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DETERMINANTS OF *MORINGA OLEIFERA* UTILIZATION AMONG HIV POSITIVE PATIENTS ATTENDING COMPREHENSIVE CARE CLINIC AT MIGORI COUNTY REFERRAL HOSPITAL, KENYA

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Abstract

Purpose: This is cross-sectional study to determine *M. oleifera* utilization among HIV positive patients attending Comprehensive Care Clinic at Migori County Referral Hospital, Kenya.

Methodology: Data was collected using semi structured questionnaires. Quantitative data was analyzed using Statistical Package for Social Sciences (SPSS V.17). Frequency tables and graphs were used to present the data. Chi-square test of independence was used to identify the relationship between socio-demographic and socio-economic characteristics and the use of *M. oleifera* with the level of significance at 0.05.

Findings: Of the 278 patients recruited into the study 75.5% used *M.oleifera* either as food due to its high nutritive value and ability to boost immune system or as medicine for other diseases such as ulcers, stomach upset, skin infections etc. Herbalists indicated that they used *M. oleifera* to treat various diseases including diabetes, high blood pressure, hypertension and arthritis. The commonly used part of the *M.oleifera* tree was the leaves. Relatives had marked influence on 31% of the respondents using *M.oleifera*. *M. oleifera* was commonly used in crushed (non-powder) and powdered form. The findings indicated that majority of the respondents (99%) had not experienced any side effects after using *M. oleifera* together with HIV drugs. A significant socio demographic factor that was associated with the use of *M. oleifera* was age. The findings also indicate that distance to the health facility was the main challenge faced by majority (59.8%) of the HIV patients attending comprehensive care clinics (CCC) at Migori County Referral Hospital while other challenges included drug side effects, long waiting times and delays, and stigma.

Unique contribution to theory, practice and policy: The study contributes to a theoretical enhancement of the current level of knowledge on the existing literature on *Moringa oleifera* use among HIV positive patients. In terms of practice, the findings of the study could be utilized to develop strategies to ensure that HIV positive patients are well aware on the benefits and health implications of using herbal medicines such as *M. oleifera* together with conventional medicine. The study points out the need for policy development targeting regulation of traditional medicine and provision of better information.

Key words; *Comprehensive Care Center, Determinants, M. oleifera, utilization*

1.0 INTRODUCTION

Throughout history mankind has relied on nature for therapeutic properties by using poultices and infusion of local plants. Modern medication has progressively developed through inspiration, observation and scientific efforts from traditional treatments, and even today the ancient wisdom of ethno-medicines is an important source of drug development (Yuan, Ma and Piao, 2016). Conventional medical care systems continue to co-exist with traditional medicine care systems in most Countries. The World Health Organization estimates that 80% of World's population complements conventional therapy with herbal therapies in some aspects of their health care (WHO, 2008). The recognition of the contribution of traditional medicine was advocated by WHO in the 2002-2005 Traditional Medicine Strategy (Asiimwe, 2012). This strategy indicated that the ratio of traditional healers to the population in Africa is 1:200-400 while the ratio of biomedical practitioners to the population is 1:200000. This points out to the significant role traditional healers can and do play in the management of diseases including chronic ones such as HIV/AIDS. Traditional medicine use among HIV/AIDS patients who are on anti retroviral treatment is a common practice. In Africa, between 36 percent and 68 percent of HIV patients use both complementary and alternative medicine (Gurmu, *et al*, 2017).

Globally, HIV/AIDS still remains a major public health burden as it is estimated that in 2018 about 37.9 million persons were living with HIV worldwide (WHO, 2019). Sub-Saharan Africa has a majority of the infected persons attributed to the significantly high populations, endemic malnutrition and low economic status. In Kenya, it is estimated that in 2017, 1.5 million people were living with HIV (NACC, 2018). Several initiatives have been set up to improve the quality of life as well as increase the life expectancy of HIV/AIDS patients including the establishment of Comprehensive Care Clinics (CCC) in Kenya which are outpatient medical facilities that offer comprehensive care. Despite these efforts, most of those infected are faced with the burden of seeking care as anti-retroviral drugs remain expensive or unavailable. They are also faced with stigma limited access to adequate food thus they are in constant need for nutritional support. These factors have pushed many of the patients turn to alternative or complementary therapy including traditional medicine and herbal supplements (Gurmu, *et al*, 2017; Asiimwe, 2012).

