COMPLEMENTARY AND ALTERNATIVE MEDICINE UTILIZATION AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE CLINICS IN TONGAREN SUB-COUNTY, BUNGOMA COUNTY

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Complementary and Alternative Medicine Utilization among Pregnant Women Attending Antenatal Care Clinics in Tongaren Sub-County, Bungoma County

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University

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DEDICATION

This thesis work is dedicated with love and gratitude to my parents (Mr. Ronald and Mrs. Consolata Makhapila), my husband (Dr. Stephen Balaka Opiyo Sr., PhD), my son (Stephen Balaka Opiyo Jr.), my daughter (Stephanie Sofia-Aluoch Balaka), and my siblings (Dennis, Sellah, Karen and Lucy), for being a great source of inspiration and strength throughout my studies.God bless you all!

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ABBREVIATIONS AND ACRONYMS

AMREF   American Medical Research Fund

ANC   Antenatal Care

CAM   Complementary and Alternative medicine

KEMRI   Kenya Medical Research Institute

KNBS   Kenya National Bureau of Statistics

KNHPF   Kenya National Health Policy Framework

MoH   Ministry of Health

NCAPD   National Coordinating Agency for Population and Development

NCCAM   National Center for Complementary and Alternative Medicine

NCCIH   National Center for Complementary and Integrative Health

NCD   Non Communicable Diseases

NCI   National Cancer Institute

NHIF   National Hospital Insurance Fund

TBA   Traditional Birth Attendant

TM   Traditional Medicine

WHO   World Health Organization

OPERATIONALDEFINITIONS

Cohabited Individuals who are in a committed, unmarried relationship and are living together as a couple, often sharing a household and responsibilities.

Complementary and Alternative Medicine A group of different healthcare products and practices that are presently in use by the pregnant women of Tongaren Sub-County though they are not part of the dominant health care structure.

Divorced A person who was previously married but has legally ended their marriage through divorce, meaning they are no longer married to their former spouse and are alone.

Factors for CAM use These are aspects that pull or push pregnant women to use CAM therapies. They include level of income, education, age, ethnicity, occupation and habits.

Married Two individuals who have legally entered into a marriage contract, which typically involves a formal ceremony and legal documentation.

Pattern of CAM use Mode/technique, time or period of CAM administration employed by pregnant women.

Prevalence of CAM use: The frequency of CAM usage during pregnancy.

Single A person who has never been legally married and is not currently in a marriage or committed relationship.

Widowed A person who was married but whose spouse has passed away, leaving them no longer married.

ABSTRACT

Despite CAM being a primary form of healthcare for a large portion of Kenya's population, its utilization during pregnancy remains poorly studied. Limited data is available on the extent to which pregnant women in Kenya's rural use CAM, and the factors associated with that usage.Therefore to bridge this knowledge gap, this study sought to determine CAM utilization among pregnant women attending antenatal care clinics (ANCs) in Tongaren Sub-County, Bungoma County. Specifically, the study sought to determine the prevalence and patterns of utilization of CAMamong pregnant women; evaluated the factors that influencethe utilization of CAM therapies;identified the common forms of CAM therapies used; and assessedthe rates of CAM use disclosure to healthcare givers and its associated determinants. A cross-sectional survey design was employed in collecting data from 340 systematically sampled pregnant women attending 12 ANCs in Tongaren Sub-County. 340 semi-structured questionnaires and 6 structured interview guides were used to collect the primary data required for the study. Using Statistical Package for the Social Sciences (SPSS), quantitative data was analyzed through descriptive statistics, inferential statistics (Chi-square test of independence to compare associations between nominal variables), and multiple logistic regression analysis to check for the joint influence of multiple independent variables. Findings indicated that 172 out of 340 (50.7%) surveyed pregnant women use CAM during pregnancy, of which half of them concomitantly use CAM and modern medicine while another half use CAM separately. The high prevalence (50.7%) of CAM utilization among the survey participants was majorly motivated by: the preference of CAM over conventional medicine for certain illnesses (31.4%), and the perceived lack of response to conventional medicine (27.1%). Herbal therapies (65.1%) and spiritual remedies (40.1%) were the major forms of CAM utilized to primarily treat some pregnancy-related discomforts (36.2%). About 38 plant species(including Neem tree and Aloe vera) and 4 forms of animal-based therapies (e.g. oils) used during pregnancy were profiled.Prayers were the most frequently used form of spiritual remedies whereas massages were the most commonly used form of alternative/psycho-physical therapies. Herbal and animal-based therapies were ingested or applied on the body, weekly/daily during $1^{st}$and 2^{nd}trimesters of pregnancy.From logistic regression analysis, the variables positively associated with CAM use among pregnant women were marital status (Odds ratio (OR) = 2.341, p = 0.008), having a spouse with no formal education (OR = 5.371, p < 0.001), self-employed status (OR = 0.415, p = 0.028), farming occupation (OR = 2.777, p = 0.026), and monthly income higher than Kshs 35,000 (OR = 0.093, p = 0.012). Over 80% of the 172 CAM users didn't disclose it to their healthcare givers at the clinics, because of three main reasons, namely, unwillingness to disclose CAM use to anyone, healthcare providers not asking, and fear of the healthcare providers' reactions. Educational status ($\chi2 = 11.855$, p = 0.037), religion ($\chi2 = 8.563$, p = 0.003), employment status ($\chi2 = 6.522$, p = 0.038), occupationtype ($\chi2 = 10.855$, p = 0.013), and insurance status ($\chi2 = 3.852$, p = 0.05) were found to be significantly associated with CAM use disclosure. In conclusion, there is a high prevalence of CAM usage among pregnant women in Tongaren, with many using various CAM therapies (especially herbal forms) alongside conventional medicine, often without disclosing this to healthcare providers.The study recommends, among other measures, the scientific validation of the identified herbal forms and the implementation of targeted CAM awareness campaigns to promote safe and effective CAM use during pregnancy.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Utilization of Complementary and Alternative Medicine (CAM) has increased for the past two decades globally (Alhalaseh*et al.*, 2020; Ansari, 2021). Most folks globally seek complementary and alternative medicine (CAM) to cure, prevent or treat widespread non-communicable diseases due to the belief that conventional medicine has failed to adequately address these diseases and complications (Kuunibe&Domanban, 2012).

The utilization of CAM during pregnancy has gained widespread popularity on a global scale, with reported usage rates ranging from as low as seven percent to as high as ninety-six percent in certain countries (Mordeniz,2019). Complementary and Alternative Medicine (CAM) is often employed by pregnant women throughout various stages of their pregnancy, from early trimesters to the final weeks, to address various health and wellness concerns (Laelago *et al.*, 2016). Different types of CAM therapies are utilized by pregnant women including herbal medicine, mineral supplements and vitamins, spiritual healing, homeopathy, acupuncture, aromatherapy, physical and psychological techniques(Hall & Jolly, 2014).

According to Adams *et al.* (2015), CAM is a holistic approach encompassing a range of substances and services distinct from conventional medicine. CAM serves a dual purpose, including complementary medicine, which involves treatments that complement standard therapeutic approaches, and alternative medicine, which is utilized as a preference over therapies recommended by healthcare professionals (NCCIH, 2016). This holistic approach to CAM is particularly evident during pregnancy, as it not only addresses physical health but also emphasizes the importance

of mental and emotional well-being (WHO, 2019). CAM plays a pivotal role in providing a comprehensive framework for maternal care. However, unavailability of robust evidence and data regarding safety and reliability of CAM on health especially in pregnancy has raised a concern of health experts and policy makers (Adams *et al.*, 2020).In Kenya for instance, there are few studies on CAM use during pregnancy, with majority focusing on herbal medicine which is just one of the components of CAM practices (Ngetich, 2013; Mothupi, 2014). Therefore, this study sought to identify the common therapies of CAM utilized among pregnant women visiting antenatal care clinics in Tongaren Sub-County (Bungoma County),evaluate factors influencing utilization of these practices,determine the prevalence as well as pattern of usage of CAM treatments, and finally find out whether pregnant women open up on their CAM use to health care providers.

1.2 Statement of the Problem

The increasing use of complementary and alternative medicine (CAM) in Kenya due to gaps in conventional healthcare services (Gitobu *et al.*, 2018), similar to many developing countries in Africa and Asia (WHO, 2014), has highlighted the need for a deeper understanding of its prevalence and impact, particularly during pregnancy. Despite CAM being the primary form of healthcare for a substantial portion of Kenya's population (estimated at 65–80%) (Chebii *et al.*, 2020), its utilization during pregnancy remains poorly studied, resulting in a significant knowledge gap. Limited data is available on the extent to which pregnant women in Kenya use CAM, despite the sparse knowledge regarding the potential benefits or risks associated with these practices during pregnancy, as indicated by the World Health Organization (WHO, 2018). Moreover, previous studies (such as Githinji, 2014; Ondicho *et al.*, 2016; Gakuya *et al.*, 2020) conducted in Kenya have largely overlooked the critical issue of whether pregnant women attending antenatal care disclose their CAM usage to healthcare providers. Understanding the factors influencing this disclosure or non-disclosure is essential, as it can have significant implications for maternal and fetal

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health. The utilization of CAM during pregnancy period can influence health outcomes, healthcare-seeking behavior, and the potential for drug-CAM interactions (Wassie *et al.*, 2015), underscoring the importance of healthcare providers being aware of common CAM products used by women and the available evidence on their benefits or risks.

Notably, no prior study has specifically examined CAM usage during pregnancy in rural regions of Kenya, leaving a critical gap in our understanding of the magnitude of CAM use and the associated factors. To address this gap and contribute to the enhancement of maternal health, this study conducted an assessment of CAM usage during pregnancy in Tongaren Sub-County, a rural area within Bungoma County. The study aimed to uncover the prevalence of CAM use, the patterns of utilization, determinants that influence its use, and the practices surrounding disclosure of CAM usage among pregnant women in this rural region.

1.3 Justification of the Study

Rural areas in Bungoma County, including Tongaren Sub-County, often face significant healthcare disparities compared to urban areas (Mumo *et al*., 2023). Access to conventional healthcare services may be limited, and maternal healthcare services can be particularly inadequate (Moturi *et al.*, 2022). This study aimed to understand whether CAM usage during pregnancy is more prevalent in Tongaren due to these disparities, along with associated usage patterns, determinants, and disclosure practices. The results obtained will provide insights that can guide policy-making on the development and promotion of CAM for safe motherhood in rural areas of Bungoma County and Kenya as a whole. Understanding the prevalence and types of CAM used during pregnancy can shed light on how cultural and traditional beliefs influence healthcare choices. Identifying the determinants of CAM usage during pregnancy can help healthcare providers and policymakers comprehend why women turn to CAM, whether due to cultural beliefs, lack of access to conventional healthcare,

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or other factors. This information can inform healthcare policies and interventions aimed at improving maternal healthcare services. Understanding disclosure practices related to CAM usage during pregnancy is crucial for healthcare providers. If pregnant women do not disclose their CAM usage to healthcare professionals, it can pose risks to maternal and fetal health. By exploring disclosure practices, the study can contribute to improving communication and collaboration between CAM practitioners and conventional healthcare providers. Additionally, the findings of this study can play a pivotal role in public health planning and resource allocation. If CAM usage is prevalent and deemed safe in rural areas, public health authorities may consider integrating specific CAM practices into their healthcare systems or providing education on safe CAM usage during pregnancy.

1.4. Research Questions

i. What is the prevalence of complementary and alternative medicine (CAM) utilizationamong pregnant women in Tongaren Sub-County, Bungoma County?

ii. What are the factors that influence the utilization of complementary and alternative medicine (CAM) utilization among pregnant women in Tongaren Sub-County, Bungoma County?

iii. What are the common therapies of complementary and alternative medicine (CAM) that are used by pregnant women in Tongaren Sub-County, Bungoma County?

iv. What inhibits disclosure of information regarding CAM use to healthcare givers among pregnant women in Tongaren Sub-County, Bungoma County?

1.5 Objectives of the Study

1.5.1 General Objective

To determine Complementary and Alternative Medicine utilization among pregnant women attending antenatal care clinics in Tongaren Sub-County, Bungoma County.

1.5.2 Specific Objectives

i. To determine the prevalence and pattern of utilization of complementary and alternative medicine (CAM) among pregnant women in Tongaren Sub-County, Bungoma County.

ii. To evaluate the factors that influences the utilization of complementary and alternative medicine (CAM) among pregnant women in Tongaren Sub-County, Bungoma County.

iii. To identify the common therapies of complementary and alternative medicine (CAM)used among pregnant women in Tongaren Sub-County, Bungoma County.

iv. To assess disclosure of information regarding CAM use to healthcare givers among pregnant women in Tongaren Sub-County, Bungoma County.

1.6 The Conceptual Framework

Independent Variable   **Dependent Variable**

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┌─────────────────────────────────┐
│ Socio-cultural        and        │
│ economic                         │
│ background (e.g. age, marital    │
│ status, level of education,      │              ┌──────────────────────────────┐
│ occupation, level of income)     │              │ UTILIZATION  CAM              │
│                                  │              │                              │
│ Pregnancy-related                │   ──────►    │ ❖ Prevalence of CAM use      │
│ characteristics                  │              │ ❖ Patterns of CAM use        │
│ (stage of pregnancy, parity,     │              │ ❖ Disclosure of CAM use to   │
│ no. of live children)            │              │   healthcare givers          │
│                                  │              └──────────────────────────────┘
│ CAM practices and products       │
│ (herbal therapies, animal-based  │
│ products, spiritual healing,     │
│ alternative therapies/psycho-    │
│ physical techniques)             │
└─────────────────────────────────┘

               ┌──────────────────────────────┐
               │ Intervening Variables         │
               │                               │
               │ ❖ Modern healthcare systems   │
               │ ❖ Institutional, policy and   │
               │   legal framework             │
               └──────────────────────────────┘
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Figure 1:1: Conceptual Framework (Researcher, 2019)

CHAPTER TWO

LITERATURE REVIEW

2.1 Classification of CAM

The concept of CAM has been debated by several scientists and organizations in an attempt to clarify the valid meaning of CAM to populations. Despite several debates and arguments there is no lucid definition for CAM due to different cultural practices, social status and beliefs (Foley *et al*., 2019). WHO (2019) observes that CAM is a diverse set of healthcare practices, therapies, and approaches that extend beyond conventional medicine. It includes interventions that aim to enhance physical, mental, emotional, and spiritual health, and may be used alongside or in conjunction with mainstream medical treatments (van Wyk, 2020).NCCAM describes CAM as "a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine.'' Ansari (2021) argues that CAM is "a variety of different medical systems and therapies based on the knowledge, skills and practices derived from theories, philosophies and experiences used to maintain and improve health, as well as to prevent, diagnose, relieve or treat physical and mental illnesses." British Medical Association defines CAM as "those forms of treatment which are not widely used by the conventional health care professions, and the skills of which are not taught as part of the undergraduate curriculum of conventional medical and paramedical healthcare courses" yet some standard medical professionals such as medical doctors or registered nurses may also be CAM providers (NCCIH, 2016).

Traditional Medicine (TM) is used interchangeably with CAM since it may be used as complementary or alternative therapy when it is 'borrowed' from a different state or region hence the term CAM may be substituted with TM (Hoover, 2021).WHO(2019)

describes CAM as TM which was not native to a particular culture but has been implemented or accepted as part of their traditions. Gyasi (2015) argues that TM is a diagnostic, preventive, rehabilitative and treatment system for impediment or ill-health to relieve an individual physically, mentally and psychologically using plants or plant-derivatives, mysticism and further substances occurring in nature. However this definition fails to acknowledge the cultural possession and origin of these practices hence Okaiyeto and Oguntibeju(2021) adds that these therapies are ancient and have simply been passed down through generations in a certain culture or region therefore the society claims ownership of these practices.

The NCCAM (2014) categorized CAM in to two main domains with a third group being labeled as others. The first two fields are natural products traded for supplementing the diet such as herbal substances, probiotics, preventive therapies, minerals, and second groupmind and body practices. 'Others' groupinclude movement practices such as Pilates and Alexander Technique, Traditional curative systems for instance Shamanism, Whole therapies such as Indian Ayurveda, African TM and Chinese TM, Energy medicine. The NCCAM classification is the most acceptable worldwide since it accounts for all types of available CAM therapies.

Lee *et al*.(2022) sorted TM in to three distinct categories: 'Codified medical systems' which are customs which have evolved over time and include Ayurveda, Siddha, and Unani in India, traditional Chinese medicine and acupuncture, offering sacrifices, protective magic, wearing protective charms and herbal therapies in Africa (John& Shantakumari, 2015), Folk medicine, tales which utilize the ecosystem components generated by ancestors and are passed down generations verbally to ensure continuity of the community's knowledge (Payyappallimana, 2010),Techniques for good health –practices related to wellbeing for health maintenance or restoration. They include tai-chi, qi-gong, different meditations and breathing techniques.

Mahomoodally (2013) further classified African TM in to three integrated groups. The first one is spiritualism which involves spiritual cleansing using blood or special water and offering sacrifices. In this practice appeasing the gods through pouring libation and offering specific animals (spotless or dark animals) or special items such as plain clothes or cola nuts (Ozioma&Chinwe, 2019) is the focal point. Evil spirits are also driven out through exorcism. The second practice Herbalism involves use of medicinal plants to treat ailments. Herbalists play a significant role in selecting the medicinal plant; preparation and administering the right dose to the patient and are usually known by the community members. Ekor (2014) confirmed drawbacks of herbal medicine as: incorrect diagnosis, low hygiene standards, the secrets of some healing methods, inaccurate dosage and lack of documentation about the patients. Additionally, there is competition and secrecy among the providers hence healers are always reluctant to pass on their knowledge to other people apart from relatives whom they win their trust (Mordeniz, 2019). Despite the competition, a study revealed that almost half (41.9%) of the respondents could prepare TM (Usifo&Udezi, 2013). Lastly foretellingor divination entails a diviners communicating with fore fathers, deities or spirits for disease prevention, treatment and diagnosis.

2.2. CAM Remedies Used during Pregnancy

2.2.1. Herbal Medicine

Herbal medicine alternatively refers to "herbs, herbal materials, herbal preparations and finished herbal products that contain active ingredients parts of plants, or other plant materials, or combinations" (WHO, 2019). These herbal products may comprise several or just one ingredient (Okaiyeto & Oguntibeju,2021).

The WHO (2018) details a high dependency rate of 80% on herbal medicine among the populations in developing nations. However, studies carried out in Africa illustrate a prevalence of 12 -90.3% phytomedicine use during pregnancy (Mothupi, 2014; Mekuria*et al.*, 2017). There are conflicting findings on the causes of this increased

herbal remedies utilization especially in developing states. Some studies have brought forward inaccessibility to convectional medical system as major cause (Ngetich, 2013; Onyiapat*et al.*, 2017) while others oppose the statement since studies in urban areas yield similar results (El Hajj& Holst, 2020a). It has been estimated that over 60% of the current anticancer and antihypertensive drugs are of plant origin (Siddiqui*et al.*, 2022). Medicinal plants have therefore become important source of research and development of new drugs (El Hajj& Holst, 2020b). A study in the Middle East found 82.2% prevalence of women who had used herbal products for safe pregnancy especially in the early trimester (Kennedy*et al*., 2013). A cohort study carried out in South West England showed an increasing trend of herbal medicine use across the three trimesters (Bishop *et al*., 2015).

In pregnancy herbs may be ingested, applied on the skin or placed in strategic places for protection. Dafam*et al*. (2021) found that women used herbs on a regular basis to clean the womb to stimulate quick delivery and child protection from evil. Hence herbs are used during all stages of pregnancy. In Kenya Ethno-botanical surveys point out that traditional medicine is broadly practiced nationwide by diverse communities (Rotich*et al.*, 2022).

