compared to 11 (7.4%) who
did not use. Also significant in this study are those who covered over 10 kilometers to the health facility which showed use of 116 (93.5%) and 8 (6.5%) non-use (Table 6).

4.3.3 Source of herbal medicine

Herbal medicines have mostly been obtained from various sources (WHO, 2008). Figure 4 below presents the source from which the parents/guardians obtained their herbal medicine. This includes the source from which may have significantly influenced the caregivers to opt for herbal use. The results were presented in figure 4 below.

![Figure 4: Sources of herbal medicine.](image)

**Figure 4: Sources of herbal medicine.** Total sample size, n = 313. OFR, obtained from friends/relatives. CFB, collected from farm/backyard. OHP, Obtained from herbal practitioner.
Majority 123(39.3%) of caregivers obtained herbal medicine from relatives and friends, about 105(33.5%) obtained it from the farm or backyard while 85(27.2%) of the caregivers obtained their herbal medicines from herbal practitioners.

4.3.4 Herbs used for different diseases among under-five years of age

The World Health Organization (WHO) defines herbal medicine as “a plant-derived material or preparation with therapeutic or other human health benefits which contains either raw or processed ingredients from one or more plants (WHO, 2008).

Herbs that are used for medicinal purposes come in a variety of forms. Active parts of a plant may include leaves, flowers, stems, roots, seeds, and berries (Woolf, 2003). The plant part(s) used by the Tharaka Nithi community for treatment of human ailments are shown in Table 7 below. They may be taken internally as pills or powders, dissolved into tinctures or syrups, or brewed in teas and concoctions. Table 7 is from a multiple response question where one respondent can have more than one herbal medicine use. The total number of responses exceeds the sample size because there were some respondents with more than one past or present herbal use.
**Table 7: Herbs used for different diseases among under 5 years of age children (n = 313)**

<table>
<thead>
<tr>
<th>Herb</th>
<th>Part used</th>
<th>Family name</th>
<th>Local name</th>
<th>No of responses</th>
<th>Percent</th>
<th>Disease treated</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Erythrina abyssinica</em></td>
<td>Root, bark</td>
<td>Fabaceae</td>
<td>Muuti</td>
<td>123</td>
<td>39.3</td>
<td>Allergy, malaria, snake bite, cough, measles, colic</td>
</tr>
<tr>
<td><em>Landolphia buchananii</em></td>
<td>Leaves</td>
<td>Apocynaceae</td>
<td>Muungu</td>
<td>96</td>
<td>30.7</td>
<td>Wounds, Cold and flu</td>
</tr>
<tr>
<td><em>Croton macrostachus</em></td>
<td>Juice</td>
<td>Euphorbiaceae</td>
<td>Mutundu</td>
<td>7</td>
<td>2.2</td>
<td>Bleeding, constipation, stomach ache, skin rash, wounds, cough, cold,</td>
</tr>
<tr>
<td><em>Acacia hockii</em></td>
<td>Bark</td>
<td>Mimosaceae</td>
<td>Mugaa</td>
<td>113</td>
<td>36.1</td>
<td>Colds and flu, diarrhea, skin</td>
</tr>
<tr>
<td><em>Eucalyptus saligna</em></td>
<td>Leaves</td>
<td>Myrtaceae</td>
<td>Munyua-mai</td>
<td>45</td>
<td>14.4</td>
<td>Colds and flu, influenza, chicken pox, fever, toothache, measles</td>
</tr>
<tr>
<td><em>Cordial Africana</em></td>
<td>Bark</td>
<td>Boraginaceae</td>
<td>Muringa</td>
<td>42</td>
<td>13.4</td>
<td>Eye problem (infection)</td>
</tr>
<tr>
<td><em>Senna didymobotrya</em></td>
<td>Leaves</td>
<td>Caesalpinae</td>
<td>Mwinu</td>
<td>81</td>
<td>25.9</td>
<td>Malaria, fever, abscess, diarrhea.</td>
</tr>
<tr>
<td><em>Vernonia lasiopurus</em></td>
<td>Leaves</td>
<td>Asteraceae</td>
<td>Mucatha</td>
<td>56</td>
<td>17.9</td>
<td>Malaria, scabies, amoeba, hot rash, chicken pox, cold, antirabies</td>
</tr>
<tr>
<td><em>Prunus africana</em></td>
<td>Bark</td>
<td>Rosaceae</td>
<td>Mwiria</td>
<td>7</td>
<td>2.2</td>
<td>Typhoid, amoeba, chest pain, colds, malaria and general body weakness,</td>
</tr>
<tr>
<td><strong>Dovyalis abyssinica</strong></td>
<td>Fruit</td>
<td>Flacourticeae</td>
<td>Mukambura</td>
<td>86</td>
<td>27.5</td>
<td>wound dressing, arrow poisoning, appetite stimulant.</td>
</tr>
<tr>
<td><strong>Ricinus communis</strong></td>
<td>Root</td>
<td>Euphorbiaceae</td>
<td>Mubariki</td>
<td>58</td>
<td>18.5</td>
<td>Wounds, boils and swelling, constipation</td>
</tr>
<tr>
<td><em>Vitex doniana</em></td>
<td>Fruits</td>
<td>Verbenaceae</td>
<td>Mupuru</td>
<td>99</td>
<td>31.6</td>
<td>vitamin supplement, skin disease, diarrhea, ulcerated mouth and throat,</td>
</tr>
<tr>
<td><em>Amaranthus hybridus</em></td>
<td>Leaves</td>
<td>Amaranthaceae</td>
<td>Terere</td>
<td>115</td>
<td>36.7</td>
<td>vitamin supplement, skin disease, diarrhea, ulcerated mouth and throat,</td>
</tr>
<tr>
<td><em>Psidium guajava</em></td>
<td>Leaves</td>
<td>Myrtaceae</td>
<td>Mubera</td>
<td>107</td>
<td>34.2</td>
<td>vitamin supplement, skin disease, diarrhea, ulcerated mouth and throat,</td>
</tr>
<tr>
<td><em>Vangsueria madagascariensis</em></td>
<td>Leaves</td>
<td>Rubiaceae</td>
<td>Mupiru</td>
<td>89</td>
<td>28.4</td>
<td>vitamin supplement, skin disease, diarrhea, ulcerated mouth and throat,</td>
</tr>
<tr>
<td><em>Mangifera indica</em></td>
<td>Leaves</td>
<td>Anacardiaceae</td>
<td>Muembe</td>
<td>93</td>
<td>29.7</td>
<td>vitamin supplement, skin disease, diarrhea, ulcerated mouth and throat,</td>
</tr>
<tr>
<td><em>Solanum incanum</em></td>
<td>Fruits</td>
<td>Solanaceae</td>
<td>Mutongu</td>
<td>98</td>
<td>31.3</td>
<td>vitamin supplement, skin disease, diarrhea, ulcerated mouth and throat,</td>
</tr>
<tr>
<td><em>Aloe kedongensis</em></td>
<td>Leaves</td>
<td>Aloeaceae</td>
<td>Kithunju</td>
<td>80</td>
<td>25.6</td>
<td>vitamin supplement, skin disease, diarrhea, ulcerated mouth and throat,</td>
</tr>
</tbody>
</table>

**Totals**
Table 7 above shows the different herbs mentioned by the caregivers. 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 350 because of the fact that the respondents could report more than one herb use. *Erythrina abyssinica* (39.3%) was a multi-purpose medicinal plant and among the most used herbal plant for various conditions. It was used alone or in combination with other plants. The second and third most utilized medicinal plants were *Amaranthus hybridus* (36.7%) and *Psidium guajava* (34.2%) respectively. The least used herb at 2.2% of the respondents was *Croton macrostachyus* and *Prunus africana* which is used to stop bleeding. Some other herbs are also least used due to the fact that these herbs are so crude and bitter or contraindicated to certain ages.

### 4.3.5 Common ailments treated by medicinal plants from Mwimbi division.

Several diseases or ailments may be treated effectively with the roots, bark, leaves, fruits and flowers of plants. According to African Population and Health Research Center (APHRC, 2005), in Kenya under 5 morbidity stands at 37.9% with cough, fever, diarrhea, skin problems and eye diseases, making up the top 5 causes of morbidity. The diseases were defined as those which the patients were given herbal medicine. Table 6 presents diseases that elicit use of herbal medicine among the under-five years of age children in Tharaka Nithi County. The responses are from table 7 where one respondent
can have more than one herbal medicine use to treat diseases. The results are shown in the table below.