One herb that has been widely used as traditional medicine or as a nutrition supplement by HIV/AIDS patients is *M. oleifera*. According to Lubing *et al.* (2012), *M. oleifera* has been reported to be used in up to 80% of HIV/AIDS patients in Africa. The high percentage of patients using *M. oleifera* arises from ethno-botanical and biochemical studies where *M. oleifera* is grown indicating that the species are multipurpose with varying health benefits and nutritional value (Singh, *et al.*, 2019; Rajbhar, *et al.*, 2018; Gopalakrishnan, *et al.*, 2016; Tshingani, *et al.*, 2017). Various parts and tissues from the tree have been and continue to be used around the World as food, medicine, spice and cosmetic oil. *M. oleifera* leaves for instance, are generally used as a basic food because of its high nutrients content (Thurber and Fahey, 2009). *M. oleifera* contains more than 90 nutritional compounds including lipids, protein, carbohydrates and dietary fibers (Singh, *et al.*, 2019) making it an effective remedy for malnutrition (Gopalakrishnan, *et al.*, 2016). As a result of the nutrition value found in *M. oleifera*, it was considered as an alternative management to boost the immune systems of HIV/AIDS positive patients in Africa during the 14th international AIDS forum that was held in Barcelona, Spain in 2002. *M. oleifera*

leaf powder supplementation can offer nutritional support to HIV/AIDS positive patients particularly those in limited resource settings (Tshingani, *et al.*, 2017). However, how *M. oleifera* is grown, used, and which parts of the tree are consumed as meals vary depending on the region (Kumssa *et al.*, 2017).

In Kenya, *M. oleifera* is grown and used as herbal medication, food and as fodder. Herbalists are known to use *M. oleifera* extracts to manage various illness and opportunistic infections due to the herb's nutritional and medicinal values. Until recently, the species was considered of marginal value and details on the genetic diversity had not been presented. *M. oleifera* leaves have been used as an alternative vegetable for human consumption as it tastes like spinach. The young tender and green pods are eaten as beans (Kumssa *et al.*, 2017). Despite the usage, preliminary data shows that the human therapeutic usage of the *M. oleifera* in Kenya is still limited. Kenyan *M. oleifera* is not categorized as herbal medicine, though some scientific studies have been done to document its usefulness. A study by Kigondu *et al.*, (2017), showed that ethyl acetate extract of the seeds of *M. oleifera* collected from Kibwezi in Makueni County demonstrated reversible antifertility outcome at 800mg/kg. Thin layer chromatography (TLC) of the extract shown the existence of terpenoids, steroids and fluorescent compounds, which can be responsible for the antifertility effect observed.

1.1 Problem Statement

Although traditional medicines are said to have incomparable advantages due to their unique diversity of chemical compounds and biological properties, very few have been scientifically studied. There also exists limited knowledge on the prevalence of use of herbal medicine, the appropriate processing procedures and dose regulation. A study by Kumssa *et al.*, (2017) established that there was little evidence about the nutritional and therapeutic values of Kenyan *M. oleifera* and an unknown dosage of its palatable parts used as medication. While studies on health benefits have shown that the crop is beneficial to animals and humans, many claims of nutritional benefit of *M. oleifera* remain unsubstantiated (Daily Nation, 2015).

Most people are faced with various difficulties and challenges as valuable information on herbs and traditional medicine is mixed in a numerous documents, data and useless rumors (Yuan, Ma and Piao, 2016). Moreover, any herb used as medicine can contain a diverse range of chemical compounds which can be active or invalid. The lack of knowledge has put the users of traditional medicines at risk of developing unknown side effects that can be detrimental to their health. HIV/AIDS patients widely including those in Kenya consume *M. oleifera*, however, its effects and contrainteractions with anti retroviral drugs is not quite well known. Research on the prevalence of use of *M. oleifera* in Kenya is limited particularly among HIV positive patients. The aim of this study was therefore, to establish the determinants of *M. oleifera* use among HIV positive patients attending Comprehensive Care Clinic at Migori County Referral Hospital.