During the first trimester, plants are used to develop the fetus and prevent miscarriages. They include *Pothomorphe umbellate*, *Desmodiumadscendens*, *Sparganophorussparganophora*, *Spondiasmombin* or *Solenostemonmonostachyus*. *Pothomorphe umbellate* aerial parts have an antioxidant 4 nérolidylcatéchol, which chemically prevents first signs of pregnancy during the first trimester (Omale, 2020). Ginger – during the first pregnancy trimester it inhibits the feeling of nausea, vomiting and common cold symptoms.in the second trimester fetus development is the motivation. Herbs used include *Ficusexasperata*, *Hoslundiaopposita* or *Tremaguineensis*. Finally in the third trimester,*Ageratum conyzoides*, *Cyathulaprostrata* or *Heliospermumindicum* are used to ease labor and

childbirth.Nevertheless, *Voacangaafricana,* a strong labor stimulant, is only encouraged when a pregnant woman goes beyond the normal gestation period of nine months. Sage, aniseeds, and fenugreek are used for their oxytocic effect (John &Shantakumari, 2015).

Euphorbia hirta, which is a strong antibacterial, treats colic and pains during pregnancy (Tabuti, 2018). Green tea used as a laxative agent and for relaxing purposes; peppermint, thyme, and cinnamon are used to prevent bloatinsg as well as stomachaches, garlic for treatment of common cold and urinary tract infections, sage, aniseeds, and fenugreek for flatulence (John &Shantakumari, 2015). St John's wort (Hyperium) is used as an antidepressant for seasonal affective problem (Domis *et al*., 2016) and can also be obtained at lower cost (Usifoh&Udezi, 2013). All these herbs are used throughout the pregnancy period.However, caution must be taken when handling herbs or oils since they may come with complications on health hence may affect the mother and the unborn baby (Patti&Wigington, 2019).

2.2.2. Manipulation of Spirits

Haun (2017) outlines that people choose to appease malevolent spirits to use them for healing, guidance and family protection by wearing jewelry particularly during pregnancy to protect both the mother and baby from harm. He furthers states that in Ghana, a special magical belt known as Kanni is worn by women around their waist for protection. In honoring of benevolent spirits, women often create an ancestral tower to ask for blessings for their unborn babies from their bloodline or offer sacrifices to those believed as goddess of fertility and child bearing.

2.2.3. Aromatherapy

Aromatherapy involves the use of highly concentrated plant essential oils administered via the skin (massage, water or compresses); via the respiratory tract (inhalation, and vaporizers); via Gastro intestinal tract (Bertone & Dekker, 2021). Products of traditional origin like "gamat oil" and "tiger balm" may also be utilized during

pregnancy (Othman &Farooqui, 2015). The odor or aroma or fragrance is believed to have therapeutic effects. The clinical effect of aromatherapy comes from the combination of the therapeutic properties of the oils' chemical constituents with mood enhancing effect of the aromas, and relaxation effects of the administration method, especially massage(Guo*et al*., 2020).

2.2.4. Use of Traditional Birth Attendants

According to WHO (2014), a TBA refers to "a person who assists the mother during childbirth and who initially acquired her skills by delivering babies herself or by working with other TBAs". TBAs existed since the ancient times before the introduction of orthodox medicine and are highly respected by community members (Turinawe*et al.,* 2016). The main support to pregnant and lactating women in rural areas are these TBAs who lack any formal training hence their services pose greater risks to their clients and may sometimes lead to morbidity or maternal and postnatal deaths (AMREF, 2017). Conversely, a study in Western Kenya revealed that obstetric complications were higher in cases that were attended to by skilled birth attendants in health facilities than those who visited TBAs at home (Liambila& Kuria, 2014).

2.2.5. Prayer for Health

A survey carried out in the US indicated 35% use of prayer for health reasons with seventy five percent praying for wellness whereas 22% prayed for specified medical condition. Sixty nine percent found prayer helpful among those with specific medical conditions. There is therefore need for clinicians to understand the role of prayer in a person's well-being health (Simão *et al.*, 2016). Prayer and spirituality may improve quality of life by enhancing persons' subjective well-being by providing coping strategies, stress relief, and social support (Palmer *et al.*, 2020). Rao*et al*. (2015) reports that prayer was regularly used because of the perception that it is incredibly helpful in illnesses characterized by aggravating symptoms, nonspecific diagnoses,

and inadequate treatment options such as depression, digestive problems, headaches, back, neck pain, and allergic reactions which are conditions related to pregnancy.

2.3. Factors for CAM Use

The choice of engaging with a particular medical channel is subjective to a number of social, cultural and economic factors such as education, accessibility of service, the cost of service, perceptions on the quality of services, age, ethnicity, gender, physical location, poorer health status, nature of sickness and metabolic disorders (Nyeko*et al*., 2016).The popular characteristics that influence use of CAM are its cost-effectiveness, acceptability, convenience to users as compared to orthodox medicine (WHO, 2019) and established efficacy of its several therapies (National Center for Complementary and Integrative Health, 2020). In developing countries, TM compliments personal ethics, religious and health beliefs of the people (Bishop*et al*., 2015) hence highly valued.

A study in thirty six developing countries reported that drugs were still unavailable to the majority of the population in rural dwellings (Toroitich*et al*., 2022). Widespread use of TM in Africa can also be justified by limited accessibility since there is one traditional healer to every five hundred people as compared to one medical doctor for every forty thousand people in Africa(Tangkiatkumjai *et al*., 2020).

2.3.1. Motivation for CAM Use

Factors motivating individuals to utilize CAM can be put in to two themes namely the "push" and the "pull" aspects(Tangkiatkumjai *et al.*, 2020). The 'push' refers to the assumed drawbacks, inconveniences and disappointments that individuals come across while seeking or utilizing conventional medical services hence they discourage individuals from utilizing conventional therapies whereas the 'Pull' factors on the other hand are positive aspects regarded as beneficial to individuals when they utilize

CAM hence catch the attention of individuals (Gyasi *et al*., 2014). Table 2.1 shows some of the push-and-pull factors for CAM use.

Table 2.1: Push and Pull Factors for CAM Use

Push Factors	Pull Factors
"No responsiveness" to orthodox therapies (Asfaw Erku & Mekuria, 2016; Clark*et al*., 2018).	Restoration of health and maintenance of wellbeing (Othman & Farooqui, 2013).
Unwillingness of the medical staffs to provide medication; Disappointment with the attitudes of clinic staff; (Ganasegeran *et al.*, 2014; Adams*et al.,* 2015).	CAM Abundance and perceived efficacy (Chebii*et al*., 2020).
Social pressure; Lack of essential privacy within the conventional clinic setting (Barnes*et al*., 2018).	CAM is more natural hence chemical-free or with less chemicals (Gyasi *et al*., 2015).
Mother –in-laws decision for their daughter-in-laws to use CAM especially during pregnancy since rejection is considered disrespectful (Ahmed *et al*., 2006).	Individuals are in control of their own condition (Kigen *et al*., 2013; Dafam *et al*., 2021).

2.4. Prevalence and Pattern of CAM Use During Pregnancy

National surveys have reported an increase in demand for CAM around the world with almost half the population utilizing it in developed countries (e.g. 42% in the United States to 70% in Canada), 40 to 71% in developing countries with as much as 80% in Africa (Hussain & Malik, 2013).The prevalence of herbal medicines usage during pregnancy in the Middle East varied from 22.3%-82.3% (Chan *et al*., 2014). This study revealed that majority of these CAM users was from rural contexts, stay at home mothers with no or lower educational levels (not college graduates).

In Nigeria, a study by Onyiapat *et al.*(2017) revealed that 81.2% women were using CAM during pregnancy with 69.2% using four or less remedies and the rest five and more. The third trimester accounted for high CAM use (27.4%) while the first semester recorded the least use (Onyiapat *et al.*, 2017). In Kenya, the prevalence of herbal medicines use during pregnancy, labour and post-natal period among women visiting antenatal clinic at Embu Provincial General Hospital was seventy per cent with no significant difference among women of different education levels (Ng'etich, 2013). According to a study conducted in Nairobi by Mothupi (2014), 12% of pregnant women were found to use phytomedicine during pregnancy, with education levels playing a significant role in this choice. Furthermore, the study revealed that 12.5% of these users discussed their phytomedicine usage with healthcare professionals, and 20% were using herbs as a complementary approach alongside orthodox medicine.

Women use CAM for immunity strengthening in order to avoid pregnancy-related complications like disorders of the digestive system and infections of the urinary tract (Othman &Farooqui, 2015). Ramadhani *et al*. (2020) on the other hand revealed that pregnant women sought advice from CAM practitioners during pregnancy due to abdominal pain, lack of fetal movement and related complications, constipation, morning sickness, ''wind'' or ''dirt'' in the womb. A study in Nigeria found that women used CAM because it was easily accessible, for cultural reasons and baby

weight reduction in the womb with other minor motives being baby protection from evil, adjustment of baby's position in the womb, prevention of baby's sex change and beauty enhancement (Onyiapat*et al.*, 2017). An ethno botany survey to determine herbal remedies use among Anyi- Ndenye women yielded 90.3% prevalence utilization with good fetal development, beautifying the baby and labor facilitation, curing malaria a common ailment of first trimester pregnancy and miscarriage preventions as the major four reasons for utilization (Malan &Neuba, 2015).

In Kenya pregnant women used TM for evil and harm protection, to stimulate or induce labor when overdue, (Ng'etich, 2013) relieving toothache and back pain, indigestion and contagious disease treatment, for instance respiratory tract illnesses and malaria with only a fraction for health maintenance. Whereas Mothupi(2014) highlighted self-reliant on herbal prescriptions by friends, the changing dynamics reveal visits to Traditional Practitioners. High rates of such visits and purchasing of herbal remedies from herbal shops have been reported (Ng'etich, 2013) with as high as 90% TM practitioners' prescription from a similar study population in Nigeria (Onyiapat *et al*., 2017).

2.5. Disclosure of CAM Use During Pregnancy

Different researchers have confirmed the belief among populations that CAM is safe. For instance, a survey in Italy on herbal remedies among 1420 women showed that women considered CAM to be an important and effective way to promote health and wellbeing and to manage diseases as well as being safer than conventional medicine (Cuzzolin*et al*., 2016).

Hwang *et al*. (2016) undertook a research to establish CAM use during pregnancy among Iraq women where 56.7 % among 335 respondents used CAM. Out of 24 CAM therapies that were used, phytomedicine accounted for a high percent (53.7%) and (36.3%) use of multivitamins. More than 30% of these respondents used CAM weekly,

18.4% daily and 9.7% had used CAM just once. Only less than 0.6% informed their doctors about CAM use with 50.53% reporting that they were never asked. However, 28.2% did not find any importance in disclosing to doctors while 5.3% were afraid of the doctors responses.

Out of 1,396 respondents of different ethnicities, 59% of Bruneians had used a type of TM at some point in their life with high use (71%) among people who were 56 years and more (Lim *et al.*, 2013). Forty three percent were using TM complementarily and out of these seventy three percent never disclosed the information to healthcare providers. Additionally, sixty four percent of the respondents indicated that TM was safe (Lim *et al.*, 2013). Unfortunately in Kenya, previous studies have paid no attention to understanding whether pregnant women attending ANC disclose their CAM use to healthcare givers or the factors influencing their disclosure/non-disclosure, which is critical since misuse of CAM may have harmful effects on both pregnant woman and the fetus.

2.6. The Theoretical Framework

This study adopted the Health Belief Model (HBM).The HBM was developed towards understanding the failure of people in adopting preventive measures for health promotion (Anuar*et al.*, 2020). This model has been used in designing various health interventions which were a success (Sulat *et al.*, 2018). For instance, healthy eating (Deshpande*et al*., 2019), and dental-care (Oveisi*et al*., 2019). This health belief model was initially grounded on six variables applicable in both long and short-range health behaviour interventions namely; perceived susceptibility, perceived severity,perceived barriers,perceived benefit, perceived Cue to action and Self-efficacy (Rahmati-Najarkolaei*et al*, 2016).Regardless of the success of HBM in enlightening, Nobiling and Maykrantz(2017) laments about its inadequacy in behaviour prediction. This owes to the fact that it has low capability when it comes to determinants prediction (small effect size) and the lack of clear rules for combining

variables and their relationship (Alhalaseh, 2020). Orji *et al.*(2012) view this weakness as strength because it makes the HBM appropriate to an array of diverse health interventions in population groups. They however extended the model by introducing other important variables that had not been initially accounted for by HBM which can be applied through several health domains. They include interaction with appearance, consideration of future consequences, self-identity and perceived importance.

To be precise, the HBM model explains why pregnant women take CAM remedies. For instance, when a pregnant woman notices her susceptibility to contracting a disease, she may go for a CAM therapy for prevention (perceived susceptibility) or choose to compliment orthodox medicine with CAM if they believe their condition is severe (perceived severity). A pregnant woman who values CAM therapies (perceived importance) would want to use the identified therapy since it is part of their culture (self-identity).More so, there are attached benefits she believes in (perceived benefits) assimilated through experience. Such individuals believe that CAM therapies are long term when it comes to maintaining their health (future consideration). Interactions with friends, social media or cognitive thinking may influence a pregnant woman to go for CAM (cues to action). Pregnant women bothered by their body shapes or skin texture may go for CAM products (concern for appearance). Factors such as distance from health facilities or attitude of clinic staff may force pregnant women to seek CAM (perceived barriers) especially if they believe they can follow CAM providers directives 'safely' (self-efficacy).

CHAPTER THREE
MATERIALS AND METHODS

3.1.The Study Area

The study was undertaken in Tongaren Sub-County in Bungoma County which lies between 0° 46' 54.0156" N and 34° 57' 43.92" E on the western part of Kenya. This region was initially a white settlement scheme before the end of the colonial period

and hence it is currently a multi-tribe context consisting of immigrants from other Kenyan counties. Additionally, the Luhya tribe which typically live here is composed of more than 16 sub-groups with diverse cultural practices hence the probability of variation in CAM therapies usage. The Tongaren Sub-County is divided in to six political wards namely Naitiri-Kabuyefwe, Ndalu, Mbakalo, Milima, Tongaren, and Soysambu-Mitua(KNBS, 2019). The population of this area is 186,279 with 90,610 males and 95,669 females. Residents in this constituency have illiteracy level of 17% which is the lowest in the whole county of Bungoma (KNBS, 2019).The Tongaren Sub-County has one County Hospital, two public health centers, fourteen dispensaries, and tworegistered privately-owned health facility (Moturi*et al.*, 2022). This study was conducted on the antenatal care clinics of the County Hospital, the public health centers and the dispensaries shown in the Figure 3.1.
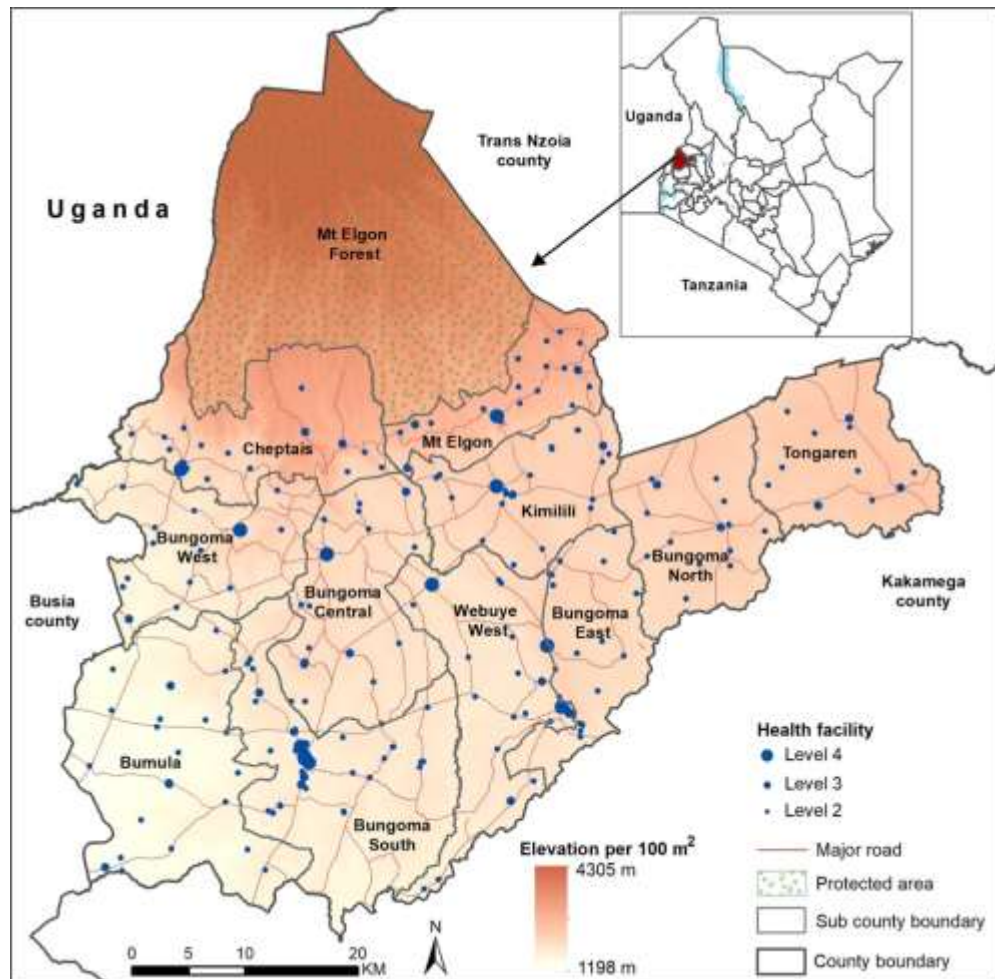
Figure 3.1: Distribution of Health Facilities in Tongaren Sub-County in Bungoma County, Kenya(Mumo *et al.*, 2023)

3.2 Research Design

A cross sectional survey design was used to provide data on the entire population under study. This study design was deemed appropriate sinceitprovide an efficient and cost-effective method of capturing a snapshot of a population's characteristicssuch as prevalence rates, opinions, or behaviors (Wassie*et al*., 2015).Researchers can compare data from different subgroups within the population to identify patterns, differences, and associations (Asfaw-Erku*et al*., 2016). This can help in understanding how variables relate to each other. Cross-sectional surveys are commonly used in public

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health to assess the health status of a population, including the prevalence of diseases and risk factors (Dafam*et al*., 2021).

3.3 Target Population

The target population for the study was pregnant women attending antenatal clinics at health centers in the six wards of Tongaren Sub-County.This was estimated to be 430 as per records of October 2019 provided by the Bungoma County Ministry of Health.

3.3.1Inclusion Criteria

Consenting pregnant women aged between 18 to 49 years attending ANC at public health centers in the study area were involved in the study.This age range covers adult women of reproductive age who are more likely to provide legally valid informed consent. This simplifies the consent process and may result in more reliable data.

3.3.2 Exclusion Criteria

Pregnant women whodidn't provide consent for participation in the study or those who were in severe medical condition like laborpains were excluded from the study.

3.4 Sample Size Determination

The sample size of the study was 340 pregnant women. This sample size was determined based on the following Cochran's formula, as provided in Adams (2020);

$n= [z^2 .P (1-P)]/d^2$

Whereby;

n is the requisite sample size

z represents the standard normal deviation 1.96 at 95% confidence interval

P stands for the proportion estimate of the proportion value of interest. Where there is no proportion information available 50% is usually employed. According to James *et*

al. (2018), the proportion of Kenyans utilizing CAM is estimated to be 67%, thus 0.67 was used as the value of P.

d represents 0.05 margin error

$$n = \frac{1.96^2 \times 0.67 (1 - 0.67)}{(0.05)^2} = 339.75, \text{ hence } n=340$$

3.5 Sampling Technique

The 12 study sites (public health facilities) were purposively selected while the 340 participants were selected through systematic sampling technique. The systematic sampling technique of simple random sampling was used to select the n^{th}number for sampling. The sampling interval (i) was calculated by dividing the target population by the size of the sample (430/340) which translated to 1.265 – rounded off to 1. Pregnant women who fit the inclusion criteria were then selected. The first random number (r) was generated using an online random number generator. In this, the minimum (1) and maximum (340) values of the sample size were entered in the system and the algorithm run, producing a random integer (r) as 12. The next samples werecomputed as r+i, r+2i, r+3i until the desired sample size was achieved.