**Table 8: Diseases that elicit use of herbal medicine**

<table>
<thead>
<tr>
<th>DISEASES</th>
<th>Respondents (n=313)</th>
<th>No of responses</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaria</td>
<td>99</td>
<td>31.6</td>
<td></td>
</tr>
<tr>
<td>Respiratory diseases</td>
<td>106</td>
<td>33.9</td>
<td></td>
</tr>
<tr>
<td>Intestinal worms</td>
<td>82</td>
<td>26.2</td>
<td></td>
</tr>
<tr>
<td>Skin infection/trauma</td>
<td>98</td>
<td>31.3</td>
<td></td>
</tr>
<tr>
<td>Gastrointestinal diseases</td>
<td>123</td>
<td>39.3</td>
<td></td>
</tr>
<tr>
<td>Eye infection</td>
<td>34</td>
<td>10.9</td>
<td></td>
</tr>
<tr>
<td>Tooth ache</td>
<td>51</td>
<td>16.3</td>
<td></td>
</tr>
<tr>
<td>Vitamin supplements</td>
<td>42</td>
<td>13.4</td>
<td></td>
</tr>
<tr>
<td>Allergy</td>
<td>40</td>
<td>12.8</td>
<td></td>
</tr>
<tr>
<td>Immune boosters</td>
<td>60</td>
<td>19.2</td>
<td></td>
</tr>
</tbody>
</table>

Total sample size, n = 313. Data are presented as number (n) of responses and proportions (%)

The majority 39.3% used herbal products for gastrointestinal treatment. About 33.9% used the herbs for respiratory condition. Few (10.9%) of the respondents used the herbs to treat eye infection.

**4.4 Concomitant use of herbal medicine with conventional medicine**

**4.4.1 Use of herbal and convectional medicine for the same condition**

Data was collected on the use of herbal medicine and conventional medicine. The purpose of this investigation was to identify the proportion of participants who were using both conventional and herbal medicine for same condition. Table 9 shows the respondents who used herbs concomitantly with conventional medicine and those who
did not. This was done either co-currently or at different times, but for the same condition.

**Table 9: Use of herbal and conventional medicine for the same condition**

<table>
<thead>
<tr>
<th>Concomitant use</th>
<th>Herbal medicine (n=313)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Herbs alone</td>
<td>156</td>
</tr>
<tr>
<td>Herbs + conventional medicine</td>
<td>157</td>
</tr>
</tbody>
</table>

Total sample size, n = 313. Data are presented as number (n) of subjects and proportions (%)

Majority 157 (50.2%) of the respondents were using both conventional and herbal medicines for the same condition. This may cause complications if used at the same time or not disclosed to the clinicians. This was confirmed by the clinicians as very few patients disclosed concomitant use until complications occurred. 156 (49.8%), of the participants did not use both kinds of medicines at the same time.

**4.4.2 Distribution of level of education of caregivers by concomitant use of herbal medicine with conventional medicine.**

The Knowledge on the level of education of the caregivers can provide an insight into its influence in concomitant use of herbal medicine and conventional medicine. Table 10 shows the association between level of education of the caregivers and concomitant use of herbal medicine with conventional medicine.
Table 10: Distribution of level of education of caregivers by concomitant use of herbal medicine with conventional medicine.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Level of education(n=313)</th>
<th>χ² Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concomitant Use</td>
<td>No formal Education</td>
<td>Primary 74(67.3)</td>
</tr>
<tr>
<td>Use at different times</td>
<td>2(4.8)</td>
<td>63(44.1)</td>
</tr>
<tr>
<td>Concomitant Use</td>
<td>40(95.2)</td>
<td>80(55.9)</td>
</tr>
<tr>
<td>Totals</td>
<td>42(100)</td>
<td>143(100)</td>
</tr>
</tbody>
</table>

Data shown are frequencies (n) of subjects and proportions (%). df, degrees of freedom χ², Pearson’s chi-square. Value in bold is significant P-values.

Majority 40 (95.2%) of the respondents who were using both conventional and herbal medicines for the same condition had no formal education. This was followed by respondents 80 (55.9%) with primary education reported to have concomitantly used herbal medicine and conventional medicine while only 1 (5.6%) with tertiary education reported concomitantly used conventional medicine and herbal medicine. There was significant statistical relationship between the level of education (χ² = 63.7, df = 3, P < 0.001) and concomitant herbal use.

4.4.3 Diseases that elicit use of herbal medicine with conventional medicine concurrently.

The table 11 below 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 and conventional medicine concurrently among the under-five years of age children in Tharaka Nithi County.

**Table 11: Diseases that elicit use of herbal and conventional medicine concurrently**

<table>
<thead>
<tr>
<th>DISEASES</th>
<th>Responses n=313</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No of responses</td>
</tr>
<tr>
<td>Gastrointestinal diseases</td>
<td>63</td>
</tr>
<tr>
<td>Malaria</td>
<td>43</td>
</tr>
<tr>
<td>Respiratory diseases</td>
<td>54</td>
</tr>
<tr>
<td>Worms</td>
<td>42</td>
</tr>
<tr>
<td>Skin infection/trauma</td>
<td>47</td>
</tr>
<tr>
<td>Tooth ache</td>
<td>26</td>
</tr>
<tr>
<td>Allergy</td>
<td>19</td>
</tr>
<tr>
<td>Eye infection</td>
<td>0</td>
</tr>
</tbody>
</table>

Total sample size, n = 313. Data are presented as number (n) of responses and proportions (%)

The most common conditions for which respondents reported use of herbs and conventional medicine concurrently include gastrointestinal diseases and worms (20.1%), respiratory disorder (17.3%) and malaria (13.7%).

### 4.4.4 Perception of safety and efficacy of herbal medicine

The central idea about the efficacy of a medicine is the measure of its ability to improve health and well-being. Thus, Darko (2009), comments that, the functional scope of each medical system is largely determined by its ability to get results in specific cases of illness. The study sought to establish the parents/guardians perception of safety and efficacy of herbal medicine compared to conventional medicine and results presented in Table 12.
<table>
<thead>
<tr>
<th>Statement</th>
<th>Agree (%)</th>
<th>Disagree (%)</th>
<th>Not sure (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most conventional medicine is not safe for my child</td>
<td>140(44.7)</td>
<td>111(35.5)</td>
<td>62(19.8)</td>
</tr>
<tr>
<td>Most herbal medicine is not safe for my child</td>
<td>132(42.2)</td>
<td>121(38.7)</td>
<td>60(19.1)</td>
</tr>
<tr>
<td>Most herbal medicine is natural</td>
<td>220(70.2)</td>
<td>57(18.2)</td>
<td>36(11.6)</td>
</tr>
<tr>
<td>Most herbal medicine is safe</td>
<td>143(45.7)</td>
<td>112(35.8)</td>
<td>58(18.5)</td>
</tr>
<tr>
<td>Herbal medicine may be beneficial to my child if recommended by herbalist</td>
<td>137(43.8)</td>
<td>95(30.4)</td>
<td>81(25.9)</td>
</tr>
<tr>
<td>Herbal medicine may be beneficial to my child if recommended by family member/relative</td>
<td>108(34.5)</td>
<td>146(46.6)</td>
<td>59(18.9)</td>
</tr>
<tr>
<td>There are illnesses or conditions for which herbal medicine is more effective than Western medicine</td>
<td>233(74.4)</td>
<td>40(12.8)</td>
<td>40(12.8)</td>
</tr>
<tr>
<td>There are illnesses or conditions for which western medicine is more effective than herbal medicine</td>
<td>194(62)</td>
<td>29(9.3)</td>
<td>90(28.7)</td>
</tr>
</tbody>
</table>

Total sample size, n = 313. Data are presented as number (n) of subjects and proportions (%)

Majority of the respondents 220 (70.2%) agreed that most herbal medicine is natural. There are illnesses or conditions for which western medicine is more effective than herbal medicine 194 (62%) and that there were illnesses or conditions for which herbal medicine is more effective than conventional medicine 233 (74.4%). Close to half of the respondents 146 (46.6%) disagreed that herbal medicine may be beneficial in general for their children if recommended by family member/relative and that most conventional medicine is not safe for their children 140 (44.7%). According to respondents, weaknesses in herbal medicine include unclear measurements and
preparations, which could cause overdosing and enhance harmful effects. A statement of great concern from a respondent was that herbal medicine could be dangerous because it didn’t have measurements and one won’t be able to know how much to give to a child.

Caregivers were greatly appreciative of the conventional medicine. For herbal medicine, communication lacked about use, dose and ingredients of herbal medicine and the parallel use with western medicine.