1.2 Specific Objectives

- i. To determine the prevalence and patterns of use of *M. oleifera* among HIV positive patients attending comprehensive care clinics (CCC) at Migori County Referral Hospital.

- ii. To determine the individual and health system level factors associated with the use of *M. oleifera* among HIV positive patients attending comprehensive care clinics (CCC) at Migori County Referral Hospital.

2.0 MATERIALS AND METHODS

2.1 Study Site

The study was carried out at Migori county referral hospital in Migori County. Migori County was purposefully selected because of the high HIV prevalence rates. Migori County has a HIV prevalence of 14.3% which is nearly 2.5 times higher than the national prevalence (Kenya HIV Estimates, 2015). Migori county referral hospital was identified for the study as it offers CCC services to HIV patients across the entire County and offers an opportunity to get a diverse sample.

2.2 Study Design

This was a cross sectional descriptive study. The study population consisted of HIV positive patients who visited Comprehensive Care Clinic (CCC) at Migori Referral Hospital within the period of February 2019 to May 2019. A sample size of 278 patients was obtained using Cochran's formula (Cochrans, W.G. *et al.*, 1977) and systematic random sampling used to select the respondents. Key Informants (herbalists) were used to provide an overall view of *M. oleifera* usage. Herbalists were selected using snowballing technique (Kurant, *et al.*, 2010).

2.3 Data Collection Tools

The data was collected by principle investigator together with research assistants who understood the local language. They were recruited, trained and participated in pre testing of the data collection tools in order to test and improve Validity of the results. Quantitative data was collected using semi-structured Questionnaires (administered through face to face interview) while qualitative data was collected from herbalists who prescribe *M. oleifera* to their patients using a Key informant interview guide.

2.4 Data Management and Analysis

Data was analyzed statistically using software SPSS (V.17) where Chi-square test was used to compare categorical variables. A P-value of of less than or equal to 0.05 was considered statistically significant.

2.5 Ethical Considerations

Ethical approval was granted by KEMRI Scientific and Ethical Review Unit (SERU). Permission to carry out the study was also sought from the Sub County Administration at Migori County and medical superintendent at Migori Referral Hospital. Prior consent was sought from the respondents before commencement of their participation in the study which included a written consent.

3.0 FINDINGS

3.1 Social demographic and socio-economic characteristics of respondents

Table 1 represents a summary of socio-demographic and socio-economic characteristics of Respondents.

Table 1: Socio-demographic and socio-economic characteristics of Respondents

Variable	Category	No. of Respondents (n=278)	Percentage (%)
Age	Below 25 years	44	15.8
	Between 26 - 35 years	86	30.9
	Between 36 - 45 years	95	34.2
	Between 46 - 55 years	37	13.3
	Above 55 years	16	5.8
	Total	278	100
Gender	Male	114	41
	Female	164	59
	Total	278	100
Highest level of education	No formal education	13	4.7
	Primary	99	35.6
	Secondary	108	38.8
	College	45	16.2
	University	13	4.7
	Total	278	100
Occupation	Farming	76	27.3
	Formally Employed	77	27.7
	Business	77	27.7
	Self employed	23	8.3
	Unemployed	8	2.9
	Farming and business	12	4.3
	Employed and business	5	1.8
	Total	278	100
Type of treatment	HIV Treatment and Care	262	94.2
	HTC and traditional medicine	16	5.8
	Total	278	100
Years on treatment	Below 1 year	70	25.2
	Between 1 - 3 years	90	32.4
	Between 3 - 5 years	49	17.6
	Above 5 years	69	24.8
	Total	278	100

A total of 278 patients and nine herbalists were interviewed. Majority (59%) of the respondents were females. Most (34.2%) of the respondents were aged between 36 and 45 years. Majority (57.2%) of the respondents were married. More than thirty eight percent (38.8%) of the respondents had attained secondary level of education. An equal percentage of the respondents were either employed in the formal sector or operating businesses (27.7%) as shown in Table 1.

Approximately (24.8%) of the respondents had lived with the HIV for more than 5 years. Most (32.4%) of the respondents were on Antiretroviral Therapy for the duration between 1 and 3 years, while those who were on treatment between 3 and 5 years were 17.6%.