The study also engaged six key informants (a mixture of medical and CAM specialists tending to pregnant women) who were purposively selected from the six wards (one per ward) to provide insights on CAM practices used by their clients/patients. They included; 2 traditional midwives, 2 prayer warriors, 1 ANC nurse, and 1 clinical officer.

3.6 Data Collection

3.6.1 Data Collection Instruments

A semi-structuredquestionnaire (Appendix 1) and structured interview guides(Appendix 2) were used to collect primary data on CAM use during pregnancy.

The questionnaire(Appendix 1) contained both open ended and closed questions on various aspects of CAM utilization.The questionnaires were supplemented by key informantinterviews and some secondary data obtained from hospital records.

3.6.2 Data Collection Procedures

The pregnant women who were recruited for the studysigned consent forms before they received detailed explanation on the purpose of the study, willingness to leave the study other than an assurance on the confidentiality of information. After this process,questionnaires were administered to the pregnant women by 12 research assistants (one per ANC) following the sampling frame until the required size was realized. Key informants for the structured interviewswere visited at their homes where they use CAM to attend to patients.

3.7. Validity of the Instruments

To ensure the validity of the data collection tools used in this study, expert opinions from the health professionals in Bungoma County Health Ministry and the thesis supervisorswere used to make necessary adjustments in the tools, including eliminating inadequacies, irrelevance and ambiguities, to ensure the questions were clear, logical and able to measurethe variables they were intended to represent (Ngetich, 2013).

3.8. Reliability of the Instruments

The results from a pilot study were used to confirm whether test instruments provided reliable results. The split-half reliability test involving 10 questionnaires distributed to two groups of participants in Kimilili Sub-County Hospital was carried outthrough the Spearman-Brown prophecy method (de Vet *et al.*, 2017) in assessing the reliability of

the questionnaire. A reliability coefficient of 0.874 was realized, indicating that the questionnaire was reliable enough to provide valid results.

3.9. Ethical Consideration

Before data collection, Ethical Approval No: UEAB/REC/43/03/2021(Appendix 3) was obtained from the ethical review committee of University of Eastern Africa, Baraton. After which, research permit (Appendix 4) was obtained from the National Commission on Science, Technology and Innovation (NACOSTI). Research permits were also obtained from both the Bungoma County Director of Health and Tongaren Sub-County Public Health Officer. Written consent from the informed respondents who met the inclusion criteria were obtained before administration of the questionnaire. The information obtained was confidential and has only been used for the purpose of this research. The 12 research assistants were thoroughly trained on ethical issues by one of the health professional from the Bungoma County Ministry of Health.

3.10. Data Processing, Analysis and Presentation

The data was organized in MS Excel 2016 before it was analyzed by the Statistical Package for Social Sciences (SPSS 24.0). Descriptive statistics including means (and standard deviation), percentages, frequencies, variance were employed in the data analysis procedure. Inferential statistics using Chi-square test of independence was carried out whereby statistical associations between socio-demographic variables captured in the survey (taken as independent variables) and the responses on various

aspects of utilization of complementary and alternative medicine (CAM) among pregnant women attending antenatal care clinics in Tongaren Sub-County (taken as dependent variables) were analyzed. The relative effects of selected socio-demographic variables on CAM use and the disclosure of CAM use were further examined in the multinomial logistic regression analysis.

CHAPTER FOUR

RESULTS

4.1. Response Rate

A total of 340 consenting pregnant women who satisfied the inclusion criteria participated in the study; hence a 100% response rate was achieved.

4.2. Social-Demographic and Pregnancy-related Characteristics of the Study Participants

4.2.1 Age

The age of the 340 surveyed pregnant women ranged from 18 to 48, with the mean age being 26.9±7.2 years (Fig. 4.1).
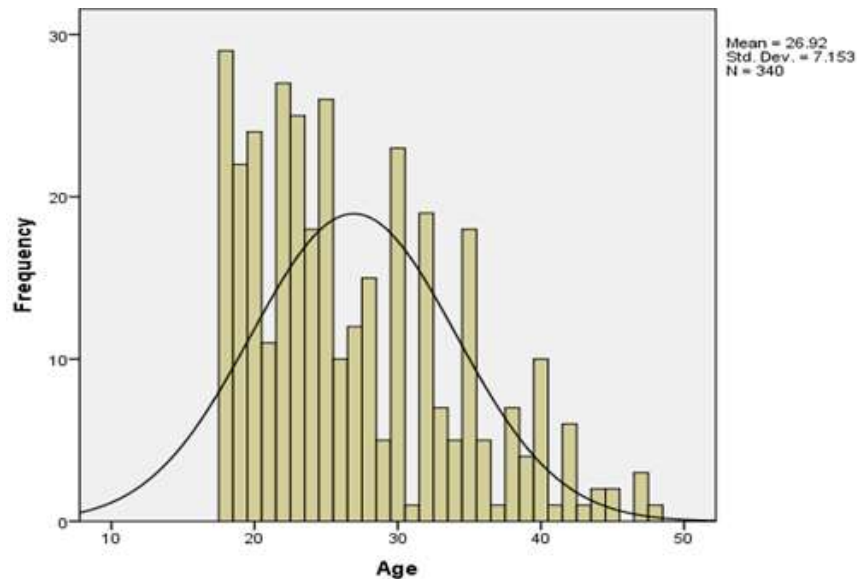
Figure 4.1: Age Distribution of Pregnant Women Attending ANC Clinics in Tongaren Sub-County

Table 4.1 shows the summarized socio-demographic profile of the 340 surveyed pregnant women with regards to residential ward, marital status, educational status of respondents and their spouses, religion, employment status, occupation, household

income level, distance to the nearest health facility, ANC attendance and insurance status.

Table 4.1: Socio-Demographic Characteristics of Pregnant Women Attending ANC Clinics in Tongaren Sub-County

Variable	Category	Frequency(N=340)	Percent (%)
Residential ward	Naitiri-Kabuyefwe	158	46.5
	Milima	44	12.9
	Mbakalo	74	21.8
	Soysambu-Mitua	13	3.8
	Ndalu	30	8.8
	Tongaren	21	6.2
	Total	**340**	**100**
Marital status	Single/ Widowed/ Divorced	116	34.1
	Married/Cohabitated	224	65.9
	Total	**340**	**100**
Educational status	No formal education	6	1.8
	Primary education	63	18.5
	Secondary education	168	49.4
	Diploma holder	88	25.9
	Degree holder	15	4.4
	Total	**340**	**100**
Education attainment of spouse	No formal education	3	1.3
	Primary education	31	13.8
	Secondary education	81	36.0
	Diploma holder	86	38.2
	Degree holder	24	10.7
	Total	**225**	**100**
Religion	African Traditional Religion	1	0.3
	Christian	323	95.0
	Islam	16	4.7
	Total	**340**	**100**
Employment status	Employed	49	14.4
	Self-employed	129	37.9
	Unemployed	162	47.6
	Total	**340**	**100**

Table 4.1 (Continued)

Variable	Category	Frequency(N= 340)	Percent (%)
Occupation	Farming	122	35.9
	Civil servant	36	10.6
	Trading	80	23.5
	Student	102	30.0
	Total	**340**	**100**
Household average monthly income level (Kshs)	Less than 5000	129	37.9
	5001- 15000	138	40.6
	15001 – 25000	38	11.2
	25001 – 35000	17	5.0
	More than 35000	18	5.3
	Total	**340**	**100**
Distance to the nearest health facility	Less than 5km (not far)	153	45.0
	Five to 10km (a bit far)	171	50.3
	More than 10km (far away)	16	4.7
	Total	**340**	**100**
Number of ANC attendance	This is my first time	30	8.8
	This is my second time	185	54.4
	This is my third time	66	19.4
	I have come more than thrice	59	17.4
	Total	**340**	**100**
Covered by Linda Mama Insurance?	Yes	322	94.7
	No	18	5.3
	Total	**340**	**100**

4.2.2 Residential Ward

Respondents were from various wards of the Tongaren Sub-County, with 46.5% (n=158) from Naitiri-Kabuyefwe, 12.9% (n=44) from Milima, 21.8% (n=74) from Mbakalo, 3.8% (n=13) from Soysambu-Mitua, 8.8% (n=30) from Ndalu, and 6.2% (n=21) from Tongaren (Table 4.1).

4.2.3 Marital Status

The majority of the survey participants' represented by 65.9% (n=224) were married or cohabited whilst single, widowed or divorced women accounted for the remaining 34.1% (n=116) (Table 4.1).

4.2.4 Educational Status of Respondents and their Spouses (For Married/Cohabited)

The findings indicate that about half of the survey participants (49.4%) had attained up to secondary education, 25.9% (n=88) were holders of college diplomas, 18.5% (63) had attained up to primary level education (grade 1-8), 4.4% (n=15) were university degree graduates, and the rest, 1.8% (n=6), had no formal education - never been to school (Table 4.1).

As for the spouses of married or cohabiting women, 86 (38.2%) of them were holders of college diplomas, 36.0% (n=81) had attained up to secondary education, 13.8% (n=31) had attained up to primary level education (grade 1-8), 10.7% (n=24) were university degree graduates, and the rest, 1.3% (n=3), had no formal education – never been to school (Table 4.1).

4.2.5 Religion

Majority of survey participants (n=323; 95%) identified themselves as belonging to the Christian faith, followed by 4.7% (n=16) of participants who professed Islamic faith. The African Traditional Religion accounted for 1 participant (0.3%) (Table 4.1).

4.2.6 Employment Status and Occupation Type

About half of the surveyedpregnant women(n=162; 47.6%) were unemployed, 37.9% (n=129) were self-employed, and 14.4% (n=49) were employed (Table 4.1).Many of the surveyedpregnant women (n=122; 35.9%) were farmers, followed by 102 (30%) who werestudents, 80 (23.5%) were involved in trading, and 36 (10.6%) were working as civil servants (Table 4.1).

4.2.7 Household Monthly Income

Results of the income distribution indicated that majority of the surveyedpregnant women (n=138; 40.6%) were from households receiving an average monthly income between 5001 and 15000 Kenyan Shillings while 129 (37.9%) were from ones earning less than Kshs5000. 21.5% of respondents (n=73) were from households having an average monthly income above Kshs 15000 (Table 4.1).

4.2.8 Distance to the Nearest Health Facility

The study explored the distance between the nearest health facility and the respondent's homes and found that half of the surveyedpregnant women (n=171; 50.3%) were living 5-10 km away from the nearest health facility while another 45% of the participants (n=153) were living less than 5km away from the nearest health center (Table 4.1).

4.2.9 Number of ANC Attendance

Slightly over half of the surveyedpregnant women (n=185; 54.4%) indicated to have attended ANC twice, 66 (19.4%) had attended three times, 59 (17.4%) had attended more than thrice, and 30 (8.8%) were attending for the first time (Table4.1). Noteworthy, antenatal care coverage (also known as percentage of "at least 4 ANC visits") in Tongaren during 2020 was found to be 72%.

4.2.10 Insurance Status

Almost all the respondents (n=322; 94.7%) had health insurance known as Linda Mama programme offered by the Kenyan government (Table4.1).

4.2.11 Pregnancy-Related Characteristics of the Sampled Pregnant Women

The age of pregnancy of the surveyedpregnant womenranged from 1 month to 9 months, with the mean age of pregnancy of the entire group being 5.3 months (±1.9). The study also explored the number of times each of the surveyedpregnant women had been pregnant and found a mean of 2.3 times (±1.8) among the total respondents, with

the minimum being 1 time and the maximum being 12 times. For those who had been pregnant before the current one, the number of living children ranged from 0 to 11 children, with the mean number of living children being 1.3 (±1.7).

4.3. Prevalence and Pattern of CAMUtilization Among Pregnant Women Attending ANC Clinics in Tongaren Sub-County

Out of a total of 340 respondents, 50.7% (n=172) participants reported that they had used CAM products at least once during past or present pregnancy while 49.3% (n=186) indicated not to have used any CAM product at any point during their pregnancies.

4.3.1. Association Between Socio-Demographic Variables and CAM Use Prevalence Among Pregnant Women Attending ANC Clinics

A. *Distribution of CAM Use Prevalence by Residential Ward of the Respondent*

The location of residence of the respondent was an important factor in CAM utilization. With respect to residential ward and CAM utilization (Table 4.2), majority of respondents from Naitiri-Kabuyefwe ward (n=80; 23.5%) reported using CAM, followed by those from Mbakalo ward (n=35; 10.3%), Milima (n=22; 6.5%), Ndalu (n=19; 5.6%), and finally Soysambu-Mitua and Tongaren each having 2.4% (n=8). A chi-square test of independence indicated that there is no statistically significant association between residential ward of the respondent and the use of CAM ($\chi2$ = 4.211, p = 0.519).

B. *Distribution of CAM Use Prevalence by Ethnicity of the Respondent*

Concerning ethnicity and CAM utilization, the respondents from the Luhya ethnic group comprising 40.9% (n=139) predominantly reported using CAM compared to those from Teso (3.5%), Kisii (2.4%), Kikuyu (1.8%), Kalenjin (1.5%), and finally

Luo (0.6%) (Table 4.2). A chi-square test of independence indicated that there is no statistically significant association between ethnicity of the respondent and the use of CAM ($\chi2 = 3.960$, p = 0.555).

C. *Distribution of CAM Use Prevalence by Marital Status of the Respondent*

CAM utilization was highest among respondents who were married or cohabitated (n=135; 39.7%) compared to those who were single, widowed or divorced (n=37; 10.9%) (Table 4.2). A chi-square test of independence revealed that marital status of the respondent was statistically significantly associated with the use of CAM ($\chi2 = 24.610$, p < 0.001).

D. *Distribution of CAM Use Prevalence by Educational Status of the Respondent*

CAM utilization was highest among respondents who attained secondary education (n=76; 22.4%) followed by those holding college diplomas (n=53; 15.6%), those who had attained up to primary level education (n=31; 9.1%), university degree graduates (n=7; 2.1%), and finally the rest with no formal education, 1.5% (n=5) (Table 4.2). A chi-square test of independence indicated that there was no statistically significant association between education status of the respondent and the use of CAM ($\chi2 = 8.242$, p = 0.143).

E. *Distribution of CAM Use Prevalence by Educational Attainment of Spouse of the Respondent*

With respect to educational attainment of spouse of the respondent and CAM utilization, the findings presented in Table 4.2revealed that CAM utilization was highest among pregnant women whose spouses had college diplomas (n=61; 27.1%) followed by those whose spouses had attained secondary education (n=45; 20.0%),

had attained up to primary level education (n=18; 8.0%), were university degree graduates (n=9; 4.0%), and finally had no formal education, 1.3% (n=3). A chi-square test of independence indicated that there is a statistically significant association between educational attainment of spouse of the respondent and the use of CAM ($\chi2$ = 12.086, p = 0.034).

F. *Distribution of CAM Use Prevalence by Religion of the Respondent*

Concerning religion and CAM utilization, findings presented in Table 4.2showed that respondents who professed the Christian faith were the predominant users of CAM (N=163; 47.9%) compared to those who professed Islam (n=9; 2.6%). No respondent from the African Traditional Religion indicated CAM use. A chi-square test of independence revealed that religion of the respondent was not statistically significantly associated with the use of CAM ($\chi2$ = 1.231, p = 0.540).

G. *Distribution of CAM Use Prevalence by Occupational Status of the Respondent*

According to Table 4.2, CAM utilization was found to be highest among respondents who were self-employed (n=86; 25.3%) compare to those who were unemployed (n=63; 18.5%) and those who were employed (n=23; 6.8%). A chi-square test of independence revealed that there exists a statistically significant association between occupational status of the respondent and the use of CAM ($\chi2$ = 22.473, p < 0.001).

H. *Distribution of CAM Use Prevalence by Occupation of the Respondent*

The findings in Table 4.2revealed that CAM utilization was highest among respondents who were farmers (n=69; 20.3%) followed those who were traders (n=55; 16.2%), students (n=33; 9.7%) and finally civil servants (n=15; 4.4%). Based on the chi-square test of independence, it was established that there exists a statistically

significant association between occupation of the respondent and the use of CAM ($\chi2$ = 27.011, p = 0.001).

I. Distribution of CAM Use Prevalence by Average Monthly Income of the Respondent's Household

Based on results shown in Table 4.2, respondents from households receiving an average monthly income of between 5001 and 15000 Kenyan Shillings were the highest users of CAM (N=87; 25.6%). This was followed by those from households earning less than Kshs 5000 per month (n=48; 14.1%) and those from households having an average monthly income above Kshs 15000 (n=37; 10.9%). According to the chi-square test of independence, there exists a statistically significant association between average monthly income of the respondent's household and the use of CAM ($\chi2$ = 25.559, p = 0.001).

J. Distribution of CAM Use Prevalence by Distance to the Nearest Health Facility from the Respondent's Residence

The study findings (Table 4.2) revealed that CAM utilization was highest among respondents who were living less than 5km away from the nearest health center (n=84; 24.7%) followed by those who were living 5-10 km away from the nearest health facility (n=80; 23.5%) and lowest among the respondents living more than 10 km away from the nearest health center (n=8; 2.4%). According to the chi-square test of independence, there is no statistically significant association between distance to the nearest health facility from the respondent's residence and the use of CAM ($\chi2$ = 2.131, p = 0.344).

K. Distribution of CAM Use Prevalence by Respondent's Number of ANC Attendance

Respondents who had attended ANC twice during the current pregnancy reported the highest rates of CAM utilization (n=88; 25.9%) compared to those who had attended ANC more than three times (n=37; 10.9%) those who had attended three times (n=36; 10.6%) and those who were attending for the first time (n=11; 3.2%) (Table 4.2). The chi-square test of independence showed that there is no statistically significant association between respondent's number of ANC attendance and the use of CAM ($\chi2$ = 6.884, p = 0.076).

L. *Distribution of CAM Use Prevalence by Insurance Status of the Respondent*

Based on the results presented in Table 4.2CAM utilization was highest among respondents who had Linda Mama health insurance (n=151; 47.3%) compared to those who didn't have that insurance (n=6; 1.9%). According to the chi-square test of independence, there is no statistically significant association between insurance status of the respondent and the use of CAM ($\chi2$ = 1.396, p = 0.238).