4.4.5 Focused group discussion with caregivers

The qualitative information reported was collected from FGDs with caregivers. While the majority of the caregivers seemed to be knowledgeable about herbal medicine, a few participants were not well-informed about how herbal medicine work and were not aware of its consequences. Perceptions about traditional medicine were not uniform among the participants. Some described herbal medicines as having significant side-effects, while others perceived herbal medicine to be very helpful medicines which ensure a quick recovery.

4.4.5 Key informant report about use of herbal medicine

The research sought to establish whether respondents disclose to the health care professional advice regarding herbal medicine use on their children. Only 79 (25.2%) of those who used herbal medicine on their children discussed with the doctor.
This finding corresponds to the view of a health care profession comments in key informants’ interviews that majority of the parents/guardians 234(74.8%) didn’t inform their doctor or pediatricians. These parents/guardians even believed herbal medicine gave them greater choice of cure for their children’s illnesses. However, a few parents/guardians inquired whether some herbs could cure some specific conditions from the conventional health care provider. All caregivers who disclosed with the healthcare professionals about use of herbs were advised to discontinue their use. According to a doctor, majority of the parents/guardian thought herbal medicines were always safe, effective and beneficial to their children.

According to another doctor despite the belief of many of the respondents that those herbal medicines rarely produce adverse effects, a few experienced them mildly and moderately. The healthcare professionals affirmatively suggested that there should be a deliberate move to evaluate the efficacy of these herbal medicines. They suggested that public enlightenment programme, in the form of health education about safe use of herbal medicines, may be a useful means of minimizing the potential adverse effects.

4.5 Other uses of medicinal plants among children under-five years of age.

Ethno-pharmacology and natural product drug discovery remains a significant hope in the improving the livelihoods of rural communities (Tamboura et al., 2000). Table 13 shows other uses of medicinal plants among under-five years of age children in the study area a part from curative purposes. The total number of respondents exceeds the sample size because there were some respondents with more than one condition.
Table 13: Other uses of medicinal plants among children under-five years of age

Additional uses for herbal medicines

<table>
<thead>
<tr>
<th>Condition</th>
<th>No of respondents</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body growth booster</td>
<td>115</td>
<td>36.7</td>
</tr>
<tr>
<td>Supplements</td>
<td>144</td>
<td>46.0</td>
</tr>
<tr>
<td>Teething</td>
<td>12</td>
<td>3.8</td>
</tr>
<tr>
<td>Brushing teeth</td>
<td>53</td>
<td>16.9</td>
</tr>
<tr>
<td>Immunostimulant</td>
<td>47</td>
<td>15.0</td>
</tr>
<tr>
<td>Improve appetite</td>
<td>66</td>
<td>21.1</td>
</tr>
<tr>
<td>Incense</td>
<td>17</td>
<td>5.4</td>
</tr>
<tr>
<td>Bath</td>
<td>41</td>
<td>13.1</td>
</tr>
<tr>
<td>Teas</td>
<td>39</td>
<td>12.5</td>
</tr>
<tr>
<td>Magic</td>
<td>9</td>
<td>2.9</td>
</tr>
<tr>
<td>Ritual oils</td>
<td>4</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Total sample size, n = 313. Data are presented as number (n) of subjects and proportions (%)

The condition for which the herbal products was most used for was supplements by 27.9% of the respondents. This was followed by body growth boosters at 22.2% respondents. Few respondents 1.7% were using herbal products for magic and 0.8% for rituals. These conditions may have been a big factor contributing to the use of the herbal products in this region. This was revealed by the big difference between the total number of children using the herbal medicine for other conditions and for the main diseases. Often, caregivers believe that since herbal medications, supplements and body growth boosters are promoted as natural; they are safer and less likely to cause side effects than prescription medications.
CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Overview

This study was designed to establish the utilization of herbal medicine among children less than 5 years of age in Mwimbi Division, Tharaka Nithi County, Kenya. The independent variables, which were postulated to influence the use of herbal medication among under-five years of age children, were analyzed. In keeping with specific objectives of the study, the following summary of the main findings will glimpse at the prevalence of herbal medicine use, socio-demographic characteristics that influence herbal use, the herbs used and the health conditions they are used for and the level of concomitant use of herbal medicine and conventional medicines.

5.2 Discussion

5.2.1 Prevalence of herbal medicine use in under-five years of age children

The study set out to establish the utilization of herbal medicine among children under-five years of age in Mwimbi Division, Tharaka Nithi County, Kenya. The prevalence of herbal medicines use among children less than 5 years of age in Mwimbi Division, Tharaka Nithi County, Kenya was 89.4%. The findings were higher than the estimate that 80% of the African population use herbal medicine in some way for their primary health care needs (WHO, 2008). Studies by WHO (2008) suggested heavier reliance of people in rural areas on traditional medicine for primary health care. In addition, similar figures can be observed in some urban contexts. This finding is higher than that of South Africa where 55% of under-five years of age children used herbal medicines
(Mabina et al, 2007). Another study in South Africa found that about 60% of caregivers used traditional medicine on their children (Jewkes et al, 2008). This is also similar to a study carried out in Kisii, Kenya, on the prevalence and pattern of herbal medicine use among children aged 0-12 years admitted to Kisii level 5 hospital. Out of 260 children recruited into the study, 214 (82.3%) had used or continued to get herbs for the current illness, (Otieno and Sam, 2007).

5.2.2 Socio-Demographic and other Characteristics associated with herbal Medicine use among under-five years of age

In the current study, age of the under-five children, level of education, occupation, distance to the nearest health facility, location of residence and monthly income were found to be significantly associated with use of herbal medicine. However age of the caregivers, both sex of the under-five children and caregivers and religion, were not a significant predictor of herbal medicine use among under-five years of age children. The findings are similar to the report that in developed countries herbal medicine use has been associated with income, or being a cultural minority (Buor, 2008; Fosu, 2005). Also similar to a report by official Journal of the American academy of paediatrics on herbal therapy use in a pediatric emergency department population, where the mean age of children receiving herbal therapies was 2.76 years (59%) (Laski et al, 2008). Most caregivers who gave their children herbs were between the ages of 21-30 years. This is contrary to a study carried out in Brunei Darussalem on the use of traditional remedies where the usage was highest in the caregivers of children under five of age with 31-45
years age category (Kifli et al, 2007). Sex of caregivers was not significantly associated with herbal medicine use. This result however differs from the findings of Fosu (2005) who found a significant relationship between sex of the caregiver and the use of herbal medicine. Also with respect to sex, women caregivers are more likely to rely on herbal medicines than men. Women caregivers are less likely than men to consult modern health services, less willing to wait longer than men caregivers to seek treatment when ill, less reluctant to spend limited resources on their own needs, and often cope with illness by self-treatment or consulting herbalists.

Level of education was significantly associated with herbal medicine use and these findings were similar to another study conducted among caregiver’s in Ghana; herbal medicine use was higher among those with only primary or no education than among secondary and tertiary education. According to Buor (2008) and Mensah (2008), there is a strong inverse relationship between educational attainment and the use of herbal medicine. Buor (2008), for instance, states that people with little or no formal education patronize herbal medicine more than those with higher education. Occupation was significantly associated with herbal use. The findings were similar to a study done by Brown (2008) that herbal medicine use was significantly highest among those in unskilled occupations and lower socioeconomic status. Location of residence was significant predictor of herbal medicine use. This is contrary to the findings in Tanga in which prevalence of herbal medicine use in urban and rural areas were 43.3% and 40.2% respectively. This was similar to another study done in Ghana that herbal medicine is often used in the rural areas than the urban areas (Brown, 2008, Buor,
Generally, herbal practitioners in the rural areas are consulted at the early stages of diseases and for more acute complaints, often before a conventional medical practitioner. This is because rural residents have little or no access to conventional medicine and find herbal medicine to be relatively less expensive (Buor, 2008; Brown, 2008).

5.2.3 Herbal medicine, Health condition and herbal medicine use

The report shows gastrointestinal and respiratory conditions as the commonest addressed disease by the doctors at the local hospital. Most of the respondents that reported to use herbal medicine reported to use it for treatment of malaria respiratory and gastrointestinal diseases. This is similar to annual report of morbidity data for under-five years of age covering a three-year period from year 2011-2013 taken from P.C.E.A Chogoria hospital, a hospital in the area of study.