3.2 Prevalence and pattern of use of *M. oleifera* among HIV positive patients attending CCC at Migori County Referral Hospital

Table shows the prevalence of *M. oleifera* use among HIV positive patients attending Migori County Referral Hospital.

Table 2: Prevalence of *M. oleifera* use among HIV positive patients attending Migori County Referral Hospital

Prevalence of <i>M. oleifera</i> use	No. of Respondents	Percentage (%)
Yes	210	75.5%
No	68	24.5%
Total	278	100%

Total sample size, n=278. Data are presented as number (n) of subjects and proportions (%)

The prevalence of use of *M. oleifera* among the respondents was 75.5% (210). About 68 (24.5%) reported not to have used *M. oleifera* as shown in Table 2. The findings indicated that a majority of those using *M. oleifera* were mainly female, aged between 26 and 45 years, married, with secondary education and below, farmers, and those who had lived with the disease for more than five years.

Figure 1 shows the uses of *M. oleifera* among the HIV positive patients attending Comprehensive Care Clinic at Migori Referral Hospital

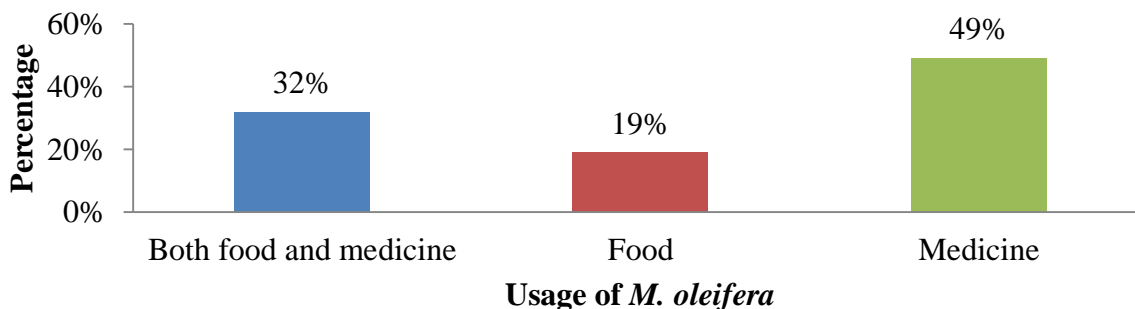


Figure 1: Uses of *M.oleifera*

The findings also indicated that of those who used *M. oleifera* (210 respondents), 32% used it as both food and medicine, 49% used *M. oleifera* as medicine only while 19% used it for food only (Figure 1).

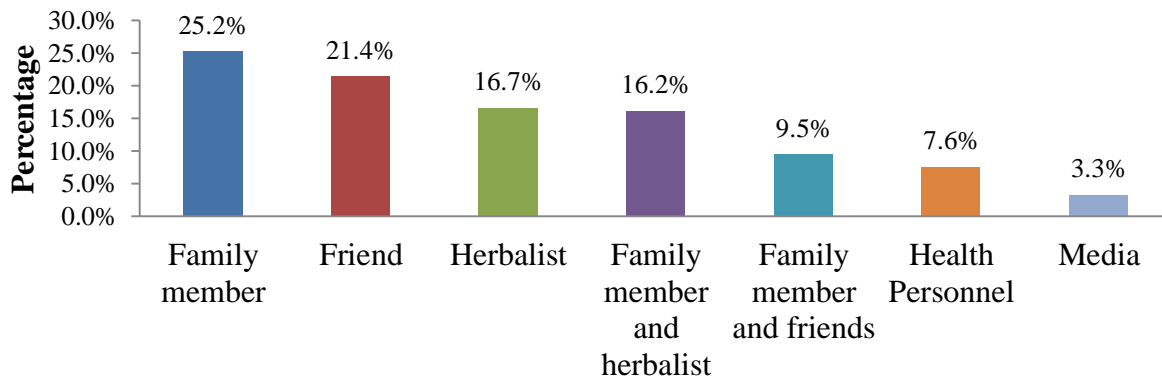
M. oleifera was taken mainly on a weekly basis (37.6%). The length of usage of *M. oleifera* varied with a 28.1% of those who used *M. oleifera* indicating that they had used *M. oleifera* for more than five years. Leaves were the most (64.1%) used part of the plant. Thirty one percent (31%) of those who used *M. oleifera* obtained *M. oleifera* from the market, relatives and friends.