Table 4.2: Association between Socio-Demographic Factors and Prevalence of CAM Utilization among Pregnant Women Attending ANC Clinics in Tongaren Sub-County

Socio-demographic variable	Category	Total	CAM Utilization During Pregnancy (N=340)		Chi-square Analysis		
			Users of CAM n (%)	Non-Users of CAM n (%)	x^2	df	p value
Residential ward	Naitiri-Kabuyefwe	158 (46.5)	80 (23.5)	78 (22.9)	4.211	5	0.519
	Milima	44 (12.9)	22 (6.5)	22 (6.5)			
	Mbakalo	74 (21.8)	35 (10.3)	39 (11.5)			
	Soysambu-Mitua	13 (3.8)	8 (2.4)	5 (1.5)			
	Ndalu	30 (8.8)	19 (5.6)	11 (3.2)			
	Tongaren	21 (6.2)	8 (2.4)	13 (3.8)			
	Total	**340 (100)**	**172 (50.7)**	**168 (49.3)**			
Ethnicity	Luhya	265 (77.9)	139 (40.9)	126 (37.1)	3.960	5	0.555
	Kalenjin	15 (4.4)	5 (1.5)	10 (2.9)			
	Kikuyu	15 (4.4)	6 (1.8)	9 (2.6)			
	Kisii	19 (5.6)	8 (2.4)	11 (3.2)			
	Teso	21 (6.2)	12 (3.5)	9 (2.6)			
	Other	5 (1.5)	2 (0.6)	3 (0.9)			
	Total	**340 (100)**	**172 (50.7)**	**168 (49.4)**			
Marital status	Single/ Widowed/ Divorced	116 (34.1)	37 (10.9)	79 (23.2)	24.610	1	0.000
	Married/Cohabitated	224 (65.9)	135 (39.7)	89 (26.2)			
	Total	**340 (100)**	**172 (50.6)**	**168 (49.3)**			

Table 4.2(Continued)

Socio-demographic variable	Category	Total	CAM Utilization During Pregnancy (N=340)		Chi-square Analysis		
			Users of CAM n (%)	Non-Users of CAM n (%)	x^2	df	p value
Educational status	No formal education	6 (1.8)	5 (1.5)	1 (0.3)	8.242	5	0.143
	Primary education	63 (18.5)	31 (9.1)	32 (9.4)			
	Secondary education	168 (49.4)	76 (22.4)	92 (27.1)			
	Diploma holder	88 (25.9)	53 (15.6)	35 (10.3)			
	Degree holder	15 (4.4)	7 (2.1)	8 (2.4)			
	Total	**340 (100)**	**172 (50.6)**	**168 (49.4)**			
Education attainment of spouse	No formal education	3 (1.3)	3 (1.3)	0 (0.0)	12.086	5	0.034
	Primary education	31 (13.8)	18 (8.0)	13 (5.8)			
	Secondary education	81 (36.0)	45 (20.0)	36 (16.0)			
	Diploma holder	86 (38.2)	61 (27.1)	25 (11.1)			
	Degree holder	24 (10.7)	9 (4.0)	15 (6.7)			
	Total	**225 (100)**	**136 (60.4)**	**89 (39.6)**			
Religion	African Traditional Religion	1 (0.3)	0 (0.0)	1 (0.3)	1.231	2	0.54
	Christian	323 (95.0)	163 (47.9)	160 (47.1)			
	Islam	16 (4.7)	9 (2.6)	7 (2.1)			
	Total	**340 (100)**	**172 (50.6)**	**168 (49.4)**			
Occupational status	Employed	49 (14.4)	23 (6.8)	26 (7.6)	22.473	2	0.000
	Self-employed	129 (37.9)	86 (25.3)	43 (12.6)			
	Unemployed	162 (47.6)	63 (18.5)	99 (29.1)			

Total	**340 (100)**	**172 (50.6)**	**168 (49.4)**

Table 4.2(Continued)

Socio-demographic Variable	Category	Total	CAM Utilization During Pregnancy (N=340)		Chi-square Analysis		
			Users of CAM n (%)	Non-Users of CAM n (%)	x^2	df	p value
Occupation	Farming	122 (35.9)	69 (20.3)	53 (15.6)	27.011	3	0.000
	Civil servant	36 (10.6)	15 (4.4)	21 (6.2)			
	Trading	80 (23.5)	55 (16.2)	25 (7.4)			
	Student	102 (30.0)	33 (9.7)	69 (20.3)			
	Total	**340 (100)**	**172 (50.6)**	**168 (49.4)**			
Household average monthly income level	Less than 5000	129 (37.9)	48 (14.1)	81 (23.8)	25.559	4	0.000
	5001- 15000	138 (40.6)	87 (25.6)	51 (15.0)			
	15001 – 25000	38 (11.2)	23 (6.8)	15 (4.4)			
	25001 – 35000	17 (5.0)	10 (2.9)	7 (2.1)			
	More than 35000	18 (5.3)	4 (1.2)	14 (4.1)			
	Total	**340 (100)**	**172 (50.6)**	**168 (49.4)**			
Distance to the nearest health facility	Less than 5km (not far)	153 (45.0)	84 (24.7)	69 (20.3	2.131	2	0.344
	Between 5 - 10km (a bit far)	171 (50.3)	80 (23.5)	91 (26.8)			
	More than 10 km (far away)	16 (4.7)	8 (2.4)	8 (2.4)			
	Total	**340 (100)**	**172 (50.6)**	**168 (49.4)**			
Number of ANC attendance for the current pregnancy	This is my first time	30 (8.8)	11 (3.2)	19 (5.6)	6.884	3	0.076
	This is my second time	185 (54.4)	88 (25.9)	97 (28.5)			
	This is my third time	66 (19.4)	36 (10.6)	30 (8.8)			
	Have come more than thrice	59 (17.4)	37 (10.9)	22 (6.5)			
	Total	**340 (100)**	**172 (50.6)**	**168 (49.4)**			
	Yes	302 (94.7)	151 (47.3)	151 (47.3)	1.396	1	0.238

Linda Mama programme registration	No	17 (5.3)	6 (1.9)	11 (3.4)
	Total	**319 (100)**	**157 (49.2)**	**162 (50.8)**

4.3.2. Reasons for Complementary and Alternative Medicine (CAM) Utilization among Pregnant Women Attending ANC Clinics

For Tongaren Sub-County (Table 4.3), the three most commonly provided reasons for CAM utilization among pregnant women attending ANC clinics were "I preferred CAM to orthodox medicine for this ailment" (31.4%), followed by "Orthodox medicine had failed to work for me" (20.1%), and "Long distance to the healthcare facility" (9.1%). Other important motivations for CAM use cited by the respondents included lack of necessary drugs at the health center, unlikeable attitude of the health clinic personnel and inability to afford treatment the health center.

Table 4.3: Reasons for CAMUtilization (Push-Factors for CAM Use) Among Pregnant Women Attending ANC Clinics in Tongaren Sub-County

Variable	Category	Frequency (N=172)	Percent (%)
Push-factors for CAM use (*drawbacks of the modern healthcare system*)	I preferred CAM to orthodox medicine for this ailment	54	31.4
	Orthodox medicine had failed to "work" for me	35	20.1
	Long distance to the healthcare facility	16	9.1
	The drugs I needed were unavailable at the health center	15	8.6
	I did not like the attitude of the clinic staff	15	8.6
	Didn't have funds to pay for the treatment cost	14	8.0
	The service I needed was unavailable at the health center	13	7.3
	Could not find the conventional cure for what was suffering from	10	6.8
	Total	**172**	**100.0**

4.3.3. Health Benefits of CAM Use During Pregnancy

The health benefits of CAM use are often referred to as indications of use. Treatment of pregnancy-related discomfort was the most commonly reported indication/benefit for CAM utilization (36.2%), followed by improvement of physical appearance and wellbeing (27.5%), then health promotion and maintenance (19.5%), general improvement of the immune system (9.4%) and finally the least reported indications of use being improvement of the psychological status (7.4%) (Table 4.4).

Table 4.4: Indications/Health Benefits of CAM Use during Pregnancy (Pull-Factors for CAM Use) for Women Attending ANC Clinics in Tongaren Sub-County

Variable	Category	Frequency (N=172)	Percent (%)
Reported indications of CAM use during pregnancy	Treatment of pregnancy-related discomforts	62	36.2
	Health promotion and maintenance	50	28.9
	Improvement of physical appearance and wellbeing	47	27.5
	Improvement of the psychological status	13	7.4
	Total	**172**	**100**

4.3.4. Potential CAM Utilization in the Future

All the 340 surveyed pregnant women were asked whether or not they intend to use CAM therapies in their future pregnancies. The results shown in Figure 4.2 indicate that an overwhelming majority (86.6%) plan to use CAM products and practices in their future pregnancies because they perceive them to be beneficial to the mother and the fetus. About 10% were not sure if they will use them in the future because they believe that some of those CAM products and practices may be harmful. 2.7% absolutely stated that they don't intend to use them in their future pregnancies because they believe they have adverse effects on both the mother and the fetus.
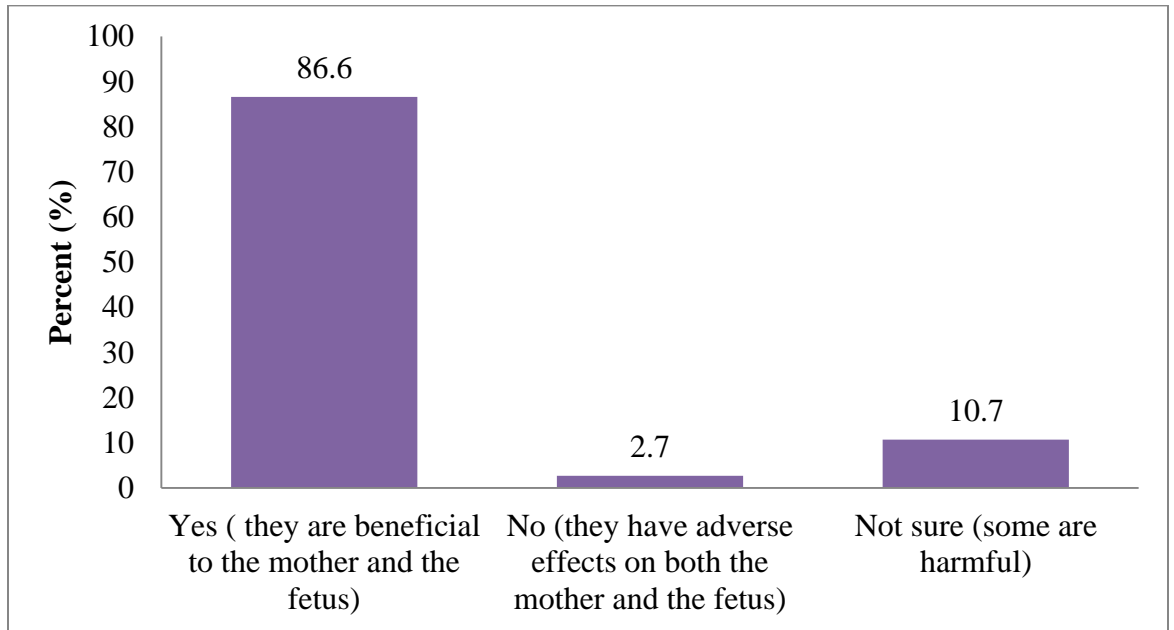
Figure 4.2: Percentage of Pregnant Women Attending ANC Clinics in Tongaren Sub-County Who Plan to Use CAM Therapies in Their Future Pregnancies

4.3.5. Concomitant Utilization of CAM and Conventional Medicine (Doctor's Prescription)

The study sought to assess the proportion of surveyed pregnant women who were using CAM (herbal medicine in particular) and conventional medicine concomitantly, i.e. using both CAM and conventional medicine on the same day for the same or different illnesses. It was established that majority (55.80%) of the CAM users don't use CAM and orthodox medicine concurrently, they use CAM separately when they are not using conventional medicine. The remaining 44.20% reportedly use CAM and orthodox/conventional medicine concurrently on the same day either for the same/different illnesses (Figure 4.3).
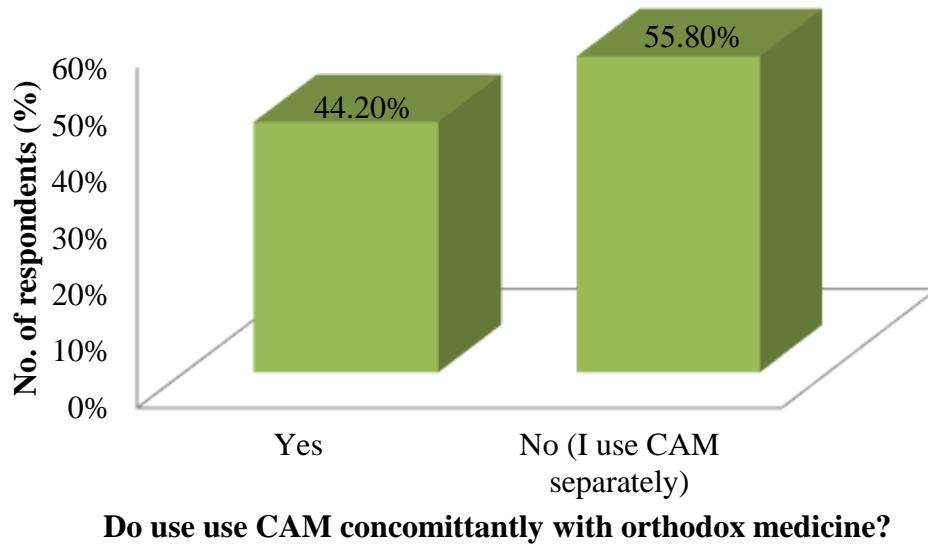
Figure 4.3: Concomitant Utilization of CAM with Conventional Medicine among Pregnant Women Attending ANC Clinics in Tongaren Sub-County

4.3.6. Sources of Information on CAM Use among Pregnant Women

The results indicated that family members (49%) were the primary source of information concerning CAM use for most respondents. For another 39% of the respondents, they obtained information on CAM use from their friends. Mass media and social media were only used as sources of CAM information by few of the respondents, 7% and 5% respectively.

4.4. Factors Influencing the Utilization of Complementary and Alternative Medicine (CAM) among Pregnant Women Attending ANC Clinics

The pre-disposing factors for the use of CAM among pregnant women were analyzed using a combination of chi-square test of independence (Tables 4.4) and multiple logistic regression analyses (Table 4.5).Since the Chi-square tests revealed that marital status, educational status, educational status of spouses, occupational/employment status, occupation, and average household monthly income were significantly

associated with CAM use, the relative effects of these variables on CAM use were further examined in the multinomial logistic regression analysis.

It was revealed that marital status of the respondent was significantly associated with the use of CAM ($\chi 2$ = 24.610, p < 0.001). Pregnant women who were married/cohabited were found to be 2.34 times more likely to use CAM than those who were single/widowed (OR = 2.341, 95.0% CI: 1.709 – 13.372, p = 0.008).

According to the analyses, there is a significant association between educational attainment of spouse of the respondent and the use of CAM ($\chi 2$ = 12.086, p = 0.034). Pregnant women whose spouses had no formal education were 5.37 times more likely to use CAM than those with other educational qualifications (OR = 5.371, CI: 0.391 – 15.945, p < 0.001).

Also, employment status of the respondent was found to be significantly associated with the use of CAM ($\chi 2$ = 22.473, p < 0.001). The odds of using CAM were found to be lower among self-employed participants than unemployed ones (OR = 0.415, CI: 0.161 - 1.068, p = 0.028).

Further, it was established that there exists a significant association between occupation of the respondent and the use of CAM ($\chi 2$ = 27.011, p < 0.001). Pregnant women who were farmers were found to be 2.77 times more likely to use CAM than other occupations (OR = 2.777, CI: 0.57 - 13.531, p = 0.026).

Finally, the average monthly income of the respondent's household and the use of CAM were found to be significantly associated ($\chi 2$ = 25.559, p < 0.001). Pregnant women from households earning more than Kshs 35,000 per month were at lower odds of using CAM than those with lower monthly income (OR = 0.093, CI: 0.015 - 0.6, p = 0.012).

Table 4.5: Multiple Logistic Regression Analysis for Determining Factors Impacting CAM Utilization among Pregnant Women Attending ANC Clinics in Tongaren Sub-County

Socio-demographic variable	Category	OR	95% Confidence Interval		p-value
			Lower	Upper	
Marital status	Single/Widowed/Divorced	1			RC
	Married/Cohabitated	2.341	1.709	13.372	0.008**
Educational status	No formal education	0.532	0.284	3.551	0.035**
	Primary education	1.672	0.158	17.728	0.673
	Secondary education	2.605	0.224	11.508	0.014**
	Diploma holder	1.138	0.177	7.331	0.891
	Degree holder	1			RC
Education attainment of spouse	No formal education	5.371	0.391	15.945	0.000**
	Primary education	0.583	0.077	4.396	0.600
	Secondary education	1.063	0.236	4.797	0.937
	Diploma holder	0.343	0.095	1.237	0.102
	Degree holder	1			RC
Occupational status	Employed	0.806	0.147	4.411	0.803
	Self-employed	0.415	0.161	1.068	0.028**
	Unemployed	1			RC
Occupation	Farming	2.777	0.571	13.531	0.026**
	Civil servant	1.197	0.105	13.662	0.885
	Trading	1.323	0.248	7.063	0.744
	Student	1			RC
Household average monthly income level	Less than 5000	0.123	0.014	1.087	0.059
	5001- 15000	0.093	0.015	0.627	0.012**
	15001 – 25000	0.097	0.014	0.614	0.013**
	25001 – 35000	0.174	0.028	1.073	0.059
	More than 35000	1			RC

*RC: Reference Category; OR represent Odds Ratio; ** represents statistical significance of interaction at p ≤ 0.05*

4.5. Types and Pattern of Utilization of CAM Modalities Used during Pregnancy

On a multiple response scale (4.6), it was established that of the 172 CAM users, 65.1% (n=112) used herbal therapies (plant products), 40.1% (n=69) used spiritual remedies, 28.5% (n=49) used animal-based therapies, and 35.5% (n=61) used alternative therapies (psycho-physical remedies).

Table 4.6: Type of CAM Therapy Used By Pregnant Women in Tongaren Sub-County

Type of CAM Therapy	Total	CAM Utilization During Pregnancy	
		Users n (%)	Non-Users n (%)
Herbal therapies	172 (100)	112 (65.1)	60 (34.9)
Animal-based therapies	172 (100)	49 (28.5)	123 (71.5)
Spiritual remedies	172 (100)	69 (40.1)	103 (59.9)
Alternative (psycho-physical) therapies	172 (100)	61 (35.5)	111 (64.5)

Note: The question allowed ticking more than one item, and the percentage for each item is reflective of number of responses out of the total no. of CAM users (172).

4.5.1. Common Herbal Forms ofCAM Therapies and Their Pattern of Utilization

About 38 plant types were mentioned as herbal therapies by the respondents (Table 4.7). Some of these plants are used alone or in combinations with other plant types and hence respondents were allowed to report more than one. On a multiple response scale, the most commonly used plants during pregnancy (in order of reducing frequency of mentions) were *Mwarubaini* (15.3%), Aloe Vera (11.5%), *Mbegu rahisi* (7.7%), Sodom apple (4.8%), Black jack (3.8%), *Kibuyi* (3.8%), Guava (2.9%), *Kumunyama* (2.9%), *Muchinduli* (2.9%) and *Nderema* (2.9%).

"I often advise the women who come to me to for some regular checkups to use Aloe Vera throughout the pregnancy after the first month of pregnancy. It helps them with frequent headaches and tummy pains. They prepare the leaves by.....! Nandemu [stinging nettle] is another plant that I encourage them to use its leaves...at the

beginning of the third trimester to improve the appetite or to help with occasional fever" -**(Traditional Midwife #1)**

"Yes, it's true that Mwarubaini [Neem tree] is a highly effective plant for many ailments ...about 40 diseases/illnesses... including pregnancy, and many of my patients tell me they use it ... but for pregnancy I often caution the pregnant women that they must be careful with it...it should be used before six months of pregnancy becauseany usage beyond that can increase the risk of a miscarriage" - **(Herbalist)**

"Nderema and mrenda are popular among pregnant women in this area...they are all over our farms...even I use them a lot during my pregnancies...they actually work the same way...are effective for loosening the stools for easier defecation. You know pregnant women sometimes experiences difficulties in passing stool..." - **(Traditional Midwife #2)**

The least used herbal remedies cited by the survey participants included lemon, *managu* roots, pawpaw leaves, pumpkins, sisal, cypress, *kumsiola* among others. They may be ingested (as ground powders, syrups or mixed with food substances like tea), topically applied on the body or displayed inside or outside the house. Most of these herbal remedies were commonly used during the first trimester and second trimesters of the pregnancy and consumed on a daily or weekly basis (Table 4.7).