The most common diseases within the study area were gastrointestinal disorders, respiratory disorders, malaria, skin diseases, and pneumonia, diarrhea and eye infections. Their incidences increased in that order. This was confirmed by the P.C.E.A Chogoria Hospital morbidity data covering a three-year period from year 2010 to 2013 above. This is similar to a study (Karuru et al, 2007) done in Embu and Mbeere which reported that the most frequent medical conditions for herbal use were malaria, upper respiratory infections, gastrointestinal infection, skin infection and pneumonia.
Gastrointestinal disorders were identified as the most common diseases that elicited use of herbal medicine. Similarly, Njoroge and Kibunga (2007) reported that a majority of their respondents relied on traditional herbal preparations for the treatment of respiratory and gastrointestinal diseases in an urban area, Thika, Kenya. They added that spatial inequity of facilities favoring urban areas, unavailability of medical services such as drugs and personnel and accessibility problems are quoted as some of the common reasons why people rely heavily on traditional systems in the presence of a modern medical system. Sindiga et al. (2005), however, also suggest that some people use the traditional system of healthcare for predominantly psychosocial and cultural reasons. Similar findings were also reported in the current study.

In addition, it was reported that conventional medicine “was not working”. Similar findings were reported by Langloid-Klassen et al. (2007) AIDS study, that most common reason of use was abundance of herbal medicine as well as its perceived efficacy. “Lack of response” to conventional medicine was one of the main reasons of use of herbal study in an Iranian urban area (Langloid-Klassen et al., 2007). Kuo et al (2004), who studied cancer in children, stated that, patients often combine herbal medicine with conventional treatment to improve quality of life, alleviate side effects, take control of their care and accommodate their worldview into the healing process.

*Erythrina abyssinica* was a multi-purpose medicinal plant and among the most used herbal plant for various conditions. It was used alone or in combination with other plants. The second and third most utilized medicinal plants were *Amaranthus hybridus*
and *psidium guajava* respectively. This is similar to a study done in Embu and Mbeere in which *Amaranthus hybridus* was identified as third most used. Malaria was identified by Kareru, *et al*, 2007 as the most common disease that elicited use of herbal medicine. There was a correlation between the number of plants used to treat the most common diseases and the prevalence of diseases found in the study area.

5.2.4 Known Phytochemicals and Medicinal Use of Herbs in the study

Plants are known as a major source of modern medicines. From ancient times, human beings 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 5 have been found to contain the medicinal properties as outlined below:

*Erythrina abyssinica*

It has anti-mycobacterial activity. The plant extracts contains alkaloids, tannins, terpenoids and flavones. The plant is used for TB and TB-related diseases in ethno medicine, (Bunalema *et al*, 2011). In the study the plant is used in treatment of cough.

*Croton macrostachus*

*Croton macrostachus* contains diterpenoids, triterpenoids, alkaloids, flavonoids, lignoids and proanthocyanidins, which have strong antiplasmodial and antihelmithic activity (Salatino *et al*, 2007). Croton oil has been used in traditional Chinese medicine. It has active ingredient used as facial-rejuvenating chemical peels when used in a phenol-based solution since it has a caustic
exfoliating effect on the dermal layer of the skin (Njoroge and Bussmann, 2007; Tedeg et al., 2005). In the study the plant is used in management of cold and flu.

**Eucalyptus saligna**

Chemical composition of essential oil found in *E. saligna* are isoamyl isobutyrate, hydrocarbons monoterpenes such as α-pinene, camphene, β-pinene, myrcene, α-phellandrene, p-cymene and γ-terpinene; oxygenated monoterpenes such as 1,8-cineole, α-pinen oxide, fenchol, campholenal, E-pinocarveol, pinocarvon, borneol, terpinen-4-ol and α-terpineol; hydrocarbons sesquiterpenes such as aromadendrene, Z-β-farnesene, β-bisabolene, Z-α-bisabolene and germacren B, oxygenated sesquiterpenes such as elemol, spathulenol, cubenol and γ-eudesmol (Dongmo et al., 2008). The essential oil shows antifungal activity and this is attributed to the oxygenated compounds. *Eucalyptus* – based medicines often have a potent anti-inflammatory action that has generally been attributed to 1,8-cineole (eucalyptol)- which also has analgesic properties. The eucalyptus also has antispasmodic and antibacterial qualities. These qualities make it perfectly suited for respiratory conditions. Based on the study the plant is therefore used in management of colds and flu and toothache. (Griffin and Wyllie, 1999). Based on the study findings the plant is used in management of cold and flu and toothache.

**Senna didymobotrya**

The plant is also indicated for the treatment of fungal and bacterial infections, hypertension, haemorrhoids, sickle cell anaemia, and a range of women’s diseases, such as inflammation of the fallopian tubes, fibroids and backache, to stimulate lactation, and
to induce uterine contractions and abortion. It is recommended that pregnant women and children take a small dose (Griffin and Wyllie, 1999).

A number of anthraquinone derivatives have been isolated from the leaves and pods of *Senna didymobotrya* such as emodin, chrysophanol, physcion and knipholone. Other compounds isolated from the leaves are aloe-emodin, rhein and small quantities of dianthrone emodin, dianthrone aloe-emodin, sennoside B, C and D, catechinic tannins, flavonoids and aloe-emodin B-glucoside (Alemayehu *et al*, 1996), some of which have antimicrobial and antioxidant activities. From the study findings the plant is used for treatment of abscess and diarrhea.

**Vernonia lasiopus**

The organic fraction extracts of the plant was shown to possess cytotoxic effects towards human carcinoma cells of the nasopharynx. It is effective against amoebic dysentery, gastrointestinal disorders and has antimicrobial and antiparasitic activities. The biologically-active compounds are saponins and alkaloids, terpenes, steroids, coumarins, flavonoids, phenolic acids, lignans, xanthones and anthraquinone, edotides and sesquiterpenes (Moundipa *et al*, 2000). Based on the study findings the plant is used in management of cold and amoeba.

**Prunus africana**

*Prunus africana* has anti-inflammatory, antitumor and antibacterial properties. In modern medicine, stem bark water extract is used to manufacture products used for the treatment of prostate gland hypertrophy (enlarged prostate glands) and more serious
conditions of benign prostate hyperplasia, a debilitating ailment common in older men which is eased through the anti-inflammatory effect of *P.africana* extract on prostatic tissue. These extracts have been patented and are being sold in a number of pharmacies (Schipmarn, 2001). The plant is used in management wound dressing and arrow poisoning.

**Ricinus communis**

Has both Antihistamine and anti-inflammatory properties. Castor Oil an extract from the plant is commonly used for the preparation of hair-oils, hair fixers and aromatic perfumes. It is used as an ingredient in hair lotions and tonics in concentrations of 0.5-20 per cent. Oil is also used externally for dermatitis, warts, cold tumors, indurations of the abdominal organs, whitlows, lacteal tumors, indurations of the mammary gland, corns, and moles, and eye infection. (Lomash *et al.*,2010).

Castor Oil is a cathartic and has labor-inducing properties. Ricinoleic acid has served in contraceptive jellies. Ricin, a toxic protein in the seeds, acts as a blood coagulant. It is used externally for dermatitis and eye ailments. Seeds, which yield 45–50% of a fixed oil, also contain the alkaloids ricinine and toxalbumin ricin, and considered purgative, counter-irritant in scorpion-sting and fish poison. Leaves can be applied to the head to relieve headache and as a poultice for boils.

Castor Bean is considered anodyne, antidote, aperient, bactericide, cathartic, cyanogenetic, discutient, emetic, emollient, expectorant, insecticide, lactagogue, larvicidal, laxative, purgative, tonic, and vermifuge. castor or castoroil is a dangerous
ingredient in folk remedies for abscess, anasarca, arthritis, asthma, boils, burns, cancer, carbuncles, catarrh, chancre, cholera, cold, colic, convulsions, corns, craw-craw, deafness, delirium, dermatitis, dogbite, dropsy, epilepsy, erysipelas, fever, flu, gout, guineaworm, headache, inflammation, moles, myalgia, nerves, osteomyelitis, palsy, parturition, prolapse, puerperium, rash, rheumatism, scald, scrofula, seborrhea, skin, sores, stomachache, strabismus, swellings, toothaches, tuberculosis, tumors, urethritis, uteritis, venereal disease, warts, whitlows, and wounds (Lomash et al, 2010). In the study it’s used in treatment of swelling, boils and wounds, constipation.

**Vitex doniana**

*V. doniana* has saponins, tannins, anthraquinones, terpenoids and flavonoids and cardiac glycoside. It has antioxidant property and is used to treat anemia and the root is used for gonorrhoea. It is also supposed to improve fertility and is used to treat jaundice, leprosy, and dysentery (Lomash et al, 2010). Based on the study findings the plant is used as a vitamin supplement.