M. oleifera was commonly (38.1%) used in crushed form (small pieces), while 36.24% used *M. oleifera* in grounded powder form. *M. oleifera* is mainly taken orally as food or drunk in teas by 89%, a small percentage (1.0%) however indicated they smear it on their bodies.

Nearly all (99%) of those who used *M. oleifera* indicated that they had never experienced any side effects after using it with only 1% indicating that they had some side effects that included rashes and stomach aches. Majority (88.6%) stated that it is appropriate to supplement modern treatment with herbal medicine. However, some of those who used *M. oleifera* (11.4%) thought it was not appropriate as traditional medicine has not yet been tested and may cause serious health problems when used.

3.2.1 Sources of information on the uses and benefits *M. oleifera*

Figure 2 shows the main source of information on the uses and benefits of *M. oleifera*.



Source of knowledge on *M.oleifera*

Figure 2: Sources of Knowledge on *M. oleifera*

More than twenty-five percent (25.2%) of those who used *M. oleifera* reported to have gotten the information from family members followed by 21.4% from friends.

3.3 Socio demographic and Socio-economic factors associated with use of *M. oleifera* among HIV positive patients attending CCC at Migori County Referral Hospital.

Table 3 represents the Socio demographic and socio economic factors associated with use of *M. oleifera*.

Table 3: Socio demographic and Socio-economic factors associated with use of *M. oleifera*

Variable	Category	<i>M. oleifera</i> Use		Chi Square	p-Value
		Used <i>M.o</i>	Not Used		
		(n=210)	(n=68)		
		Yes	No		
Age	Below 25 years	35(79.5)	9(20.5)	10.086	0.039
	Between 26 - 35 years	67(77.9)	19(22.1)		
	Between 36 - 45 years	62(65.3)	33(34.7)		
	Between 46 - 55 years	33(89.2)	4(10.8)		
	Above 55 years	13(81.3)	3(18.8)		
Gender	Male	83(72.8)	31(27.2)	0.781	0.377
	Female	127(77.4)	37(22.6)		
Highest level of education	No formal education	9(69.2)	4(30.8)	7.332	0.119
	Primary	78(78.8)	21(21.2)		
	Secondary	84(77.8)	24(22.2)		
	College	33(73.3)	12(26.7)		
	University	6(46.2)	7(53.8)		
Marital Status	Single	40(76.9)	12(23.1)	5.244	0.155
	Married	117(73.6)	42(26.4)		
	Divorced/Separated	24(68.6)	11(31.4)		
	Widowed	29(90.6)	3(9.4)		
Occupation	Farming	60(78.9)	16(21.1)	7.176	0.305
	Employed	52(67.5)	25(32.5)		
	Business	57(74.0)	20(26.0)		
	Self employed	19(82.6)	4(17.4)		
	Unemployed	6(75.0)	2(25.0)		
	Farming and business	11(91.7)	1(8.3)		
	Employed and business	5(100.0)	0(0.0)		
Years living with HIV	Below 1 year	55(79.7)	14(20.3)	1.800	0.615
	Between 1 - 3 years	57(72.2)	22(27.8)		
	Between 3 - 5 years	38(71.7)	15(28.3)		
	Above 5 years	60(77.9)	17(22.1)		
Years on treatment	Below 1 year	56(80.0)	14(20.0)	2.271	0.518
	Between 1 - 3 years	66(73.3)	24(26.7)		
	Between 3 - 5 years	34(69.4)	15(30.6)		
	Above 5 years	54(78.3)	15(21.7)		

Findings indicate that age was the only significant variable associated with use of *M. oleifera* with a p-value of 0.039 (Table 3).

3.4 Individual and Health System factors associated with the use of *M. oleifera* among HIV positive patients attending CCC at Migori County Referral Hospital

3.4.1 Influence of HIV status on usage of *M. oleifera*

Majority (64.3%) of the respondents who were using *M. oleifera* started using it before they knew their HIV status. However, 35.7% started using it after knowing their status, with the HIV status influencing 60% of this category usage of the plant.