These herbal therapies are utilized by the pregnant women from Tongaren to treat some pregnancy-related ailments ranging from digestive discomforts (like diarrhea, acid reflux and constipation), respiratory tract illnesses (like cough and cold), skin problems (like stretch marks and acne), bodily aches (like toothache, stomachache, headache, abdominal and chest pains), nutritional deficiencies related illnesses(like anemia, inappetence), opportunistic bacterial infections (like urinary tract infections), malaria to psycho-physical issues (like stress, depression and insomnia) (Table 4.7).

Table 4.7: Common Plant Products Used As CAM Therapies by Pregnant Women Attending ANC Clinics in Tongaren Sub-County and Their Patterns of Utilization

Local/English name	Scientific name	Parts utilized	Mode of preparation	Mode of utilization	Utilization stage of pregnancy	Frequency of utilization	Pregnancy ailment reportedly treated
Aloe Vera	*Aloe barbadensis*	Leaf	Squeezed to produce sap	Topical application	First trimester only	Once daily	Skin problems
Black jack	*Bidens pilosa*	Leaf	Powder/infusion	Ingestion, topical application	First trimester only	Once daily	Opportunistic bacterial infections, pain, skin problems
Indereresia	*Thunbergia alata*	Leaves and root	Decoction	Ingestion	First and second trimesters	Once per week	Malaria, headaches, abdominal pains
Eshikata	*Carissa spinarum*	Fruit	Infusion	Ingestion	Second and third trimesters	Once per week	Indigestion, abdominal pains, inappetence
Garlic	*Allium sativum*	Bulb	Raw usage	Ingestion, sniffed	Second trimester only	Once daily	Infections, cold, flu, hypertension
Guava	*Psidium guajava*	Leaf and fruit	Infusion, raw	Ingestion	First trimester only	Once daily	Digestive discomforts like diarrhea, acid reflux and constipation
Kibuyi	Not established	Leaf	Powder	Ingestion	Second and third trimesters only	Once per week	Abdominal pains
Lusiola	*Markhamia lutea*	Leaf	Decoction	Topical application	First trimester only	Once monthly	Malaria, skin problems, coughs, inappetence, various body aches
Kumukuyu	*Ficus sycomorus*	Leaf and bark	Decoction	Topical application	Second and third trimesters only	Once monthly	Skin problems
Munyama Kwebugawda	*Trichilia emetica*	Leaf, bark and fruit	Powder	Ingestion	Second and third trimesters only	Once per week	Hemorrhoids, dermatitis and chest pains
Kumusiriangoko	Not established	Leaf		Ingestion	Second and third trimesters only	Once daily	Nausea, abdominal pains
Lemon	*Citrus limon*	Leaf and fruit	Decoction, infusion	Ingestion	Throughout the entire pregnancy	A few times weekly	Nausea, infections, dehydration, lack of folate

Table 4.7(Continued)

Local/English name	Scientific name	Parts utilized	Mode of preparation	Mode of utilization	Utilization stage of pregnancy	Frequency of utilization	Pregnancy ailment reportedly treated
Lukoya	Not established	Leaf and flower		Ingestion	First trimester only	Once per week	Digestive issues
Mbegu rahisi	*Tithonia diversifolia*	Leaf	Decoction	Ingestion	First trimester only	Once per week	Malaria
Managu	*Solanum villosum*	Leaf	Decoction	Ingestion	First and second trimesters only	Once per week	Bodily aches (tooth, stomachache), tonsillitis
Muchanjasi	Not established	Root	Raw usage	Ingestion, topical application	First trimester only	A few times weekly	Respiratory and skin problems
Mutoto	*Rauvolfia caffra*	Stem, bark and roots	Decoction, infusion, powder	Ingestion	First and second trimesters only	Once per week	Stress, insomnia,
Mukatakesi	*Syzygium guineense*	Leaf	Decoction	Topical application	Throughout the pregnancy	Once daily	Infections, diarrhea
Mwarobaini	*Azadirachta indica*	Leaf and bark	Infusion	Ingestion	First and second trimesters only	Once per week	Skin problems, infections, malaria,
Muchinduli	Not established	Leaf and fruit		Ingestion	First and second trimesters only	Once per week	Headache
Mukakati	Not established	Leaf	Powder	Ingestion	First and second trimesters only	Once per week	Infections
Namafuki	Not established	Leaf	Infusion	Ingestion	Second and third trimesters only	A few times weekly	Anemia
Nanjaka	*Mexican marigold*	Twigs	Raw usage	Displayed	Throughout the pregnancy	Once monthly	Bacterial infections, abdominal pains
Enderema	*Basella alba*	Leaf	Decoction	Ingestion	Throughout the pregnancy	Once per week	Diarrhea
Sodom apple	*Calotropis procera*	Fruit and root	Decoction, infusion	Ingestion, bathing solution	Throughout the pregnancy	Once per week	Digestive issues, skin problems

Table 4.7(Continued)

Local/English name	Scientific name	Parts utilized	Mode of preparation	Mode of utilization	Utilization stage of pregnancy	Frequency of utilization	Pregnancy ailment reportedly treated
Pawpaw	*Carica papaya*	Fruit	Raw usage	Ingestion	Throughout the pregnancy	Once per week	Viral infections, digestive issues, morning sickness, skin problems
Pumpkin	*Cucurbita maxima*	Leaf	Decoction	Ingestion	Throughout the pregnancy	Once per week	Abdominal pains, diarrhea, insomnia
Sisal	*Agave sisalana*	Leaf	Infusion	Topical application	First trimester only	Once monthly	Skin problems
Cypress	*Cupressus lusitanica*	Bark and leaf	Powder/Burnt to ashes	Sniffed	Throughout the pregnancy	Once monthly	Stress and respiratory ailments like cough and cold
Lidodo/Mchicha	*Amaranthus retroflexus*	Leaf and seed	Decoction	Ingestion	Second and third trimesters only	A few times weekly	Skin problems
Ubani	*Boswellia neglecta*	Bark	Burnt to ashes	Sniffed	Throughout the pregnancy	Once monthly	Skin issues (like stretch marks and acne) and respiratory issues (like flu, cold, asthma)
Vusangura	*Rhus natalensis*	Leaf	Infusion	Ingestion	First and second trimesters only	A few times weekly	Digestive, respiratory and skin issues; abdominal pains
Shilokha	Not established	Leaf and root	Decoction, infusion	Ingestion	First trimester only	Once daily	Hemorrhoids
Shirakaru	Not established	Leaf	Infusion	Ingestion	Second and third trimesters only	A few times weekly	Nausea, inappetence
Shikakai	*Senegalia rugata*	Leaf, pod	Powder	Ingestion	Second and third trimesters only	Once per week	Inappetence, skin problems

Suja	*Solanum nigrum*	Fruit	Squeeze	Ingestion	Second and third trimesters only	Once monthly	Cramps, pain, bacterial infections

4.5.2. Common Animal-BasedForms of CAM Therapies and Their Patterns of Utilization

Four (4) forms of animal product were cited by the respondents (Table 4.8). On a multiple response scale, the most commonly used animal-based product during pregnancy (in order of reducing frequency of mentions) were animal oils (40%), bones (26.7%), liver (18.3%), and milk products (15.0%). These products may be ingested (as ground powders, syrups or mixed with food substances), or topically applied on the body. All these animal products were commonly used throughout the pregnancy through daily/weekly consumption or monthly wearing on the body/displayed around the house. According to this research, these products are majorly used to treat pregnancy-related complications like disorders of the digestive system, infections of the urinary tract, and nutritional deficiencies related illnesses (like anemia and inappetence). They are also used to promote good fetal development, baby beauty enhancement and labor facilitation.

Table 4.8: Common Animal-Based Products Used As CAM Therapies by Pregnant Women Attending ANC Clinics inTongaren Sub-County and Their Patterns of Utilization

Animal-based products	Common modes and frequencies of utilization	Utilization stage of pregnancy
Oil	• Ingestion once per week, • Topical application once daily	Throughout the pregnancy
Bones	• Ingestion once per month	Throughout the pregnancy
Liver	• Ingestion once per week	Throughout the pregnancy
Milk products	• Ingestion once per week	Throughout the pregnancy

4.5.3. Common Forms of Spiritual Remedies Used As CAM Therapies and Their Patterns of Utilization

Since about 95% of the respondents are Christians, on a multiple response scale it was established that majority of the respondents who utilize spiritual therapies (n=56, 84.8%) cited prayer and meditation as their most frequently used form of CAM therapy. Prayers and meditations were conducted through visiting the places of worship once weekly, offering sacrifices once monthly or fasting once monthly, for the entire duration of the pregnancy. Other users of spiritual therapies mentioned divination which involves appeasing spirits as their preferred form of CAM therapy for pregnancy-related ailments. This was done through offering sacrifices once per pregnancy, daily wearing of charms made of skin or bones, and monthly visiting of places where spiritual reverence are done such as shrines or both, for the entire pregnancy period (Table 4.9). According to the pregnant women surveyed, these spiritual practices are solely used for evil and harm protection of the mother and the developing fetus.

Table 4.9: Common Forms of Spiritual Remedies Used As CAM Therapies by Pregnant Women Attending ANC Clinics in Tongaren Sub-County and Their Patterns of Utilization

Spiritual therapies	Mode of utilization	Utilization stage of pregnancy
Divination/foretelling	• Offering sacrifices once per pregnancy • Visits to traditionalists once per month • Wearing/display of charms (skin/bones) daily	Throughout the pregnancy
Prayer and meditation	• Fasting once per month • Offering sacrifices in place of worship once per month • Visits to place of worship once per week	Throughout the pregnancy

"As a prayer warrior, I receive many pregnant women every day. These women are often looking for spiritual healing for some pregnancy-related problems such as bleeding...take a way stress and fatigue...prayer gives strength and energy to keep working. ... I always begin the session by reading bible verse....Jeremiah 1:4-10 [I knew you before you were conceived and when you were in your mother's womb ...].I then explain to them that prayer only works for those who believe in God's healing power. In my experience I believe the main reason why pregnant women come for prayers during pregnancy is because they are afraid of evil spirits that may cause them to lose the baby...cause miscarriage or hemorrhage. ...evil spirits are always sent to the expecting mother by her family's enemies who want her and the baby dead because they think he could become more prosperous. Haha...prayer doesn't have any frequency...it can happen anytime at any stage of the pregnancy" – **(Prayer warrior #1, pastor)**

"God gave me the gift of foretelling the future ... when someone comes to me for a prayer including pregnant women, I am able to foresee both their past and future when am praying for them...I can foretell if they are being chased by evil spirits...if some calamity is going to happen to them during their pregnancy...and then pray for them to deflect the evil spirit from attacking her or the baby. I at times give out some holy charms that they carry with them in their pockets ...such as necklace with a cross or a piece of red clothing...some holy water to sprinkle around the house and to drink or bath with...these protects against evil" – **(Prayer Warrior #2)**

4.5.4. Common Forms of Alternative/Psycho-PhysicalCAM Therapies and Their Patterns of Utilization

On a multiple response scale, the most frequently reported alternative forms were massages (55.7%), special diets and supplements (13.1%), yoga (29.5%) and aromatherapy (1.6%). On patterns of utilization; massages were done on the abdomen region (especially on the womb and back) mostly weekly for all the three trimesters, special diets and supplements were exclusively ingested as food substances a couple

times per week especially during both the second and third trimesters, yoga involved running, walking and exercises which were mainly done daily throughout the entire duration of the pregnancy for the specific purpose of meditation (Table 4.10). The rural women of Tongaren majorly utilize these psycho-physical therapies to relieve stress, fatigue, and bodily aches; facilitate the adjustment of fetus's position in the womb; and induce labor when overdue.

Table 4.10: Common Forms of Alternative Therapies Used As CAM Therapies by Pregnant Women Attending ANC Clinics in Tongaren Sub-County and Their Patterns of Utilization

Alternative therapies	Mode and frequency of utilization	Utilization stage of pregnancy
Massage	Abdomen (stomach and back) once weekly	Throughout the pregnancy
Special diets and supplements	Ingestion a few times weekly	Second and third trimester only
Yoga	Running, walking and exercises once daily	Throughout the pregnancy
Aromatherapy	Sniffing once daily	First trimester only

"I am a traditional midwife, and my job is to take care of pregnant women in this village. I always perform regular massages for the women to help them relieve the pain in the body...and also help their fetus to be well positioned... or check if they have any complications. ...the massages are done when they show up for normal regular checkups which happen every three weeks ...throughout the pregnancy...! I use Arimis [local body oil] or (livonda) animal oil for massages. During labor I also massage them to ignite dilation and if six hours pass without any signs of dilation, especially first pregnancy I always refer them to the nearest hospital" - **(Traditional Midwife #2**

4.6. Disclosure of CAM Utilization to Healthcare Givers

Out of a total of 172 CAM users, over 80% of them indicated that they don't disclose their CAM use to their healthcare givers at the ANC clinics (Table 4.11).

Table 4.11: Disclosure of CAM Utilization to Healthcare Givers by Pregnant Women Attending ANC Clinics in Tongaren Sub-County

Disclosure of CAM use to Healthcare Givers	No. of Respondents (n)	Percent (%)
Yes	38	18.6
No	140	81.5
Total	**172**	**100**

Based on Table 4.12, the three most common reasons cited for non-disclosure were: unwillingness of the respondents (pregnant women) to disclose CAM use to anyone (n = 42, 30%), healthcare providers not asking (n = 38, 27.1%), and fear of the healthcare providers' reactions (n = 24, 17.1%).

Table 4.12: Reasons for Non-Disclosure of CAM Utilization to Healthcare Givers by Pregnant Women Attending ANC Clinics in Tongaren Sub-County

Variable	Category	Frequency (N=140)	Percent (%)
Main reason for non-disclosure of CAM use to caregivers	The healthcare provider didn't ask	38	27.1
	I did not think it was important	20	14.3
	I feared the healthcare providers' reaction	24	17.1
	I cannot disclose my use to anyone	42	30
	I forget to disclose	3	2.2
	Believed that physician had less knowledge about CAM type	6	4.3
	Physician discouraged use of CAM therapy in the past	7	5
	Total	**140**	**100**

Concerning disclosure of CAM use, here are some of the comments given by some healthcare givers.

"...I have personally experienced that...I realized that most pregnant women don't seem comfortable sharing with us information regarding the CAM products they are using out there. This could be because for one, they think that CAM products are inherently safe and effective since they have been used for centuries and by generations without any issues. For two, they think that we are not knowledgeable of anything to do with CAM or that we naturally think CAM is harmful and would chastise them if they revealed that they have been using it. But, I find this to be a dangerous trend, because some of these CAM are often used with modern drugs we give them for various illnesses and the reactions between this drugs and the chemicals in some of the CAM may be dangerous especially for the health of the baby they are expecting" - **(ANC Nurse, Naitiri Sub-County Hospital)**

"We used to ask the expecting women about their use of traditional medicine but since we noticed that most of them don't feel comfortable talking about it with us, with some of them missing next ANC visits, we just realized it was unproductive asking. So, we no longer bother them with such questions" - **(Clinical Officer, Ndalu Health Centre)**

About 19% of respondents indicated that they discussed their CAM use with their healthcare givers when they attend ANC clinics (Table 4.11). These respondents reported that they disclosed their CAM use majorly because the healthcare giver asked about it (62.5%) (Table 4.13). Another 28.1% of the respondents indicated that their belief that disclosure is important for safety was their motivation behind disclosing their CAM use to their healthcare givers.

The study established that herbal therapies were the highly disclosed (50%) CAM modality, followed by spiritual remedies (28.1%), animal-based therapies (12.5%) and lastly alternative (psycho-physical) therapies (9.4%) (Table 4.13). Most CAM users

who disclosed their utilization to their health care givers mostly disclosed the CAM used within 2 to 4 months before visiting the ANC (37.5%), followed by ones used in the last 1 month prior to visiting the ANC (31.3%), and disclosure of CAM used over 6 months prior to visiting the ANC accounted for 21.9% (Table 4.13). Concerning number of times of disclosure, an overwhelming majority (71.9%) disclosed CAM use once or twice during the current pregnancy (Table 4.13).

Those who discussed their CAM use during pregnancy with their healthcare givers were asked about some of the responses they received from their healthcare givers after disclosure. Half of the them (50.0%) reported that the healthcare givers commonly advised them that CAM/TM use together with conventional medicine has associated adverse effects, 37.5% were told that CAM/TM use is generally harmful and shouldn't be used, 9.4% were informed that CAM/TM use has associated benefits if it is prescribed by a licensed CAM practitioner and 3.2% reported that the healthcare providers were uninterested in offering any advice or comment (Table 4.13). Majority (68.8%) acknowledged that their disclosure of CAM use to their healthcare givers greatly enhanced the health services they received during pregnancy.

Table 4.13: Responses for CAM Use Disclosure by Pregnant Women Attending ANC Clinics in Tongaren Sub-County

Variable	Category	Frequency (N=32)	Percent (%)

Main reason for CAM use disclosure	The healthcare giver asked about it	20	62.5
	The belief that the doctor would offer advice about CAM usage	3	9.4
	Belief disclosure is important for safety	9	28.1
	Total	**32**	**100**
CAM modality (type) disclosed	Herbal therapies	16	50
	Animal-based therapies	4	12.5
	Spiritual remedies	9	28.1
	Alternative/psycho-physical therapies	3	9.4
	Total	**32**	**100**
Nature of the CAM use disclosed	CAM used in the last 1 month	10	31.3
	CAM used in between 2 and 4 months	12	37.5
	CAM used in between 5 and 6 months	3	9.4
	CAM used over 6 months	7	21.9
	Total	**32**	**100**
No. of CAM use disclosure during most recent pregnancy	One to two times	23	71.9
	Three to four times	4	12.5
	Five times or more	1	3.1
	I can't remember	4	12.5
	Total	**32**	**100**
Health care givers response after CAM use disclosure during pregnancy	CAM/TM use together with conventional medicine has associated adverse effects	16	50
	CAM/TM use is generally harmful and shouldn't be used	12	37.5
	CAM/TM has associated benefits if it is prescribed by a licensed CAM practitioner	3	9.4
	The healthcare provider was uninterested	1	3.1
	Total	**32**	**100**
Did disclosure of CAM use to healthcare givers enhanced health services received?	Yes	22	68.8
	No	10	31.3
	Total	**32**	**100**

4.6.1. Association between Socio-Demographic Variables and Disclosure of CAM Use to Healthcare Givers by Pregnant Women Attending ANC Clinics

The association between socio-demographic factors and disclosure of CAM use to healthcare givers by pregnant women attending ANC clinics is shown in Table 4.14.

A. *Distribution of Disclosure of CAM Use by Residential Ward of the Respondent*

With respect to residential ward and disclosure of CAM use to healthcare givers, Naitiri-Kabuyefwe ward reported the highest number of CAM users (n=21; 12.2%) who indicated disclosing their CAM use, followed by Ndalu (2.3%), Milima and Mbakalo both having 1.7%, Tongaren (0.6%) and lastly Soysambu-Mitua having no disclosers of CAM use. In terms of non-disclosure, Naitiri-Kabuyefwe ward still had the highest number of CAM users (n=32, 18.6%) who reported not disclosing their CAM use, followed by Mbakalo (18.6%), Milima (11%), Ndalu (8.7%), Soysambu-Mitua (4.7%) and finally Tongaren (4.1%). A chi-square test of independence indicated that there is no statistically significant association between residential ward of the respondent and disclosure of CAM use to healthcare givers ($\chi2$ = 7.874, p = 0.163).