**Amaranthus hybridus**

*A. hybridus* has astringent, Hemostatic, antidiarrheal, Nutritive, Alterative, Diuretic, Alkalizing and Anthelminthic activity (Foster and Duke 2000). It is used in treatment of the following conditions; **Acid Stomach** – The alkalinizing properties of it’s raw, fresh young leaves will help neutralize stomach acid • **Bites** – Leaf poultice to treat snake and insect bites • **Diarrhea** – Infusion for relief • **Dysentery** – Strong leaf decoction • **Menstruation (Profuse)** – Drink leaf infusion • **Mouth Irritations** – Infusion as
mouthwash or chew leaves (spit poultice) and spread them around the mouth (or pack upon sore) with the tongue • **Nose Bleeds** – The leaves encourage clotting. Roll leaf with fingers, releasing the moisture, into a nose plug. Place plug inside the affected nostril and leave until bleeding completely stops. Remove gently • **Parasites** (Intestinal) – A strong leaf decoction to remove worms and other parasites from the digestive tract • **Stings** – Leaf poultice to treat bee, wasp, hornet and scorpion stings • **Stomach Ache** – Infusion • **Throat Irritations** – Gargle infusion • **Toxicity (Blood)** – Infusion • **Wounds** – Infusion or decoction as a wash. (Foster and Duke 2000). Based on the study findings, the plant is used in management of diarrhea and indigestion.

**Psidium guajava**

It’s known for its anti-inflammatory, antimicrobial, antioxidant, anti-diarrheal, antimutagenic properties. The important constituents of guava are vitamins, tannins, phenolic compounds, flavonoids, essential oils, sesquiterpene alcohols and triterpenoid acids. Leaves contain phenolic compounds, isoflavonoids, gallic acid, catechin, epicatechin, rutin, naringenin, kaempferol having hepatoprotective, antioxidant, anti-inflammatory, anti-spasmodic, anticancer, antimicrobial, anti-hyperglycemic, analgesic actions. The leaf contain two important flavonoids quercetin known for its spasmolytic, antioxidant, antimicrobial, anti-inflammatory actions and guaijaverin known for its antibacterial action. Pulp contains ascorbic acid, carotenoids (lycopenes, β-carotene) possessing antioxidant, anti-hyperglycemic, antineoplastic antimicrobial, anti-hyperglycemic, analgesic, endothelial progenitor cells, anti-stomachache and anti-diarrhea. The seed contains glycosides, carotenoids, phenolic compounds having
antimicrobial actions (Barbalho et al, 2012). In the study the plant is used in management of worms.

**Vangueria madagascariensis**

Vangueria madagascariensis, consumed for its sweet-sour fruits, is used as a biomedicine for the management of diabetes and bacterial infections. Preliminary phytochemical screening of the leaves and stems has shown the presence of alkaloids, terpenes, and cyanogenetic heterosides as well as phenols, tannins, and saponosides which may likely be responsible for its antimicrobial and antiparasitic effects. (Nelvana and Fawzi, 2014). In the study the plant is used in management of worms.

**Mangifera aindica**

*Mangifera aindica* has active flavonoid, a natural xanthone C-glycoside, anti-diuretic, anti-emetic and cardiac protection properties. The bark is used in treating cancer sore, gingivitis, diarrhea and dysentery (Boullard, 2001). The decoction prepared from stem bark is used orally for those with toothache/dental caries (Ross, 1999; Nuñez-Selles, 2005). The mango seeds are valuable in diarrhea and are also considered useful in certain disorders connected with women’s reproductive organs. For example, the paste of the decorticated kernel of mango is applied inside the vagina to cure leucorrhoea, virginities, and relax walls due to multiple pregnancies. Aqueous extract from the stem bark is used to treat cancer, diabetes, asthma, infertility, lupus, prostatitis, prostatic hyperplasia, gastric disorders, arthralgies and mouth sores (Nuñez-Selles, 2005). Mangiferin in *M. indica* has a potential as a naturallyoccurring chemopreventive agent
(Yoshimi et al., 2001). Based on the study the plant is used in management of worm, diarrhea and vomiting.

**Solanum incanum**

The extract of *S. incanum* has tannins and saponins. Saponins are known for their medicinal properties as a natural blood cleanser, expectorant and antibiotics (Kalanithi and Lester, 2001). Extract of fruits of *S. incanum* have been shown to exhibit methanol have showed a very strong inhibition when tested in vitro for antimicrobial activity. *Solanum incanum* herb displays a superior cytotoxicity in human lung cancer cells (Liu et al., 2004). Ethanol extract of ripe berries have been tested for its growth inhibiting effect with breast cancer cells and the results have been positive (Son et al., 2003). Based on the study findings the plant is used in management of pneumonia, cold and flu.

**Aloe kedongensis**

The sap of *Aloe* contains anthraquinones, a phenolic compound that has stimulating effects on the bowels and antibiotic properties. They help with absorption from the gastro intestinal tract and have anti-microbial and pain killing effects. The anthraquinones in *Aloe* species breakup residue, pus and lifeless cells, enhances blood circulation to the region and flush out material from the wounds and ulcers (Ejele and Njoku, 2008). Based on the study findings the plant is used in management of pneumonia and constipation.
5.2.5 Concomitant use, respondents’ perception of safety and efficacy of herbal medicine

The concomitant use of herbal and conventional medicine indicates that use of both systems of care significantly influences health-seeking behavior of users. However, concurrent herbal use will likely place these patients at risks due to possible adverse interactions. According to Langloid-Klassen (2007), concomitant use of herbs with pharmacy medicine interacts to produce adverse effects. Also a study done by (Otieno and Sam, 2010) reports that nearly two out of every three children admitted at Kisii Level 5 Hospital are on herbal therapy. Fortunately, there was no report of adverse effects among the participants in the study. In a Family Care International (2003) report, use of herbal medicine for children was claimed to cause delays in seeking biomedical attention when complications arose. Pediatric herbal preparations can be used as supplements for nutritional purposes and some are used for medicinal purposes such as teething, and other uses (Glover et al., 2003). In the developed world, popular herbs include ginger for nausea, echinacea as immuno-stimulant, ginseng for energy and immune function, *Ginkgo biloba* to stimulate cognitive functioning (Tiran, 2003). In comparison to Western/conventional medicine, it was reported that some conventional medicine might not be safe for children. Similar findings were reported by Langloid-Klassen (2007), that there is a potential for drug-herb interactions which may affect course and outcome of patient’s condition. Most potential drug-herb interactions have been reported from case reports, scarcely from large scale studies (Langloid-Klassen, 2007). These case reports include Fugh-Beghman’s study on anticoagulant effects of
garlic and cod liver oil and Izzo and Ernst’s report of the interaction of St. John’s Wort with hormones, antibiotics and chemotherapeutic agents (Langloid-Klassen, 2007). When knowledge on herb-drug interactions, safety and efficacy is available, patients can be advised accordingly. In Langloid-Klassen (2007)’s study among cancer patients it was found that 12% were at potential risk of herbal medication interference with current treatment.

5.3 Conclusion

The study set out to establish the utilization of herbal medicine among children less than 5 years of age in Mwimbi Division, Tharaka Nithi County, Kenya. In the study, utilization of the herbal medicine among under-five years of age children was calculated for various social demographic factors including gender and age of both children and caregivers, marital status, residence, income, occupation, household size, distance to the nearest and education level. The following conclusions can therefore be made from the results discussed above.

1) The results have made it evidently clear that herbal medicine is highly used (89.4%) among under-five years of age children in Mwimbi Division, Tharaka Nithi County

2) The socio-demographic profile indicates that, level of education, occupation, distance to the nearest health facility, location of residence and monthly income significantly contributed to the use of herbal medicines among under-five years of age children in Tharaka Nithi County, Kenya.
3) The most frequent conditions for which herbs were used included gastrointestinal and respiratory diseases.

4) The most commonly used herbs were *Erythrina abyssinica* and *Amaranthus hybridus*

5) Concomitant use of herbal medicine with conventional medication among the under-five years of age children was (50.2%).

6) The desire of taking supplement is a way to healthy living

7) Supplements and body growth boosters are other conditions mainly contributing to use of herbs apart from treating illnesses.

8) Majority of herbal plant used in the study have an existing scientific evidence and ethno-medical use

**5.4 Recommendations**

Based on the data collected and analyzed, and from the conclusions drawn from the study, a number of recommendations can be made.

a) The community through the community leaders and herbalist that they need to be sensitized on the need of cultivation of the very popular herbs for future generations

b) The Ministry of Health should re-evaluate the issue of optimal integration of herbal medicines with the western dominated health care systems and also data should be used by MOH for purpose of decision and making in the area of study
c) The Ministry of Health should ensure that correct information on use of herbal medicine with conventional medicine is disseminated to general public. This will enable people to make informed choice on use of herbs concomitantly with conventional medicine.