3.4.2 Reason for using *M. oleifera* and HIV drugs simultaneously

68.6% of those who used *M. oleifera* used it together with HIV drugs. The reasons given for using both was that *M. oleifera* was used as food and as medicine for other diseases such as ulcers, stomach upset, and rashes while at the same time taking the HIV drugs for viral suppression. However a large percentage did not use it as a treatment to HIV.

3.4.3 Disclosure on use of herbal medicine and HIV drugs

Informing the health care practitioners on the usage of alternative forms of treatment is important as it informs on the possibility of drug interaction and toxicity. Majority of the users of *M. oleifera* (90%) however did not disclose to their health care providers that they were taking *M. oleifera*.

3.4.4 Patients - health care personnel relationship

Patient's trust of the health care providers is paramount for the healthcare services to be effective. The study sought to establish the extent to which the respondents trusted their medical providers to offer them high quality medical care. The findings indicate that majority of the users of *M. oleifer*, (90.0%) completely trusted the providers. In terms of respect, (97.1%) of those who used *M. oleifera* had not experienced hostility or lack of respect from the health care personnel.

3.4.5 Health challenges in HIV positive patients' efforts to get treatment

Several respondents who used *M. oleifera* (42.4%) had faced various challenges in their efforts to get treatment. The main challenge faced was the distance to the health facility as a majority (59.8%) lived far and had to use "boda bodas or matatus". The other challenges were drug side effects, long waiting times and delays, and stigma

3.4.6 Consequence when using *M. oleifera* and ARVs at same time

When asked whether a problem would arise when one takes *M. oleifera* and HIV drugs at the same time, majority of those who used *M. oleifera* (59.5%) stated that no problem will arise while 3.6% indicated that a problem will arise.

3.4.7 Affordability and accessibility of *M. oleifera* in the County

Majority of those who used *M. oleifera* (82.4%) indicated that *M. oleifera* was affordable. The rating of the accessibility of *M. oleifera* was high with 80.2% indicating that *M. oleifera* was accessible. When asked whether *M. oleifera* can be used to cure HIV, majority (83.9%) believed that it cannot cure HIV. Others however had the opinion that *M. oleifera* can cure HIV.

3.5 Herbalists usage of *M. oleifera*

The herbalists who were the Key Informants provided indepth details on the utilization of herbal medicine and particularly *M. oleifera*. The years of experience for the herbalists ranged from seven years to forty years and majority indicated that they acquired knowledge on the use of herbal medicine from their family members especially grandparents and fathers.

The Health Act 2017 law makes it mandatory for practitioners of alternative medicine or herbalists to be registered by the Pharmacy and Poisons Board. This is geared towards ensuring appropriate, safe and effective use of traditional medicine. However the study findings show that none of the herbalist had been registered. On average the number of patients attended to daily by the herbalists was five. A few of the herbalist attended to over ten patients per day. The period that the herbalists had used *M. oleifera* was varied with a majority of them having used the plant for between four to eight years. The *M. oleifera* is mostly sourced from the herbalists own farms with only two herbalists (22.2%) sourcing it from the market. The part of *M. oleifera* that is used often is the leaves. The findings indicate that the diseases often treated by *M. oleifera* were skin infections, hypertension, diabetes, arthritis, high blood pressure and stomach aches. Other diseases included diabetes, blood pressure, headaches, hypertension and stomach aches. The form *M. oleifera* is taken according to all the herbalist is powder form where it's mixed with water at the ratio of 1 teaspoonful of *M. oleifera* powder to 1 litre of Water. The decision on the dosage of *M. oleifera* depends on several factors including the nature of the disease and age, with children and the elderly given smaller doses than the adult patients. The length for the dosage varies from a few days to a few months depending on the diseases.

M. oleifera is usually taken alone according to majority of the herbalist with only one of them stating that *M. oleifera* is mixed with other herbal medicines. Using *M. oleifera* alone is more effective than when it is mixed. One herbalist however indicated that *M. oleifera* is 80% effective when used alone and 20% effective when combined with other herbs. According to the herbalist *M. oleifera* is a safe herb to use as it does not have any side effects. One of the herbalist however indicated that those who use *M. oleifera* may experience some itchiness. Although *M. oleifera* is stated as being safe, this does not indicate that the whole plant is safe for use.