B. *Distribution of Disclosure of CAM Use by Ethnicity of the Respondent*

Concerning ethnicity and CAM utilization, majority of respondents who disclosed their CAM use were from the Luhya ethnic group (16.3%), followed by Kalenjins (1.2%), Kikuyus and Kisiis, with Teso and Luo ethnic groups not having anyone reporting to have ever disclosed CAM use. With regards to non-disclosure, majority of women who didn't disclose their CAM use came from the Luhya ethnic group (64.5), followed by Teso (7.0%), Kisii (4.1%), Kalenjin (1.7%) and Luo (1.2%). A chi-square test of independence indicated that there is no statistically significant

association between ethnicity of the respondent and the disclosure of CAM use to healthcare givers ($\chi2$ = 5.141, p = 0.399).

C. Distribution of Disclosure of CAM Use by Marital Status of the Respondent

CAM use disclosure was highest among respondents who were married or cohabitated (15.7%) compared to those who were single, widowed or divorced (2.9%). Further, non-disclosure was highest among respondents who were married or cohabitated (62.8%) compared to those who were single, widowed or divorced (18.6%). A chi-square test of independence revealed that marital status of the respondent was not statistically significantly associated with the disclosure of CAM use to healthcare givers ($\chi2$ = 0.807, p = 0.369).

D. Distribution of Disclosure of CAM Use by Educational Status of the Respondent

Disclosure of CAM use was highest among respondents who attained secondary education (8.7%) followed by those holding college diplomas (4.7%), those who had attained up to primary level education (4.1%), those with university degree graduates and those with no formal education indicating no disclosure. In terms of non-disclosure, the same trend was observed where those with secondary education were the majority, followed by those with college diplomas, primary education and the least being university degree graduates and those with no formal education. A chi-square test of independence indicated that there was statistically significant association between education status of the respondent and the disclosure of CAM use to healthcare givers ($\chi2$ = 11.855, p = 0.037).

E. Distribution of Disclosure of CAM Use by Educational Attainment of Spouse of the Respondent

With respect to educational attainment of spouse of the respondent and disclosure of CAM utilization, the findings revealed that disclosure of CAM utilization was highest among pregnant women whose spouses had college diplomas or had attained secondary education (6.6%) followed by those whose spouses had attained primary education (4.4%), with none of those whose spouses were university degree graduates or had no formal education indicating disclosure. Non-disclosure was highest among the respondents whose spouses were diploma holders (38.2%), followed by those whose partners had attained secondary education (26.5%) and the ones whose spouses attained up to primary education (8.8%). A chi-square test of independence found no statistically significant association between educational attainment of spouse of the respondent and the disclosure of CAM use to healthcare givers ($\chi2 = 3.112$, p $= 0.634$).

F. Distribution of Disclosure of CAM Use by Religion of the Respondent

Concerning religion and the disclosure of CAM utilization to healthcare givers, findings showed that respondents who professed the Christian faith were the majority of those who reported disclosing their CAM use and those who reported non-disclosure of their CAM use when compared to those who professed Islam. A chi-square test of independence revealed that religion of the respondent was statistically significantly associated with the disclosure of CAM use to healthcare givers ($\chi2 = 8.563$, p $= 0.003$).

G. Distribution of Disclosure of CAM Use by Occupational Status of the Respondent

More unemployed respondents (10.5%) disclosed their CAM use compared to self-employed (6.4%) and employed ones (1.7%). Also, self-employed respondents (43.6%) constituted the highest number of those who reported not disclosing their CAM utilization, followed by the unemployed (26.2%) and finally the employed (11.6%). A chi-square test of independence revealed that there exists a statistically significant association between occupational status of the respondent and the disclosure of CAM use to healthcare givers ($\chi2 = 6.522$, $p = 0.038$).

H. Distribution of Disclosure of CAM Use by Occupation of the Respondent

The findings revealed that the disclosure of the use of CAM was highest among respondents who were farmers (12.2%) followed those who were traders (2.9%), students (2.3%) and finally civil servants (1.2%). On the other hand, respondents who were traders were the leading in terms of non-disclosure of CAM use (29.1%), followed by farmers (27.9%), then students (16.9%) and lastly civil servants (7.6%). Based on the chi-square test of independence, it was established that there exists a statistically significant association between occupation of the respondent and the disclosure of CAM use to healthcare givers ($\chi2 = 10.855$, $p = 0.013$).

I. Distribution of Disclosure of CAM Use by Average Monthly Income of The Respondent's Household

Respondents from households receiving an average monthly income between 5001 and 15000 Kenyan Shillings were the highest with respect to disclosure of CAM use (10.5%). This was followed by those from households earning less than Kshs 5000 per month (4.7%) and those from households having an average monthly income above Kshs 15000. Further, participants from households receiving an average monthly income between 5001 and 15000 Kenyan Shillings were the highest with respect to disclosure of CAM use (40.1%), followed by those from households earning less than Kshs 5000 per month (23.3%) and those from households having an average monthly income above Kshs 15000. According to the chi-square test of independence, there

exists no statistically significant association between occupation of the respondent and the disclosure of CAM use to healthcare givers ($\chi2 = 0.988$, p = 0.912).

J. Distribution of Disclosure of CAM Use by Distance to the Nearest Health Facility from the Respondent's Residence

The study findings revealed that the disclosure of CAM utilization was highest among respondents who were living 5-10 km away from the nearest health center (9.3%) compared to those who were living less than 5km away from the nearest health facility (8.1%) and the respondents living more than 10 km away from the nearest health center (1.2%). When it comes to non-disclosure of CAM use, it was highest among respondents living less than 5km away from the nearest health center (40.7%) followed by those living within 5-10 km radius from the nearest health facility (37.2%) and lowest among respondents living more than 10 km away from the nearest health center. According to the chi-square test of independence, there is no statistically significant association between distance to the nearest health facility from the respondent's residence and the disclosure of CAM use to healthcare givers ($\chi2 = 0.527$, p = 0.768).

K. Distribution of Disclosure of CAM Use by Respondent's Number of ANC Attendance

According to the results of this study presented in Table 4.14, respondents who had attended ANC twice during the current pregnancy reported the highest rates of disclosure of CAM utilization (11.0%) compared to those who had attended ANC more than three times (4.7%), those who had attended three times (2.9%) with none of those who were attending for the first time indicating disclosure of their CAM use. On the flipside, respondents who had attended ANC twice during the current pregnancy reported the highest rates of non-disclosure of CAM utilization (40.1%) compared to those who had attended three times (18.0%), those who had attended ANC more than three times (16.9%), and those who were attending for the first time

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(6.4%). The chi-square test of independence showed that there is no statistically significant association between respondent's number of ANC attendance and the disclosure of CAM use to healthcare givers ($\chi2 = 3.748$, $p = 0.286$).

L. Distribution of Disclosure of CAM Use by Insurance Status of the Respondent

The rates of disclosure of CAM utilization was highest among respondents who had Linda Mama health insurance (17.2%) compared to those who didn't have that insurance (1.9%). Moreover, rates of non-disclosure of CAM utilization were highest among respondents who had Linda Mama health insurance (79.0%) compared to those who didn't have that insurance (1.9%). According to the chi-square test of independence, there is statistically significant association between insurance status of the respondent and the disclosure of CAM use to healthcare givers ($\chi2 = 3.852$, $p = 0.05$).

Table 4.14: Association between Socio-Demographic Variables and Disclosure of CAM Use to Healthcare Givers by Pregnant Women Attending ANC Clinics in Tongaren Sub-County

Socio-demographic Variable	Category	Total	Disclosure of CAM Utilization to Healthcare Givers (N=172)		Chi-square Analysis		
			Disclosed CAM Use n (%)	Not Disclosed CAM Use n (%)	x^2	df	p value
Residential ward	Naitiri-Kabuyefwe	80 (46.5)	21 (12.2)	59 (34.3)	7.874	5	0.163
	Milima	22 (12.8)	3 (1.7)	19 (11)			
	Mbakalo	35 (20.3)	3 (1.7)	32 (18.6)			
	Soysambu-Mitua	8 (4.7)	0 (0.0)	8 (4.7)			
	Ndalu	19 (11.0)	4 (2.3)	15 (8.7)			
	Tongaren	8 (4.7)	1 (0.6)	7 (4.1)			
	Total	**172 (100)**	**32 (18.5)**	**140 (81.5)**			
Ethnicity	Luhya	139 (80.8)	28 (16.3)	111 (64.5)	5.141	5	0.399
	Kalenjin	5 (2.9)	2 (1.2)	3 (1.7)			
	Kikuyu	6 (3.5)	1 (0.6)	5 (2.9)			
	Kisii	8 (4.7)	1 (0.6)	7 (4.1)			
	Teso	12 (7.0)	0 (0.0)	12 (7.0)			
	Other	2 (1.2)	0 (0.0)	2 (1.2)			
	Total	**172 (100)**	**32 (18.6)**	**140 (81.4)**			
Marital status	Single/Widowed/Divorced	37 (21.5)	5 (2.9)	32 (18.6)	0.807	1	0.369

Married/Cohabitated	135 (78.5)	27 (15.7)	108 (62.8)
Total	**172 (100)**	**32 (18.6)**	**140 (81.4)**

Table 4.14(Continued)

Socio-demographic Variable	Category	Total	Disclosure of CAM Utilization to Healthcare Givers (N=172)		Chi-square Analysis		
			Disclosed CAM Use n (%)	Not Disclosed CAM Use n (%)	x^2df		p value
Educational status	No formal education	5 (2.9)	2 (1.2)	3 (1.7)	11.855	5	0.037
	Primary education	31 (18.0)	7 (4.1)	24 (14.0)			
	Secondary education	76 (44.2)	15 (8.7)	61 (35.5)			
	Diploma holder	53 (30.8)	8 (4.7)	45 (26.2)			
	Degree holder	7 (4.1)	0 (0.0)	7 (4.1)			
	Total	**172 (100)**	**32 (18.6)**	**140 (81.4)**			
Education attainment of spouse	No formal education	3 (2.2)	1 (0.7)	2 (1.4)	4.475	5	0.483
	Primary education	18 (13.2)	6 (4.4)	12 (8.8)			
	Secondary education	45 (33.1)	9 (6.6)	36 (26.5)			
	Diploma holder	61 (44.9)	9 (6.6)	52 (38.2)			
	Degree holder	9 (6.6)	2 (1.5)	7 (5.1)			
	Total	**136 (100)**	**27 (19.9)**	**109 (80.1)**			
Religion	African Traditional Religion	0 (0.0)	0 (0.0)	0 (0.0)	8.563	2	0.003
	Christian	163 (94.8)	27 (15.7)	136 (79.1)			
	Islam	9 (5.2)	5 (2.9)	4 (2.3)			
	Total	**172 (100)**	**32 (18.6)**	**140 (81.4)**			
Occupational status	Employed	23 (13.4)	3 (1.7)	20 (11.6)	6.522	2	0.038
	Self-employed	86 (50.0)	11 (6.4)	75 (43.6)			
	Unemployed	63 (36.6)	18 (10.5)	45 (26.2)			

Total	**172 (100)**	**32 (18.6)**	**140 (81.4)**

Table 4.14(Continued)

Socio-demographic Variable	Category	Total	Disclosure of CAM Utilization to Healthcare Givers (N=172)		Chi-square Analysis		
			Disclosed CAM Use n (%)	Not Disclosed CAM Use n (%)	x^2	df	p value
Occupation	Farming	69 (40.1)	21 (12.2)	48 (27.9)	10.855	3	0.013
	Civil servant	15 (8.7)	2 (1.2)	13 (7.6)			
	Trading	55 (32.0)	5 (2.9)	50 (29.1)			
	Student	33 (19.2)	4 (2.3)	29 (16.9)			
	Total	**172 (100)**	**32 (18.6)**	**140 (81.4)**			
Household average monthly income level	Less than 5000	48 (27.9)	8 (4.7)	40 (23.3)	0.988	4	0.912
	5001- 15000	87 (50.6)	18 (10.5)	69 (40.1)			
	15001 – 25000	23 (13.4)	4 (2.3)	19 (11.0)			
	25001 – 35000	10 (5.8)	1 (0.6)	9 (5.2)			
	More than 35000	4 (2.3)	1 (0.6)	3 (1.7)			
	Total	**172 (100)**	**32 (18.6)**	**140 (81.4)**			
Distance to the nearest health facility	Less than 5 km (not far)	84 (48.8)	14 (8.1)	70 (40.7)	0.527	2	0.768
	Between 5-10km (a bit far)	80 (46.5)	16 (9.3)	64 (37.2)			
	More than 10 km (far away)	8 (4.7)	2 (1.2)	6 (3.5)			
	Total	**172 (100)**	**32 (18.6)**	**140 (81.4)**			
Number of ANC attendance for the current pregnancy	This is my first time	11 (6.4)	0 (0.0)	11 (6.4)	3.784	3	0.286
	This is my second time	88 (51.2)	19 (11.0)	69 (40.1)			
	This is my third time	36 (20.9)	5 (2.9)	31 (18.0)			
	Have come more than thrice	37 (21.5)	8 (4.7)	29 (16.9)			
	Total	**172 (100)**	**32 (18.6)**	**140 (81.6)**			
	Yes	151 (96.2)	27 (17.2)	124 (79.0)	3.852	1	0.05
	No	6 (3.8)	3 (1.9)	3 (1.9)			

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Linda Mama programme registration	**Total**	**157 (100)**	**30 (19.1)**	**127 (80.9)**

CHAPTER FIVE

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1. Discussion

5.1.1. Socio-Demographic and Pregnancy-Related Characteristic of Pregnant Women Who Use CAM during Pregnancy

The pregnant women attending ANC clinics surveyed in this study were aged between 18 and 48. This was to be expected based on the inclusion criteria defined for this study. Naitiri-Kabuyefwe ward contributed the highest number of participants (almost half), because being more urbanized it has better healthcare centers compared to the other wards which attracts more patients from all over the Sub-County. Over three-quarters of the respondents were from the Luhya ethnic group, which is not surprising because Tongaren is located in the heart of Western region of Kenya, typically inhabited by Luhya tribe. Over half of the pregnant women were in marriage or cohabitation, which is consistent with the study of Augustine (2018) which found that an average of 60.7% of women from Bungoma County was either married or in cohabitation. It's important to know the participants' marital status as it can provide some insight into the role of their marriage partner on CAM use.

Evaluating the education level of a respondent is significant since it represents intellectual growth. About half of the pregnant women had attained up to secondary education level, which is in line with the 78.19% female literacy trends in Kenya as estimated by UNESCO (2018). This could be attributed to the Kenyan government's free primary education program, which has been in place for the previous two decades. An overwhelming majority (95%) of the surveyed respondents were Christians, which is consistent with Augustine (2018) study which established that 96% of women in Bungoma County professed Christianity as their religion. This pattern suggests that Christianity is widespread in the research area, corroborating national estimates of 85% percent for Christianity (KNBS, 2019).

About half of the women were unemployed, with the employed accounting for only 14.4%. This reflects the high unemployment rates in Kenya. In 2020, the Kenyan unemployment rate was 7.2% (ILO, 2021). Employed women were majorly working as farmers or in trading enterprises. This was to be anticipated in this study area because it is predominantly rural. This finding supports the assertion by KIPPRA (2021) that the majority of women work in agriculture or domestic service jobs. Almost half of the surveyed pregnant women came from households earning an average monthly income between 5001 and 15000 Kenyan Shillings (approx. 50-150 USD). The national minimum wage in Kenya is estimated to be 125.718 USD/Month (ILO, 2021); therefore a drawn comparison with the findings of this study implies that half of these households were living above this minimum wage while another half was living in poverty. Over 50% of the pregnant women were living 5-10 km away from the nearest health facility, hence limiting their access to health care services. A similar finding was observed by Ng'etich (2013) who reported that about 64% of pregnant women in Embu traveled between 5 and 10 km to reach the nearest health facility.

The antenatal phase provides chances to reach pregnant women with interventions that may be critical to their health and well-being, as well as the health and well-being of their babies. This study found that over half of pregnant women (66%) reported attending the ANC twice in the current pregnancy. Only 17.4% had attended the ANC more than thrice (which is commonly called antenatal care coverage or percentage at least 4ANC visits). This antenatal care coverage was lower than the 72% calculated for the year 2020, implying that access to healthcare among pregnant women in the study area has reduced over the past year due to the ongoing coronavirus pandemic and this might influence their CAM use prevalence. According to the WHO (2021), ANC coverage is a measure of access to and utilization of health care during pregnancy. Women's NCCF (2013) opines that regular ANC attendance throughout pregnancy provides pregnant women the opportunity to address issues and concerns

regarding self-care behaviors during pregnancy, such as CAM use, while also allowing healthcare experts to treat and assess any health complications.

Finally, the study observed that 94.7% are covered under the Linda Mama insurance scheme which is exclusively funded by the government. This is way higher than the 71% rate observed in Ghana among pregnant women (Gyasi, 2014), an indication that the Kenyan government has made tremendous achievement in providing insurance access to women with maternity healthcare needs.

5.1.2. Prevalence of Complementary and Alternative Medicine (CAM) Utilization among Pregnant Women Attending ANC Clinics

5.1.2.1. Prevalence of CAMUtilization among Pregnant Women Attending ANC Clinics

The study set out to determine the prevalence of complementary and alternative medicine (CAM) utilization among pregnant women attending ANC clinics. The study established that half of the pregnant women from Tongaren had used some CAM products at least once during past or present pregnancy. Compared to previous estimates in the nation, the 50.7% prevalence determined by this study is equal to the rate observed among pregnant women in Thika (Njoroge & Kibunga, 2007). However, it is higher than the prevalence rate of 40.5% observed among pregnant women in Nairobi (Mothupi, 2014) and 42.5% recorded among pregnant women in Kiambu County (Githinji, 2014), and lower than the 68.9% registered in Gucha District among pregnant women (Ondicho *et al*., 2016) and 70% observed among pregnant women in Embu (Ng'etich, 2013). These differences in the prevalence of CAM utilization among pregnant women from various parts of Kenya could be due to attributed to the socio-cultural differences that exist between the various ethnic groups in the country. For instance, from this study, it was established that almost 80% of the respondents are from the Luhya ethnic tribe and therefore their CAM utilization patterns would be expected to be different from those of women from Embu and Meru ethnic groups

since they have varied customs and traditions which usually shape their perceptions and practice. Apart from the socio-cultural differences, the differences in definitions of CAM by various study methodologies could be responsible for the varying prevalence rates.

Regionally, the high CAM utilization seen in this study was consistent with the relatively high CAM use prevalence reported by most studies conducted across Sub-Saharan Africa. Among pregnant women from neighboring countries, a prevalence rate of 45% was registered in DRC (Mbarambara *et al*., 2016), 52% has been recorded among 398 women surveyed in Zimbabwe (Mureyi *et al.*, 2012), 55% has been observed among 400 women surveyed in Tanzania (Godlove, 2011), and 80% was noted among 258 pregnant women surveyed in Ethiopia (Laelago *et al*., 2016). This study complements these previous pieces of literature in demonstrating that CAM use has been increasing in Kenya and in the developing world. According to the WHO (2019), above 80% of the population in the developing world rely on CAM use for their health improvement and disease treatments.

In comparison to some studies from the developed world, the prevalence of CAM use among pregnant women in Tongaren was found to be a little lower than 52% prevalence noted among 1,835 women surveyed in Australia (Frawley, 2015), 57.1% prevalence established among 315 surveyed in the United Kingdom (Hall & Jolly, 2014), and 72% prevalence observed among 201 women surveyed in the US (Strouss *et al*., 2014). However, it's not easy to state if these disparities in prevalence between surveys from various nations reflect real variances in CAM use or are due to differences in study design, characteristics of research sites, data collection, and sampling methodologies (James, 2018b).