5.5 Suggestion for further research

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

2. Further studies are needed on ways in which herbal and modern health care systems could be fully integrated. Studies are also needed on ways traditional medicine can be brought into Kenya health system and ways to improve regulation and safety standards.

3. Pharmacological study focusing on local commonly used herbal medicines should be done. This should be carried out to identify the exact active compounds of the herbs and to evaluate the effects of these compounds to the children.

4. Studies into the types of plants and the parts of plants used for medicine should be investigated in the future. The documentation of plants and their therapeutic properties is an area that must be of interest to future researchers.
REFERENCES


Vongo, R. (2009). Local production and dispensing of herbal anti-malarias. A report from the first international meeting of research initiative on traditional anti-malarias (RITAM), Moshi, Tanzania.


APPENDIX I: MAP OF KENYA SHOWING THE LOCATION OF THARAKA NITHI COUNTY.
APPENDIX II: INFORMED CONSENT

My name is David Mwikya Nzuki. I am a MPH student from Kenyatta University. I am conducting a study on “utilization of herbal medicine among children under 5 years of age in Mwimbi Division, Tharaka Nithi County, Kenya”. Please take whatever time you need to discuss the study with your family and friends, or anyone else you wish to. The decision to join, or not to join, is up to you. In this research study, 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. They will be used to improve access and quality herbal medicines among under 5 years of age in this region as well as in other regions of Kenya.

Procedures to be followed

If you decide to participate you will be asked to answer some questions about herbal use on your child. I will record the information from you in a questionnaire. You have the right to refuse participation in this study. Please remember that participation in the study is voluntary. You may ask questions related to the study at any time. You may refuse to respond to any questions and you may stop an interview at any time. You may also stop being in the study at any time without any consequences.
Discomforts and risks
This study has no known risk. Some of the questions you will be asked are on herbal use and may be embarrassing or make you uncomfortable. If this happens, you may refuse to answer these questions if you so choose. You may also stop the interview at any time.

Benefits
It is reasonable to expect the following benefits from this research: If you participate in this study you will help us to learn about herbal use among under 5 years of age that can improve the health of the children reducing mortality and morbidity rate. You will also benefit from being in the study and if you are found to have a problem you will be advised on treatment. However, we can’t guarantee that you will personally experience benefits from participating in this study. Others may benefit in the future from the information we find in this study.

Reward
There will be no reward if you agree to participate in this study.

Confidentiality
We will take the following steps to keep information about you confidential, and to protect it from unauthorized disclosure, tampering, or damage. Your name will not be recorded on the questionnaire. The questionnaires will be kept in a locked cabinet for safe keeping at Kenyatta University. Everything will be kept private.

Contact information
If you have any questions you may contact Prof Nicholas Gikonyo on 0722763186 or Dr Peterson Warutere on 0721993833 or the Kenyatta University Ethical Review Committee Secretariat on kuerc@ku.ac.ke.
1. CONSENT FOR PARTICIPANTS 18 YEARS AND ABOVE

Participant’s Statement (over 18 years)

The above information regarding my participation in the study is clear to me. I have been given a chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that my records will be kept private and that I can leave the study at any time. I understand that I will still get the same care and medical treatment whether I decide to leave the study or not and my decision will not change the care I will receive from the clinic today or that I will get from any other clinic at any other time.

Name of Participant……………………………………………………………………

_____________________________  ______________________________
Signature or Thumbprint      Date

Investigator’s statement

I, the undersigned, have explained to the volunteer in a language s/he understands, the procedures to be followed in the study and the risks and benefits involved.

Name of Interviewer…………………………………………………………

_____________________________  ______________________________
Interviewer signature         Date
2. **ASSENT FOR PARTICIPANTS 15-18 YEARS**

**Assent’s Statement (for below 18 years)**

The above information regarding my participation in the study is clear to me. I have been given a chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that my records will be kept private and that I can leave the study at any time. I understand that I will still get the same care and medical treatment whether I decide to leave the study or not and my decision will not change the care I will receive from the clinic today or that I will get from any other clinic at any other time.

Name of Couple or parent …………………………………………………………………………

_____________________________________________  ________________________

Signature or Thumbprint  Date

**Investigator’s statement**

I, the undersigned, have explained to the volunteer in a language s/he understands, the procedures to be followed in the study and the risks and benefits involved.

Name of Interviewer……………………………………………………

_____________________________  ________________________

Interviewer signature  Date
SEHEMU YA II: RUHUSA YA KUFANYA UTAFITI

Jina (David M Nzuki) ni mwanafunzi wa chuo kikuu cha Kenyatta ambaye anaomba kushiriki kwenu katika utafiti ambapo lengo lake ni kujua mambo ambayo yanachangia kuongezeka kwa matumizi ya dawa za kienyeji kwa watoto katika wilaya ya Maara. Kushiriki kwenu kutajumuisha kujibu maswali ambayo yanaonyesha hoja kuhusu kuhusu utafiti.


Data yote itakayo kusanywa italidwa vilivyo kabla na baada ya utafiti. Washiriki hawatalipwa fidia kwa kushiriki kwao. Nakala moja ya matokeo itapatiwa na chifu ili uweze kutazama matokeo ukitaka.

Ikiwa una swali lolote kuhusu utafiti huu ams kushiriki kwako unaweza kuwasiliana na:

1. David Mwikya Nzuki (mtafiti) simu: 0726484966
2. Prof. Nicholas Gikonyo simu : 0722763186
3. Dkt Peterson Warutere simu: 0721993833

Au sekta 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 sahii fomu hii ya ruhusa bila kulengeza malalamizi yoyote rasmi, haki na ukarabati.

Mshiriki

Sahii…………………………………………………………………… Tarehe …………………

“ninakubali nimemweleza mshiriki umbo na maana, faida zilizoko na madhara yanayotarajiwa katika kushiriki utafiti huu. Nimejibu maswali yote yaliyoulizwa na nimeshuhudia sahii iliyo hapo juu”

“ nimempatia mshiriki nakala ya fomu hii iliyotiwa sahii”

Mtafiti: David Mwikya Nzuki

Sahii ……………………………………………………………………… Tarehe …………………
APPENDIX III: QUESTIONNAIRE FOR PARTICIPANT

Data collection instrument

This questionnaire is an informant collecting tool for a study whose objective is to establish the use of herbal medicines in Mwimbi division, Tharaka Nithi County among children less than 5 years of age. Maara district and will be used for the purpose of this study only. All information volunteered will be treated with utmost confidentiality.

1. Name of location ………………………………………………………………

2. Sex of the subject.
   Male [ ]   Female [ ]

3. a) Where do you live …………….
   b) Location of residence.
      Town [ ]   Rural [ ]

4. How old is your child? …….. Years old.

5. What faith do you profess?
   Christian (Catholic) [ ]   Christian (Protestant) [ ]
   Muslim [ ]
   Other (specify)………………………………………………………………

6. What is the level of formal education did you attain?
   Primary school [ ]   High secondary (O level) [ ]
   College [ ]   University [ ]
   No formal education [ ]
7. What is your current occupation?

Civil servant [ ]  Casual laborer [ ]
Business man [ ]  Farmer [ ]
Other (specify) …………………………

8. A) How would you rate the current state of your child health?

Excellent [ ]  Very good [ ]
Good [ ]  Fair [ ]
Poor [ ]

B) Have you ever used herbal medicine for your child?

Yes [ ]  no [ ]

9. For which particular disease does the herbal medicine treat?

Malaria [ ]  Gastrointestinal disorder [ ]
Skin diseases/trauma [ ]  Eye infections [ ]
Respiratory disorders [ ]  Toothache [ ]
Allergy [ ]  vitamin supplements [ ]
Immune booster [ ]
Others specify ……..

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

Herbal products: why did you use it?

*Erythrina abyssinica* [ ]
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Landolphia buchananii</em></td>
<td>[ ]</td>
<td></td>
</tr>
<tr>
<td><em>Croton macrostachyus</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Hoslundia opposite</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Acacia hockii</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Clerodendron myricoides</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Eucalyptus saligna</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Cordial Africana</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Senna didymobotrya</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Vernonia lasiopus</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Prunus Africana</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Dovyalis abyssinica</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Vitex doniana</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Amaranthus hybridus</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Psidium guajava</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Vangsueria madagascariensis</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Mangifera indica</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Solanum incanum</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><em>Aloe kedongensis</em></td>
<td></td>
<td>[ ]</td>
</tr>
<tr>
<td><strong>Other (specific)</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11. a) Are there times you use conventional medicine for the disease you have mentioned in (10) above?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

b) If (12a) is yes do you use the conventional medicine together with herbal medicine or at different times for your child?

<table>
<thead>
<tr>
<th>Together</th>
<th>different times</th>
</tr>
</thead>
</table>

12. Why do you use herbal medicine for your child?
Natural [ ] Healthy [ ]

No side effect [ ]

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

13. When did your child start using herbal medicine?

Year ........ Month.........

14. Who recommended you to start using herbal medicine on your child?

Recommended by family member or friends [ ]

Obtained from the farm or backyard [ ]

Obtained from herbal Practitioner [ ]

Others specify ..............................................................

15. In your opinion is herbal medicine superior to conventional medicine?

Yes [ ] No [ ]

Sometimes [ ]

16. Has your child being treated by a specific herbalist or several?

Specific [ ] Several [ ]

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

Yes [ ] No [ ]

18. Do you consider herbal medicine expensive or cheap?

Expensive [ ] Cheap [ ]

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

Backyard [ ] Supermarket [ ]

Herbal clinic [ ]
20. For how long has your child been with this disease you have been using herbal treatment

<table>
<thead>
<tr>
<th>Time Period</th>
<th>[ ]</th>
<th>[ ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 year and below</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 year – 2 years</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>2 years – 3 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 years – 5 years</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

21. From the initial stages your child was diagnosed with the illness have you been using herbal medicines or you started with conventional medicines.

<table>
<thead>
<tr>
<th>Medication Type</th>
<th>[ ]</th>
<th>[ ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have used herbal medicine from the start</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Started using herbal medicine at some stages of</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>the disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used both hospital and herbal medicine from the</td>
<td></td>
<td></td>
</tr>
<tr>
<td>beginning</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

22. If you answer in (21) above is started using herbal medicine at some stages of the disease which drugs were your child using initially?

<table>
<thead>
<tr>
<th>Drug Type</th>
<th>[ ]</th>
<th>[ ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional medicine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Any other (specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Reason</th>
<th>[ ]</th>
<th>[ ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side effects of hospital medicines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital medicine was not helping</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>relief the disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Got bored with long use of hospital</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>medicine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desperation to get cured</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

24. Do you follow doctor’s prescription faithfully?

| [ ] Yes | [ ] No |
25. If your child use herbal medicines and hospital medicine to treat this disease at the same time, do you reveal to your herbal doctor of double use?

Yes [ ] No [ ]

26. When you compare the hospital medicine and herbal medicine which one of the two relief you much?

Conventional medicine [ ]
Herbal medicine [ ]
A combination of both [ ]

27. Other than taking herbal products to cue illness which other conditions do you use herbs for? (please tick where appropriate, check all that apply)

Supplements [ ] Magic [ ]
Brushing Teeth [ ] Improve appetite [ ]
Incense [ ] Bath [ ]
Oils of rituals [ ]
Other (specify) ……………………………………………………………

Thank you for your cooperation
APPENDIX IV: FOCUSED GROUP DISCUSSION QUESTIONS

1. Why do you people in this community use herbal medicine

| Natural | [ ] | Healthy | [ ] |
| No side effect | [ ] | Others | ………………… |

2. How do most mothers start using herbal medicine on their under 5 children?

| Recommended by friends | [ ] |
| Own free will | [ ] |
| Recommended from a family/relatives | [ ] |
| Others……………………………………………………………… | |

3. Is herbal medicine superior to conventional medicine when used on the under 5 children

| Yes | [ ] | No | [ ] |
| Sometimes | [ ] |

4. Are herbal remedies alone sufficient to relieve symptomatic episodes among under 5 years

| Yes | [ ] | No | [ ] |

5. Do you consider herbal medicine expensive or cheap?

| Expensive | [ ] | Cheap | [ ] |

6. Where do you obtain your herbs or medicinal plants from

| Backyard | [ ] | Supermarket | [ ] |
| Herbal clinic | [ ] |

Thank you for your cooperation
APPENDIX V: QUESTIONNAIRE FOR CLINICIAN

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 Mwimbi Division, Tharaka Nithi County and will be used for purpose of this study only. All information volunteered will be treated with utmost confidentiality.

1) Name of the health facility..............................................................

2) Sex of the clinician?

   Male   Female

3) How old are you?----------- years

4) a) What is your specialty............................................................

   b) For how long have you worked in your specialty............................?

5) a) Have you been receiving less than 5 years of age patients who abandon herbal treatment?

   Yes   No

   b) If yes what reasons do the under 5 years of age patients cites abandonment?

   • High cost of herbal medicines
   • Adverse effects
   • Failure to relief the condition
6) The under 5 years of age patients you treat do you find whether they use herbal medicine and conventional medicine for the same condition?

Yes ☐ No ☐

7) If (6) above is Yes, do they readily reveal their double use?

Yes ☐ No ☐

8) For cases you find concomitant use, how do you deal with the under 5 years of age patient?

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

9) Usually, how are the conditions of fewer than 5 years of age patients who usually abandon herbal medicine?

- No difference with people using conventional medicine ☐
- Desperate/ very poor ☐
- At death bed ☐

10) Are there instances when herb users come to seek treatment after developing adverse conditions after using herbs?

Yes ☐ No ☐

Thank you for your cooperation
APPENDIX VI: CIURIA

Ciura ino ni cia kwithirania ntento kwenda kumenya buria ndawa cia miti itumikaga Chogoria cibitari kuri twana twa miaka itano kuimana kiri district ya Maara. Mauntu mama ni ma kithomo aki. Nteto cionthe ukaigwa na witho.

Mworonto jwa mbere: Mauntu maria matuthiuruki maria matumaga dawa cia miti itumirwa kiri twana twa miaka itano kwinama kiri Mwimbi, county ya Tharaka Nithi.

1. Rwita ria naria umite ……..
2. Wi muntu uriku
   Muka [ ] Murume [ ]
3. a). uturuga ku……………..
   b) utwire guntu gukari
   miji iminene [ ] miji iminini [ ]
   nturani [ ]
4. kana gaku kena ukuru bwigana? [ ] miaka
5. uthijaga kaninha uriku?
   Mukristo (katholiki) [ ] Mukristo [ ]
   Muislamu [ ]
6. Ingi yonthe ………………………
7. Uthomete mwanka ku?
   Primari [ ] Secondari [ ]
   Koleji [ ] Univasiti [ ]
8. A) Urutaga wira uriku?

Mwalimu [ ] Kibarua [ ]

Biashara [ ] Mwaki [ ]

Wira ungi......................

b) utumagira kuthondeka mwana waku na miti?

ii [ ] Ari [ ]

9. a) Ugwataga mbeca jiigana(kshs) mweri umwe?

Ndi ya ngiri jiiri [ ] Gatigati ka 2001-9999 [ ]

Gatigati ka 10000- 19999 [ ] Gatigati ka 20,000-29,999 [ ]

Iguru ria 30,000 [ ]

b). Ugima wa mwiri wa mwana waku thaa ino ukari ati

Mwega muno [ ] Mwega [ ]

Gatigati [ ] Ti mwega [ ]

Mwontonu jwa 2:

Miti iria utumagirwa kuri twana twa miaka 5 kwinama kiri Mwimbi Tharaka Nithi kaunti

10. Miti iria utumagira kuthondeka mwana waku (andika iria utumagira na gitumi kia gutumira)

Miti

Muuti [ ]
<table>
<thead>
<tr>
<th>Place</th>
<th></th>
<th>Place</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Muungu</td>
<td></td>
<td>Mutundu</td>
<td></td>
</tr>
<tr>
<td>Mugaa</td>
<td></td>
<td>Munyua-mai</td>
<td></td>
</tr>
<tr>
<td>Muringa</td>
<td></td>
<td>Muringa</td>
<td></td>
</tr>
<tr>
<td>Mwinu</td>
<td></td>
<td>Mucatha</td>
<td></td>
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<tr>
<td>Mwiria</td>
<td></td>
<td>Mukambura</td>
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<tr>
<td>Mupuru</td>
<td></td>
<td>Mubariki</td>
<td></td>
</tr>
<tr>
<td>Terere</td>
<td></td>
<td>Muembe</td>
<td></td>
</tr>
<tr>
<td>Mupiru</td>
<td></td>
<td>Mutongu</td>
<td></td>
</tr>
<tr>
<td>Kithunju</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**11. Tiga kunyua dawa cia miti nikenda uragia, niatia bungi uruthaga nikenda igutethie?**

<table>
<thead>
<tr>
<th>Place</th>
<th></th>
<th>Place</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kunogora mwiri</td>
<td></td>
<td>Kweruyia maega</td>
<td></td>
</tr>
<tr>
<td>Kwongera kuria irio</td>
<td></td>
<td>Kuthamba</td>
<td></td>
</tr>
<tr>
<td>Maguta ma kutheria</td>
<td></td>
<td>Magingi</td>
<td></td>
</tr>
</tbody>
</table>
Untu bwa 3. Buria dawa jia miti itumagirwa kiri ana ba miaka itano kuenama kiki Mwimbi, Tharaka Nithi kaunti

12. Mwana waku ambiririe kunywa ndawa jia miti ri?
   
   Mwaka ...... mweri ......