5.1.2.2. Reasons for Complementary and Alternative Medicine (CAM) Utilization among Pregnant Women Attending ANC Clinics

According to this study, preference of CAM over conventional medicine for certain illnesses and the perceived lack of response to conventional medicine were the two leading reasons for the high CAM use prevalence among pregnant women from Tongaren Sub-County. These findings are similar to the conclusions of previous studies. For instance, Yazdi*et al*. (2019) study had reported that non-response to modern medicine was one of the major reasons for CAM utilization among pregnant Iranian women. In Uganda, Nyeko*et al*. (2016) found that pregnant women use herbal medicine because modern medicine had failed to work for them. In Iraq, about 28% of pregnant women reported using CAM because of its effectiveness for certain illnesses (Hwang *et al*., 2016). From the foregoing, it is clearly evident that the perceived efficacy of CAM modalities is the major driver of CAM utilization among pregnant women in Tongaren as is the case in other places around the world.

Besides efficacy, this study reported that long distance to the healthcare facility is also responsible for CAM utilization. This is plausible because the analysis in this study had revealed that half of the pregnant women in Tongaren were living between 5-10 km away from the nearest health facility while the other half were living less than 5km away from the nearest health center. The issue of long-distance is compounded by poor road networks in this study area, which therefore limits easy access to health facilities since pregnant women in most cases are expected to walk the whole distance in order to reach the hospitals. Trekking to the hospital for a long distance is extremely difficult and dangerous to these women considering their fragile conditions; hence they more often resort to CAM use, which is a more readily available alternative treatment method (Emiru*et al*., 2021). The inaccessibility challenge posed by the distance to be traveled to the healthcare facilities, is not unique to Tongaren because it has also been reported to be one of the major reasons for CAM use among pregnant women in Nairobi (Mothupi, 2014) which is a more urbanized area. In Ethiopia, it was

established that 80% of pregnant women use traditional medicine because of the difficulties they face in accessing health centers (Laelago *et al.*, 2016). It can therefore be concluded that the distance to be traveled to the healthcare facility is one of the major drivers of CAM use in the country.

5.1.2.3. Health Benefits (Indications) of CAM Use During Pregnancy

Regarding indications of use, this research revealed that pregnant women from Tongaren usually utilize CAM,especially herbal therapies, in order to treat some pregnancy-related discomforts/ailments, ranging from digestive discomforts (like diarrhea, acid reflux and constipation), respiratory tract illnesses (like cough and cold), bodily aches (like toothache, stomachache, headache, abdominal and chest pains), nutrition deficiencies related illnesses (like anemia, inappetence), opportunistic bacterial infections (like urinary tract infections), to malaria. In line with these observations, Ng'etich (2013) reported that pregnant women in Embu (Kenya) use CAM to relieve toothache and back pain, indigestion and treatment of respiratory tract illnesses and malaria. Hwang *et al*. (2016) reported that pregnant women in Iraq utilize CAM to relieve them of frequent pains in the womb, digestive ailments, and to prevent pregnancy-related complications such as urinary tract infections. Nordeng and Havnen (2014) had also reported that pregnant women from Norway commonly use CAM products to prevent pregnancy-related discomforts like nausea, vomiting, back pains, colds, and respiratory illnesses.

Based on the current analysis, the second most popular indication of CAM use among pregnant women in the study area was the improvement of physical appearance and wellbeing which was favored by 27.5% of the CAM users. The pregnant women of Tongaren utilize various herbal and animal-based products to treat pregnancy-related skin problems including stretch marks, acne and dermatitis. This conclusion supports the previous study by Lapi *et al*. (2014) which stated that pregnant women use CAM modalities to get rid of skin problems such as acne, spots, and blemishes among others. However, the percentage of those who reported improvement of physical appearance

and wellbeing as their indication of use was twice as much as the one reported by Nordeng and Havnen (2014).

Another indication of use reported in this study was health promotion and maintenance (19.5%) whereby pregnant women in Tongaren utilize use CAM for immunity strengthening in order to avoid pregnancy-related complications like disorders of the digestive system and opportunistic bacterial infections (like urinary tract infections), and for promotion of good fetal development and baby beauty enhancement. This indication has been previously reported in different studies too. For, instance, Bercaw *et al*. (2010) had observed that 38% of pregnant Hispanic women use CAM to enhance their general health during pregnancy. Warriner *et al*. (2014) opined that pregnant women are usually fascinated with the notion of being well health-wise, and therefore would therefore use CAM holistically to enhance their health potential and that of the fetus. Improvement of the immune system was reported by about 10% of the CAM users in this study. This is in line with Bercaw *et al.* (2010) which had also reported that 10% of the pregnant women in their survey started to use CAM to enhance their immune system. Moreover, this finding is supported by various existing literature (Hashem *et al*., 2012; Hwang *et al*., 2016).

Pregnant women from Tongaren also reportedly utilize CAM to improve their psychological well-being. They achieved this by utilizing psycho-physical therapies (like massages) to improve their moods thereby reducing stress, fatigue, and depression concerns. Warriner *et al*. (2014) stated that CAM products are sometimes used by pregnant women to positively influence their attitude.

5.1.2.4. The Potential Future CAM Utilization by Pregnant Women

Asked whether or not they intend to use CAM therapies in their future pregnancies, an overwhelming majority (86.6%) of the 340 pregnant women surveyed in this study indicated that they plan to use CAM products and practices in their future pregnancies because they perceive them to be beneficial to the mother and the fetus. This implies

that many women from Tongaren feel that complementary and alternative medicine (CAM) is just as safe as modern medicine in treating pregnancy-related ailments. Moreover, CAM use is probably perceived by this population as safer or effective than modern medicine in treating pregnancy-related illnesses. This notion had previously been established among pregnant Hispanic women in the US by Bercaw *et al*. (2010). Research has proven that utilization of complementary and alternative medicine (CAM) during pregnancy seems to be mainly mediated, at least to some extent, by a quest for a non-toxic and efficacious natural treatment (Holst *et al*., 2011). Among, most CAM users, there is some comfort in knowing that herbal therapy has been used for hundreds of years and has not been "interfered with" (Frawley, 2015).

5.1.2.5. Concomitant Utilization of CAM and Orthodox/Conventional Medicine

Of the 172 CAM users in this study, half of pregnant women attending ANC clinic in Tongaren are using CAM (herbal medicine in particular) and modern medicine concurrently (i.e., using both of them on the same day for same/different illnesses) while another half stated that they use CAM separately while not under conventional drugs prescription. Most of CAM users indicated that they use CAM products for certain illnesses that are not "treatable" with modern medicine, which implies that if a pregnant women is having various symptoms at the same time, she would use CAM products for some symptoms and modern medicine for other symptoms. For, instance, when a woman is having skin problems and frequent migraines at the same time during the pregnancy, she will possibly concurrently use herbal medicine to eliminate the skin problems and modern drugs for curing headache. Also, a pregnant woman suffering from malaria may be inclined to use both modern drugs prescribed by a doctor and herbal concoction on the same day for treatment. A study by Githinji (2014) shows that herbal medicine are the most common form of CAM concomitantly used by pregnant women in treating illnesses like gastrointestinal and respiratory diseases. Pregnant women probably find it much more convenient to be able to utilize both types

of medicine to combat the dangers of a certain health problems during pregnancy. The concomitant use of CAM together with conventional medicine could be driven by the widespread perception among CAM users that it would be safe if the drugs were for separate conditions. This perception has been found among CAM users in two regions in Ghana (Gyasi, 2014). Among communities, pharmacological pluralism is fast becoming a norm. Therefore, there's need for these communities to be sufficiently informed of the hazards and issues that can arise when using CAM in conjunction with conventional medications.

The other half of CAM users, who reportedly use CAM separately from the conventional medicine, expressed concern about using CAM in conjunction with conventional ones on the same day for a specific condition or separate conditions. This suggests that they are concerned that CAM treatments may interact with certain conventional medications, causing undesirable reactions which could be fatal. James *et al*. (2018a) observe that concomitant utilization of CAM and conventional medicine might change the pharmacodynamics and/or pharmacokinetics of the drugs involved, therefore causing unanticipated adverse effects of the drugs. Gyasi *et al*.(2014) asserts that, since CAM and conventional medicine arose from varying theoretical assumptions and methodological perspective, issues are highly likely when the two components are used at the same time.

5.1.2.6. Sources of Information on CAM Use among Pregnant Women

Based on the findings of this study, a total of 88% of pregnant women obtained information regarding CAM use during pregnancy from family and friends while a total of 12% indicated that media (both mainstream and social) were their source of information concerning CAM use during pregnancy. Based on existing literature, family members and friends are commonly cited as popular sources of advice regarding complementary and alternative medicine (CAM) use among women during pregnancy (Lapi *et al*., 2014; Nordeng & Havnen, 2014). In the UK, 61.8% of pregnant women were found to primarily rely on family and friends for advice on CAM use; in

Iraq, 88% of pregnant women relied on just family (Hwang *et al.*, 2016); in Malaysia, 46.6% of pregnant women relied on family and friends as their source of information on CAM use (Alshagga *et al.*, 2011); in Ghana, 70% of pregnant women indicated that family and friends were their important source of information on CAM (Gyasi, 2014); and in Zambia, 46.9% of pregnant women preferred to seek advice from family or friends (Hajj, 2020). This implies that in Tongaren as well as in other places in the world, the advice from friends and family members are usually trusted when it comes to CAM use. This could be because; family and friends' advices are usually informed by their own personal experiences with CAM use.

The media is also a little instrumental in informing pregnant women on CAM use during pregnancy. In this study, both mass and social media were reliably used as sources of information. Pregnant women have been found to actively seek advice on CAM use from mass media sources such as newspapers, magazines, TV, and radio (Frawley, 2015). Family, friends, and the media are not considered professional sources of information with respect to medical issues. According to previous studies, close to 70 percent of women use non-professional sources of information about the use of complementary and alternative medicine (CAM) during pregnancy (Frawley*et al*., 2014; Quzmar *et al*., 2021). Women are often more influenced by non-professional sources of advice than professional ones (Frawley, 2015).

5.1.3. Types of CAM and Their Patterns of Utilization during Pregnancy

In this study, the rate of herbal therapies (medicinal plant products) utilization among pregnant women was found to be generally high. Out of the 172 CAM users, 65.1% of the pregnant women utilize plant products as a CAM modality. This utilization rate was consistent with the 70% national average in Kenya established by NCAPD (2007). Moreover, this finding supports plenty of previous studies (Ng'etich, 2013; Hwang *et al*., 2016; Nzuki 2016; Hajj, 2020) that prove that pregnant women use a lot of plant products, and that plant products are the most frequently used type of complementary and alternative medicine. Globally, the utilization of plant products has increased

dramatically during the last two decades, particularly among pregnant women (John & Shantakumari, 2015). The reason for the high consumption of herbal/plant products is their perceived efficacy in improving the health of the mother and fetus. This is supported by Barnes *et al*. (2018) that concluded that the assumption that plant products, since they are natural, are safer and have fewer side effects than modern medicine has contributed to the popularity of herbal treatments among pregnant women.

This study showed that women commonly use plant products, such as *Muarobaini,* Aloe vera *Mbegu rahisi* Sodom apple, Black jack, *Kibuyi*, Guava leaves, *Kumunyama, Muchinduli, Nderema*, and garlic. The phytochemicals that treat illnesses are obtained from the parts of these plant products such as roots, leaves, stems, bark, and flowers which are ingested (as ground powders, syrups or mixed with food substances like tea), topically applied on the body or displayed inside or outside the house. Most of these products were commonly consumed during the first trimester and second trimesters of the pregnancy on a daily or weekly basis with the aim of treating a range of pregnancy-related ailments including digestive discomforts, respiratory tract illnesses, bodily aches, skin problems, nutritional deficiencies related illnesses, and opportunistic bacterial infections. These findings were found to be consistent with some of the findings of Odhiambo *et al.* (2011). Available literature indicates that plant products are often used by pregnant women for a variety of reasons, including pregnancy-related conditions like nausea and vomiting, improving fetal development, initiating labor, and pregnancy-unrelated illnesses including common cold and acne, as well as nutritional benefits (John & Shantakumari, 2015; Ahmed *et al*., 2018).

Spiritual remedies utilization was the second most popular CAM modality among pregnant women from Tongaren, which would also be consistent with James *et al*. (2018a) study which observed that in Sub-Saharan Africa, faith-based healing practices is the second most common complementary and alternative medicine (CAM) therapy after herbal medicine. Ahlberg (2017) believes that this could be due to the

fact that in many regions of Sub-Saharan Africa, sickness is interpreted as the result of a loss of societal balance (such as breaching standards of morality in the present or in the past), ancestral spirits, and demonic forces. According to this study, 95% of the pregnant women surveyed practiced Christianity while the remaining 5% practiced Islamic religion, indicating that all these women practiced some form of spirituality and this would most certainly inform their application in remedying some pregnancy-related illnesses. The current study showed that spiritual practices of prayers and meditations were conducted through visiting the places of worship, wearing of charms, offering sacrifices, and fasting, mostly on a weekly basis for the entire duration of the pregnancy, with the sole purpose of ensuring protection of the mother and fetus from evil and harm.

In most parts of Kenya, people are known to attend the churches either Saturday or Sunday or go to mosques every Friday to worship and/or offer sacrifices to God and Allah, respectively. The prayers are often offered by the pastor or Imam on behalf of the entire congregation or on some occasions offered in private upon the request of a member. In terms of pregnancy, prayers are offered as requests for God to protect both the mother and the fetus from all evil forces/spirits that are believed to be coming from bad ancestors or enemies to the family. According to Wachholtz and Sambamoorthi (2017), prayer is frequently used in ailments characterized by aggravating health problems, non - specific diagnostic, and insufficient treatment options, including depression, stomach issues, migraines, back, neck pain, and allergic reactions, all of which are conditions related to pregnancy. Apart from prayers which are seen as holy spirits by Christians and Muslims, divination is usually used by those who ascribe to the African Traditional Religion. The similarity between divination and prayers is that they are often used to seek protection from spirits. Divination is a form of spirituality that is embedded in the traditions and cultures of various communities in Kenya and certainly in Tongaren. Bones are the main objects used in this practice to consult the spiritual world (Ozioma & Chinwe, 2019) since they represent all forces against human race (Cumes, 2014).

In this study, animal-based products usage was the third most popular CAM modality after both herbal therapies and spiritual remedies. This finding differs from the Oyunchimeg *et al*. (2017) study which documented that animal product usage was the most common followed by herbal therapies and then alternative therapy. Since prehistoric times, animals and products generated from their organs have been part of the array of therapeutic medicines used by diverse cultures (Alves *et al*., 2011). Animal-based therapies are an important part of the traditional culture, and oral history about animals and their uses is passed down from generation to generation (Alves *et al*., 2011). Therapeutic animal parts traditionally used as CAM include skin, blood, bones, feathers, fat, gills, scales, bile, fur among others (Vats & Thomas, 2015). These products of animal origin may be ingested (as ground powders, syrups, or mixed with food substances), or topically applied on the body. Most of these animal products were commonly used during the first trimester and second trimesters of the pregnancy and consumed on a daily or weekly basis. This is in line with the findings of Vats and Thomas (2015) which showed that some of these animal products are consumed once or twice per day or a couple of times a week.

According to this research, these animal-based products are majorly used by pregnant women in Tongaren to treat pregnancy-related complications like disorders of the digestive system and infections of the urinary tract, nutritional deficiencies related illnesses (like anemia, inappetence) and ensuring mother and fetus protection from evil. Additionally, they are used to promote good fetal development, baby beauty enhancement and labor facilitation. In support of this finding, existing literature indicates that animal products are often used by humans for a variety of reasons, including treating bleeding, fertility problems, asthma, chest pains, heartburn, fatigue, abdominal cramps, tuberculosis, cold, paralysis, and stomach wounds, as well as for other spiritual-related ailments (Confessor*et al*., 2009; Souto*et al.*, 2012). According to Vats and Thomas (2015), these products can be obtained from domestic animals such as cattle, sheep, goats, chickens, etc. as well as wild animals such hyenas, hippos, rats, bats, snakes, spiders, birds, fish, earthworms, etc.

With only 5% prevalence, alternative/psycho-physical therapies were the least popular CAM modality among the pregnant women from Tongaren Sub-County. This finding is in line with Asfaw Erku *et al*. (2016) who mentioned that in Sub-Saharan Africa; mind-body interventions (also known as alternative therapies) are the least popular form of CAM. This observation differs from previous studies conducted in the developed world where the use of alternative therapies was relatively high. For, instance, in the UK 35% prevalence was recorded (Hall & Jolly, 2014) while in the US 47% prevalence in the use of alternative therapies was observed (Bercaw *et al*., 2010). The low utilization of alternative therapy in the study area and in extension the Sub-Saharan Africa region could be because most of its forms such as yoga and meditation are not much embedded in the socio-cultural lifestyles of the residing communities. Despite the low prevalence of alternative therapy utilization, this study established that half the pregnant women who use alternative therapies mainly utilize massages which are done on the backs, shoulders, neck, and stomach among others. This concurs with observations of James *et al*. (2022) study which noted that massage and the traditional bone setting is the most common alternative therapy within Sub-Saharan Africa.

Besides massages, other forms of alternative therapy utilized by pregnant women from Tongaren include yoga, special diets and supplements, and aromatherapy; these psycho-physical therapies are used to relieve stress, fatigue, and bodily aches; facilitate the adjustment of fetus's position in the womb; and induce labor when overdue. A study by Kretchy*et al*. (2014) had reported the same forms in addition to mediation. From the available literature, special diets and supplements taken by women during pregnancy include pregnancy vitamins (such as B6) and minerals (like zinc, iron, folic acid) (Oh*et al*., 2020). Aromatherapy commonly takes the form of oils extracted from sweet-smelling plants such as eucalyptus, lavender, and peppermints among others (Bishop *et al*., 2011). On patterns of utilization; this study established that massages were done on the abdomen region (especially on the womb and back) mostly weekly for all the three trimesters, special diets and supplements were

exclusively ingested as food substances a couple of times per week especially during both the second and third trimesters, yoga involved running, walking and exercises which were mainly done daily throughout the entire duration of the pregnancy.

5.1.4. Factors That Influence the Utilization of Complementary and Alternative Medicine (CAM) among Pregnant Women Attending ANC Clinics

In this study, the Chi-square test initially revealed that marital status, educational status, educational status of spouses, occupational/employment status, occupation, and average household monthly income were significantly associated with CAM use and were therefore considered potential predictors of CAM. A multiple logistic regression analysis was subsequently used to determine the relative effects of these selected variables on CAM use. Being married or cohabited, having secondary education, having a spouse who had no formal education, being employed, working as a farmer, and having a higher monthly income in the range of Kshs 15001 to 25,000 were positively associated with the use of CAM among pregnant women from Tongaren Sub-County. This means that they were more likely to use CAM products.

From the foregoing, there are several predictors of CAM. Marital status was significantly found to be associated with CAM use. This is contrary to the earlier studies (Addo, 2015; Nzuki, 2016,) which both established that the marital status of women and their CAM use were not significantly associated. According to this study, pregnant women who are married or cohabited were more likely to use CAM products compared to those who are single, a finding not consistent with the findings of Kretchy*et al.* (2014). This finding suggests that spouses have some influence on CAM utilization among the pregnant women in this study area. This was further demonstrated by the significant association observed between the educational attainment of spouse and CAM utilization among pregnant women from Tongaren Sub-County. However, this association was not congruent with the findings of Gyasi (2014) who found no association between the educational attainment of partner and

the use of CAM. It is important to note that only a few studies often include non-common socio-demographic variables such as educational attainment of spouse/partner hence the study findings on this were not easily comparable with existing literature. This study observed that women whose spouses had no formal education were more likely to use CAM. This could be due to fact that these spouses lack enough knowledge on the workings of conventional medicine and would be inclined to advise their pregnant wives to use the CAM which they knowledgeable of and trust its efficacy since it is embedded in their socio-cultural backgrounds.