13. Mwana waku ambiririe kunywa ndawa jia miti niki?
   
   Mataro ma antu ba muji na acore [ ]
   Kwenda gwakwa nyingwa [ ]
   Mataro ma antu ba muji [ ]
   Mangi .................

14. Kiri mecirira maku, dawa jia miti ni mbega kiri jia cibitari?
   
   ii [ ] Ari [ ]
   Rimwenarimwe [ ]

15. Mwana waku athondekagwa ni dagitari wa miti umwe kana babaingi?
   
   Umwe [ ] Babaingi [ ]

16. Dawa jia miti jionka ni mbiganu kuragithia?
   
   ii [ ] Ari [ ]

17. Dawa cia miti iri goro kana raisi
   
   Goro [ ] Raisi [ ]

18. Urutaga miti ya dawa ku?
   
   Muji [ ] Ndukani [ ]
   Cibitari ya miti [ ]

19. Mwana waku ethiritwe na thina ino woragia na dawa jia miti igita rigana?
Mwaka umwe kwinama

Gitagati ka mwaka umwe na uri

Gitagati ka mwaka iri na itatu

Gitagati ka miaka ina na itano

20. Kuma riria kaana karwarine utwire gutumira dawa jia miti kana wambiririe na dawa jia cibitari?

Ndatumire dawa jia miti kuma kiambiria

Ndambiririe gutumira dawa jia miti gatigati

Ndatumire dawa cionthe jia cibitari na jia miti

21. Kithirwa wacokia wambiririe gutumira dawa jia miti gatigati, kana gaku gatumagira dawa iriku kuuma kiambiriria?

Dawa cia cibitari

Gutiyo

Ingi………………..

22. Kithirwa watumagira dawa jia cibitari kuuma kiambiria, wambiririe gutumira cia miti niki?

Mathiria ma dawa cia cibitari

Dawa cia cibitari itatethagia thina ciawe

Ndanogire ndatumira igita iraja

Ndona itigutethie

23. Niuthingatagira mataro ma dagitari wega?

Ii [ ]

Ari [ ]
24. Kethirwa niuumagira dawa cia cibitari na cia miti niwiraga dagitari wa dawa cia miti ati niugutumira ino jingi

| Ii |  | Ari |  |

25. Waringitihania dawa jia thibitari na jia miti ni iriku igutethia anene?

| Jia cibitari | [ ] | Jia miti | [ ] |
| Jionthe amwe | [ ] |

26. Ni murimo uriku wagwata mwana waku utumagira dawa cia miti?

| Malaria | [ ] | Murimu wa gikonde | [ ] |
| Allergi | [ ] | Asthma | [ ] |

27. a) Kwi igita utumagira utunagira dawa cia cibitari niuntu bwa murimo uria wagweta au igiru (26)

| Ii |  | Ari |  |

b) Kethirwa 27 ni ii utamagira dawa jia miti na cibitari rimue kana utitumagira kagitakamwe

| Rimwe | [ ] | Ii rimwe | [ ] |

c) Niwiganirite nikuthondekwa kuria ukuewa

| ii |  | Ari |  |

28. Utumagiri dawa cia miti niki kuri mwana waku

| Kamenyeria | [ ] | Ugima wa mwiri | [ ] |
| Itimathina maingi | [ ] |
| Bungi……….. | ASANTA |
APPENDIX VII: JIURIA JIA KWARANIA NA TUKUNDI TUNINI

1. Niki gitumaga butumira dawa cia miti

   Kamencyeria [   ] Ugima wa mwiri [   ]
   Itina mathina maingi [   ] Ingi………..

2. Niki gitumia ajiari bambagirie gutumira dawa cia miti kiri twana twa miaka itano na kwimana?

   Mataro ma muchore [   ]
   Kwenda bongwa [   ]
   Mataro ma antu ba mujii [   ]
   Mangi………..

3. Dawa cia miti ni mbega kwi jia cibitari riria jiatumirwa kiri twana twa miaka itano na nthi

   ii [   ] Ari [   ]
   Rimwe narimwe [   ]

4. Dawa cia miti ni mbiganu kuoria twana twa miaka itano na nthi?

   ii [   ] Ari [   ]

5. Dawa cia miti iri raisi kana goro

   Goro [   ] Raisi [   ]

6. Niku urutaga dawa jiaku jia miti

   Mujii [   ] Ndukani [   ]
   Cibitari ya miti [   ]

ASANTA
APPENDIX VIII: PICTURES OF COMMONLY USED HERBS

*Erythrina abyssinica*

*Landolphia buchananii*

*Croton macrostachus*

*Acacia hockii*
Eucalyptus Saligna

Senna didymobotrya

Vernonia lasiopus

Prunus Africana
*Dovyalis abyssinica*

*Ricinus communis*

*Vitex doniana*

*Amaranthus hybridus*
Psidium guajava

Vangsueria madagascariensis

Mangifera indica

Solanum incanum
Aloe kedongensis
APPENDIX IX: NATIONAL COMMISSION FOR SCIENCE AND
TECNOLOGY PERMIT

NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Date:
3rd March, 2014

Ref: No.

NACOSTI/P/14/7715/747

David Mwikya Nzuki
Kenyatta University
P.O.Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “Utilization of herbal medicine among children under 5 years of age in Mwinbi Division, Maara District, Tharaka Nithi County, Kenya,” I am pleased to inform you that you have been authorized to undertake research in Tharaka Nithi County for a period ending 1st April, 2014.

You are advised to report to the County Commissioner and the County Director of Education, Tharaka Nithi County before embarking on the research project.

On completion of the research, you are expected to submit two hard copies and one soft copy in PDF of the research report/thesis to our office.

DR. M. K. RUGUTT, PhD, HSC.
FOR: SECRETARY/CEO

Copy to:

The County Commissioner
The County Director of Education
Tharaka Nithi County.
CHOGORIA, has been permitted to conduct research in Meru County.

on the topic: UTILIZATION OF HERBAL MEDICINE AMONG CHILDREN UNDER 5 YEARS OF AGE IN MWIMBI DIVISION, MAARA DISTRICT, THARAKA NITHI COUNTY, KENYA.

for the period ending: 31st April, 2014.

Signature

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
APPENDIX X: KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE

APPROVAL LETTER

KENYATTA UNIVERSITY
ETHICS REVIEW COMMITTEE

Fax: 8711242/8711575
Email: kuerc.chairman@ku.ac.ke
kuerc.secretary@ku.ac.ke
Website: www.ku.ac.ke

Our Ref: KU/R/COMM/51/280

Date: 24th January, 2014

David Mwikya Nzuki,
Department of Medical Laboratory Sciences,
Kenya University,
P.O. Box 43844


1. IDENTIFICATION OF PROTOCOL

The application before the committee is with a research topic “Utilization of herbal medicine among children under 5 years of age in Mwimbi division, Maara district Tharaka Nithi county, Kenya” dated 22nd January, 2014.

2. DECISION

The committee has considered the research protocol in accordance with the Kenyatta University Research Policy (section 7.2.1.5) and the Kenyatta University Ethics Review Committee Guidelines AND APPROVED that the research may proceed for a period of ONE year from 23rd January, 2014.

3. ADVICE/CONDITIONS

i. Progress reports are submitted to the KU-ERC every six months and a full report is submitted at the end of the study.

ii. Serious and unexpected adverse events related to the conduct of the study are reported to this board immediately they occur.

iii. Notify the Kenyatta University Ethics Committee of any amendments to the protocol.

iv. Submit an electronic copy of the protocol to KUERC.

When replying, kindly quote the application number above.

PROF. NICHOLAS K. GIKONYO
CHAIRMAN ETHICS REVIEW COMMITTEE

[Signature]

[Stamp] 28 JAN 2014

[Stamp] OFFICE OF THE CHAIRMAN

[Stamp] P.O. BOX 43844 - 00100 NAIROBI

Dated this day of 24th January 2014.

cc. Vice-Chancellor
Director: Institute for Research Science and Technology