In line with previous studies (Strouss *et al*., 2014; Nyeko *et al.*, 2015), this study found a significant association between a woman's education status and the utilization of CAM. Moreover, it was revealed that pregnant women who had attained up to secondary education were more likely to use CAM modalities. This appears to be contrary to previous studies which had established that pregnant women who use CAM are more likely to be those having tertiary education especially university degrees (Bishop *et al*., 2011; Frawley, 2015). It is, however, consistent with Torri and Hornosty (2017) study which stated that pregnant women with less education were more likely to use CAM products during pregnancy because most CAM users in this study had secondary education and below.

The significant association between a pregnant woman's occupational (employment) status and CAM use seen in this study was similar to the findings of previous research (Mureyi *et al.*, 2012; Nzuki, 2016). Being self-employed was predictive of a high likelihood of CAM use among pregnant women. This was consistent with the Australian study by Frawley (2015) which found that pregnant women who utilize CAM were unlikely to be employed. It was, however, contrary to the findings of Bishop *et al*. (2011) who had reported that an increased likelihood of CAM use was strongly associated with being employed.

In this study, household monthly income was significantly associated with CAM use, and this agrees with other previous studies (Frawley, 2015; Hwang *et al*., 2016; Rahman *et al*., 2019). Since being self-employed was also associated with CAM use, it was perfectly logical for higher household income to have an association with increased CAM use too because self-employment would usually translate to better income in the household. This finding was contrary to the Addo (2015) study which stated that increased CAM use was associated with respondents coming from lower socio-economic status. Moreover, it was contrary an earlier analysis by Frawley (2015) which observed that women who were unemployed (meaning they were neither self-employed nor in formal employment) and earn low income were more likely to use CAM.

5.1.5. Disclosure of CAM Utilization to Healthcare Givers

This study showed significantly high prevalence of non-disclosure of CAM use to healthcare givers. Over 80% of pregnant women indicated that they don't disclose their CAM use to their healthcare givers at the ANC clinics, a rate totally consistent with findings of previous research. The rate of non-disclosure of CAM use among pregnant women has been determined to be 63.6% in Zambia (El-Hajj*et al*., 2020), 89.8% in Ethiopia (Mekuria *et al*., 2017), 75% in the US (Bercaw *et al*., 2010), and 50% in Nepal (Ahmed *et al.*, 2020). This shows that the rate of non-disclosure is generally high worldwide.

According to the results of this study, three most common reasons (in order of decreasing frequency) cited for non-disclosure were: unwillingness of the respondents to disclose CAM use to anyone, healthcare providers not asking, and fear of the healthcare providers' reactions. These reasons have all been found by various studies. Gumede*et al*. (2023) study found that the most common reason for non-disclosure by pregnant women is that the healthcare givers don't ask; Rayner *et al*. (2019) study observed that pregnant women were just unwilling to disclose CAM use to anyone, let alone a doctor; and some studies have also concluded that women are hesitant to

disclose their CAM use because they feared the negative responses that might come from the doctor (Rayner *et al*., 2019; Faith *et al*., 2013). The non-disclosure of CAM use to health care givers by pregnant women in Tongaren can be attributed to their socio-cultural backgrounds considering that their CAM use is heavily influenced by family and friends. Since CAM use is considered part of a tradition or customary practice, most women probably don't feel it's appropriate to tell their caregivers about their cultural lifestyles as it could expose them to negative judgment. Furthermore, the non-disclosure could be due to low level of awareness among these women since about a half of them had only attained secondary education as their highest level of educational achievement. To encourage and promote disclosure of CAM use, healthcare givers should take the initiative of inquiring from the pregnant women if they use CAM and advise them appropriately to help raise the necessary awareness. This recommendation has also been highlighted by previous studies (Nyeko*et al*., 2016; Peprah*et al.*, 2019).

About 50% of pregnant women who discussed their CAM use with their healthcare givers were commonly advised by those healthcare givers that using CAM in conjunction with conventional medicine may bring adverse effects to them while another 37% were advised to just stop using CAM because it is harmful even if used separately. It's important to note this study found that that half of pregnant women attending ANC clinic in Tongaren are using CAM together with modern medicine, which shows that the practice is prevalent, and so the healthcare givers could be giving them this advice out of concern for their safety. Gyasi (2014) warns that there are some health hazards and complications associated with using CAM in conjunction with conventional medications, therefore great caution is warranted. According to Nordeng and Havnen (2014), some of the CAM products, especially herbs, used by pregnant women are thought to be poisonous or for which there was no evidence of safety. Quite a number of researches has documented that while healthcare givers are generally supportive about the use of complementary and alternative medicine (CAM) in pregnancy, they seem to be more comfortable with outside body therapies such as

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massages and yoga than with inside body therapies such as consumption of plant or animal products (Foley*et al*., 2019; Hall *et al.*, 2015).

5.1.5.1. Factors That Impacts the Disclosure of CAM Use to Healthcare Givers by Pregnant Women Attending ANC Clinics

Past research has shown that different socio-economic variables and healthcare consumption patterns are linked with disclosure of CAM use (Foley*et al*., 2019). In this survey, the Chi-square test initially revealed that educational status, religion, occupational/employment status, occupation and insurance status were significantly associated with the disclosure of CAM use and were therefore considered potential predictors of CAM use disclosure. Numerous demographic variables of women who use complementary and alternative medicine (CAM) during pregnancy vary by area, and only a few like educational attainment of the respondent remain consistent. The association between educational achievement of the pregnant women and their disclosure of CAM use has been documented in previous studies (Jonny*et al*., 2017; Yukawa *et al*., 2017; Jansen *et al*., 2018; Ahmed *et al*., 2020). These studies demonstrated that these links could be due to the fact that people with greater education levels have better health literacy that might encourage them to seek guidance and information from healthcare givers about CAM use.

5.2 Conclusions

The study arrived at the following conclusions:

1. The prevalence of usage of complementary and alternative medicine (CAM) by pregnant women in Tongaren Sub-County of Bungoma County is quite high since about 51% of pregnant women utilize some form of CAM at some point during their pregnancy. This indicates widespread trust in the safety and efficacy of CAM among rural populations in the region.

2. Pregnant women attending ANC clinics in Tongaren Sub-County utilize a wide range of CAM modalities during pregnancy, with herbal medicine being the most commonly used CAM form. The study established that these pregnant women use CAM during pregnancy to complement conventional medicine rather than as an alternative.

3. The study established that marital status, employment status, educational level and household income are the key determinants of CAM use among pregnant women attending ANC clinics in Tongaren Sub-County. These factors can influence pregnant women's perception of the causes of illness, health enhancement strategies, how sickness and pain are encountered and manifested, where to seek care, and the forms of therapy to prefer.

4. There's high rate of non-disclosure of CAM usage to healthcare givers by pregnant women in Tongaren. The primary reason for non-disclosure among these women was that healthcare givers did not inquire about their usage of complementary and alternative medicine (CAM), which suggests that the healthcare givers in Tongaren and Kenya in extension are either uninformed about or unconcerned with the use of complementary and alternative medicine (CAM) among pregnant women.

5.3 Recommendations

5.3.1. Recommendations for Stakeholders

From the findings, analysis and drawn conclusions of this current study, the following measures can be recommended to the relevant government agencies:

1. Health literacy among women should be strengthened to enhance safe and effective CAM use during pregnancy.

2. The safety and efficacy of the profiled herbal forms should be scientifically validated to promote safe and effective use for improved maternal outcomes.

3. Tailored CAM awareness campaigns for pregnant women on the safe use of CAM, informed by the identified determinants of CAM use (such as marital, educational and income status), are needed in Tongaren and even the entire Bungoma County.

4. Promotion of open communication between healthcare givers and pregnant women regarding CAM use is needed to will help pregnant women make informed decisions about whether or not to utilize CAM in conjunction with conventional care.

5.3.2. Recommendations for Further Research

The following aspects are suggested for further research:

1. Future researchers should consider studying the pharmacological and the ethnobotanical properties of the profiled commonly used herbal forms identified in this study in order to evaluate their safety and efficacy in treating pregnancy-related ailments.

2. Further studies are needed to establish how ingestible CAM modalities and conventional medicine interact when used together during pregnancy, and how these interactions could affect the health of the mother and the fetus.

3. A more comprehensive research into the prevalence and patterns of CAM utilization among women throughout pregnancy, labor, and the postpartum period should be conducted in all health centers in the country to corroborate the findings of this current study.

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APPENDICES

Appendix I: Survey Questionnaire for Pregnant Women

Dear Respondent

My name is **Martha Makhapila** pursuing Masters of Science in Public Health at Jomo Kenyatta University of Agriculture and Technology. I am conducting research for my thesis titled "**Complementary and Alternative Medicine (CAM) Utilization among pregnant Women Attending Ante-natal Clinics in Tongaren Sub-County**" using this questionnaire. You are kindly requested to fill out the various sections for this purpose. All the answers you provide will be treated as confidential and used only for the purposes of this research.

As a sign of your consent, kindly provide your signature and date before filling the questionnaire.

Signature……………………………….Date……………………………………

SECTION ONE: DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS OF THE RESPONDENT

Fill/tick where appropriate.

1.1 Age in years (as at last birthday)

1.2 Residential Ward

   a) Naitiri-Kabuyefwe**[**   ]

   b) Milima   **[**   ]

   c) Mbakalo   **[**   ]

   d) Soysambu-Mitua**[**   ]

   e) Ndalu   **[**   ]

   f) Tongaren   **[**   ]

1.3 Marital status

    a) Single/ Widowed/ Divorced **[**]   b) Married/Cohabitated **[**]

1.4 Educational status

    a) No formal education **[]**

    b) Primary education **[**]

    c) Secondary education **[**]

    d) Diploma holder **[**]

    e) Degree holder**[**]

1.5 Education of spouse

 a) No formal education **[**] d) Primary education **[**]

 b) Secondary education **[**] e) Degree holder **[**]

 c) Diploma holder **[**]

1.7 Religion

    a) African Traditional Religion **[**]

    b) Christian   **[**]

    c) Islam**[**]

    d) Others...

1.8 How old is your pregnancy? ....

1.9 How many times have you been pregnant? …………………………………

1.9.1 How many children are alive?……………………………………………………

1.9.2 Occupational status

        Employed   **[**   ]

        Unemployed **[**]

        Self-employed [   ]

1.9.3 Occupation

   a) Farming   **[**   ] d) Trading   **[**   ]

   b) Civil servant**[**   ] e) Student   **[**   ]

   c) Artisan   **[**   ]

1.9.4 Ethnicity

   a) Luhya (specify) ……………………..

   b) Kalenjin**[**   ]

   c) Kikuyu   **[**   ]

   d) Kisii   **[**   ]

   e) Teso**[**   ]

   f) Others (specify) ……………………….

1.9.5 Household income level in (KShs)

     a. Less than 100 **[**   ]

     b. 100- 300   **[**   ]

     c. 400 – 800   **[**   ]

     d. More than 800 **[**   ]

1.9.6 Distance to the nearest health facility.

      a) Less than five km (not far) **[**   ]

b) Five to ten km (a bit far) **[   ]**

c) More than ten km (far) **[   ]**

1.9.7. How many times have you visited the health facility ever since you discovered you are pregnant?

    a) This is my 2nd time

    b) This is my third time

    c) I have come more than thrice

1.98. Do you have any health insurance cover?

    Yes **[   ]** No **[   ]**

SECOND SECTION: COMMON THERAPIES OF CAM UNDER UTILIZATION

2.0 Have you ever used CAM remedies when you are pregnant?

    Yes **[   ]**

    No **[   ]** (**skip to 4.8**)

2.1 If yes what was your reason for CAM/TM product(s) utilization?

    a) Long distance to the healthcare facility [   ]

    b) Didn't have funds to pay for the treatment cost [   ]

    c) The service I needed was unavailable at the health center [   ]

    d) The drugs I needed were unavailable at the health center [   ]

    e) Orthodox medicine had failed to 'work' for me   [   ]

    f) Could not find the conventional cure for what was suffering from [   ]

g) I preferred CAM to orthodox medicine for this ailment [   ]

h) I did not like the attitude of the clinic staff   [   ]

i) Others specify…………………………………………

2.2. Tick where applicable

Traditional products	MODE OF UTILIZATION				
Herbal therapies (Medicinal plant products)	Insertion	Topical application	Ingestion	Display	Others
Animal-based therapies	Wearing	Appeasing	Ingestion	Display	
Spiritual remedies	Fasting	Visits	Offering sacrifices		
Alternative therapies					
Massage Yoga Aromatherapy Special diets and supplements					

2.3. Is there another remedy you are currently using or have used but is not listed above?

    a) No **[   ]**

    b) Yes **[   ]**   (specify) ………………………………….

    c) How   do   you   utilize   the   remedies   stated   in   b?
       ....

2.4 How did you learn about the CAM remedies you have used above? Through

    a) Friends   **[   ]**

    b) Family members **[   ]**

    c) Social media   **[   ]**

    d) Mass media   **[   ]**

SECTION THREE: PREVALENCE AND PATTERN OF CAM USE

3.0 Tick where applicable

CAM Therapies	Frequency of utilization					
	Once daily	Less than 4 times daily	Once per week	Less than four times per week	Once monthly	Once for the whole pregnancy period
Herbal medicine						
Animal products						

Animal-based therapies						
Alternative medicine						
Massage Yoga Aromatherapy						
Spiritual remedies						

3.1 Tick where applicable

CAM Therapies	Stage of pregnancy					
Plant products	0 to 3 months	4 to 6 months	7 to 9 months	0 to 6 months	4 to 9 months	0 to 9 months
Animal remedies						
Spiritual therapies						

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Alternative therapies					

3.2 Do you sometimes take CAM/TM (herbal medicine in particular) together with orthodox medicine (doctor prescription) on the same day for the same or different illnesses?

a) Yes **[   ]**

b) No, I use CAM separately **[   ]**

SECTION FOUR: DISCLOSURE OF INFORMATION REGARDING CAM USE TO HEALTHCARE GIVERS

PART ONE

4.0 Do you disclose your CAM use during pregnancy to your health care provider?

Yes [   ]   No [   ](skip to 4.7)

4.1 What is your major reason for disclosure

a) The doctor asked about it

b) The belief that the doctor would offer advice about CAM usage

c) Belief disclosure is important for safety

d) The doctor would support CAM use

4.2 What (type of) CAM modality did you disclose?...

4.3 What is the nature of the CAM use disclosed

a) CAM used in the last 1 month

b) CAM used in between 2 and 4 months

c) CAM used in between 5 and 6 months

d) CAM used over 6 months

4.4 How many times did you disclose CAM use during your most recent pregnancy?
    a) One to two times
    b) Three to four times
    c) Five times or more
    d) I can't remember

4.5 What was the health care givers response when you disclosed your CAM use during pregnancy?
    a) CAM/TM use together with conventional medicine has associated adverse effects

    b) CAM/TM use is harmful

    c) CAM/TM has associated benefits if it is prescribed by a licensed CAM practitioner.

    d) CAM/TM use has associated adverse effects

    e) TM use together with orthodox medicine is harmful

    f) Stop use of CAM/TM

    g) Stop use of conventional medicine

    h) The healthcare provider was uninterested.

4.6 Do you think the health services you received were enhanced after your disclosure of CAM use to the healthcare givers
    a) No

    b) Yes

4.7 What's your major reason for non-disclosure of CAM use to caregivers? (Choose One)
    a) The healthcare provider didn't ask

    b) I did not think it was important

c) I feared the healthcare provider

d) I cannot disclose my use to anyone

e) I forget to disclose

f) Believed that physician had less knowledge about CAM type

g) Physician discouraged use of CAM therapy in the past

h) Others specify........................

4.8. Do you think CAM/TM products are beneficial to your health?

a) No **[**]

b) Yes **[**]

c) Some **[**]

4.8.1. If some please specify the product(s)…………………………………..

4.9. How are they useful during pregnancy?

a) For treatment of pregnancy related discomfort

b) For improvement my immune system

c) For health promotion and maintenance

d) For improvement of my psychological status

e) For improvement of my physical appearance and wellbeing.

5.0. Do you plan to use CAM /TM products and practices when you are pregnant?

a) No **[**] they have adverse effects on both the mother and the fetus

b) Yes **[**] they are beneficial to the mother and the fetus

c) Not sure............. some are harmful

Appendix II: Informants Interview Guide

Dear respondents,

You are kindly invited to take part in this interview schedule on Complementary and Alternative Medicine (CAM) Utilization among pregnant Women Attending Antenatal Clinics in Tongaren Sub-County. All the information gathered herein will be restricted to this study.

1. Kindly explain what pregnant women use to maintain their health and pregnancy apart from conventional medicine?

2. How do they utilize the above remedies?

3. At what stage of pregnancy do they utilize these remedies?

4. What are the economic and social-cultural factors that influence pregnant women to go for these products/practices?

5. How do these products/practices benefit pregnant women?

6. Do you think pregnant women inform healthcare providers about CAM products they use? Why?

Appendix III: University of Eastern Africa Baraton Ethical Approval Letter

OFFICE OF THE DIRECTOR OF GRADUATE STUDIES AND RESEARCH
UNIVERSITY OF EASTERN AFRICA, BARATON
P.O. BOX 2500-30100, Eldoret, Kenya, East Africa

B4325032021   March 25, 2021

TO: Martha Nafula Makhapila
      School of Public Health
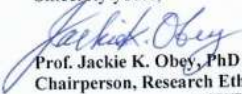   Jomo Kenyatta University of Agriculture and Technology

Dear Martha,

RE: **Contemporary And Alternative Medicine Utilization Among Pregnant Women
Attending Antenatal Care Clinics In Bungoma North Sub-County**

This is to inform you that the Research Ethics Committee (REC) of the University of Eastern
Africa Baraton has reviewed and approved your above research proposal. Your application
approval number is UEAB/REC/43/03/2021. The approval period is 25th March, 2021 – 25th
March, 2022.

This approval is subject to compliance with the following requirements;

   i.   Only approved documents including (informed consents, study instruments,
           MTA) will be used.
   ii.   All changes including (amendments, deviations, and violations) are submitted
           for review and approval by the Research Ethics Committee (REC) of the
           University of Eastern Africa Baraton.
   iii.   Death and life threatening problems and serious adverse events or unexpected
           adverse events whether related or unrelated to the study must be reported to the
           Research Ethics Committee (REC) of the University of Eastern Africa Baraton
           within 72 hours of notification.
   iv.   Any changes, anticipated or otherwise that may increase the risks or affected
           safety or welfare of study participants and others or affect the integrity of the
           research must be reported to the Research Ethics Committee (REC) of the
           University of Eastern Africa Baraton within 72 hours.
   v.   Clearance for export of biological specimens must be obtained from relevant
           institutions.
   vi.   Submission of a request for renewal of approval at least 60 days prior to expiry
           of the approval period. Attach a comprehensive progress report to support the
           renewal.
   vii.   Submission of an executive summary report within 90 days upon completion of
           the study to the Research Ethics Committee (REC) of the University of Eastern
           Africa Baraton.

Prior to commencing your study, you will be expected to obtain a research license from
National Commission for Science, Technology and Innovation (NACOSTI)
https://oris.nacosti.go.ke and also obtain other clearances needed.

Sincerely yours,

Prof. Jackie K. Obey, PhD
Chairperson, Research Ethics Committee

2 5 MAR 2021

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Appendix IV: NACOSTI Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY & INNOVATION

Ref No: 715043

Date of Issue: 06/April/2021

RESEARCH LICENSE

This is to Certify that Ms.. Martha Nafula Makhapila of Jomo Kenyatta University of Agriculture and Technology, has been licensed to conduct research in Bungoma on the topic: COMPLEMENTARY AND ALTERNATIVE MEDICINE UTILIZATION AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE CLINICS IN BUNGOMA NORTH SUB-COUNTY for the period ending : 06/April/2022.

License No: NACOSTI/P/21/9837

715043

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY &
INNOVATION

Verification QR Code

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