4.0 DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

4.1 DISCUSSIONS

4.1.1 Prevalence and patterns of use of *M. oleifera*

There was high prevalence of use of *M. oleifera* (75.5%) among the HIV positive patients attending the CCC at Migori County Referral Hospital. This finding is similar to the findings of other studies that found out that herbal medicine (including *M. oleifera*) use in HIV clinics and among HIV positive people is high. A study by Monera and Maponga (2012) conducted in Zimbabwe indicated a high percentage of participants who reported to have used *M. oleifera*. The knowledge on the importance of *M. oleifera* was mainly obtained from friends (25.2%) and family (21.4%). Only a small percentage of the participants (7.6%) had obtained the information from health care personnel. These findings are consistent with several studies which showed that

the main sources of information for herbal medicine were personal knowledge, media, friend, and family and not the health care provider (Hasan *et al.*, 2010; Shedlin *et al.*, 2013).

M. oleifera is a multipurpose plant that has been used as human food and an alternative for modern medicine for several years. It is believed to have a range of benefits including protecting and nourishing skin and hair, treating edema, protecting the liver, preventing and treating cancer, fighting against bacterial diseases, making bones healthier, treating diseases such as stomach complaints, diabetes, asthma among others (Cadman, 2017). The study sought to establish the reason as to why *M. oleifera* was being used by HIV positive patients attending CCC at Migori County Referral Hospital. The most common reasons for using *M. oleifera* was that it was used as food due to its high nutritive value and ability to boost once immune system. Other respondents however stated that they used *M. oleifera* as medicine for other diseases such as ulcers, stomach upset, skin infections etc.

The herbalists indicated that they used *M. oleifera* to treat various diseases including skin infections, diabetes, high blood pressure, hypertension and arthritis. Similar reasons for use of *M. oleifera* were given in the study by Monera and Maponga (2012) which found the most common reason for using *M. oleifera* being as an immune booster (80% of respondents). Other indications were digestive disorders, nutritional disorders, hypertension, immune suppression, diabetes and arthritis.

The commonly used part of the *M. oleifera* tree was the leaves. It was either used alone (64.3%) or in combination with the seed and dry pods (20.5% and 9.0% respectively). In 31% of cases *M. oleifera* was supplied by a friend or relative which an equal number of participants obtaining their supplies from both friends/relatives and the market. This is attributed to the fact that most of the farmers in Migori County have planted the *M. oleifera* tree. The *M. oleifera* was commonly used in crushed and powdered form by nearly 75% of those who used it. It was brewed in teas or added in foods as a spice. Other usage was cooking of the leaves as vegetables.

Several studies have indicated that there is a potential for interactions between the use of herbal medicine and modern medicine when used together. Leaf extracts of *M. oleifera* inhibit CYP3A4 enzymes which can metabolize a large proportion of drugs, including antiretroviral drugs (Monera, *et al.* 2008; Wrighton & Stevens 1992). According to Monera-Penduka *et al.* (2017), the associated use of traditional herbs with modern drugs may result in herb-drug interactions through various pharmacokinetic and pharmacodynamic mechanisms. Therefore self-directed herbal medicine use such as the use of *M. oleifera* without directions from health care personnel puts HIV patients at a high risk of developing herb-drug interactions. The findings of the study indicated that majority of those who used *M. oleifera* (99%) had not experienced any side effects after using *M. oleifera* together with HIV drugs. Those who had some side effects stated that they had some mild rashes and stomach aches after using it.

4.1.2 Social Demographic Characteristics

The findings indicate that those above the age of 26 years were most likely to use *M. oleifera* than those below that age. Majority (88.6%) of the patients stated that it is appropriate to supplement modern treatment with herbal medicine since when this is done some of the diseases that cannot be treated by modern medicine can be treated with traditional medicine.

4.1.3 Individual and Health System Level Factors Associated with the use of *M. oleifera*

Several respondents who used *M. oleifera* (42.4%) had faced various challenges in their efforts to get treatment. The main challenge faced was the distance to the health facility as a majority (59.8%) lived far and had to use “boda bodas or matatus”. The other challenges were drug side effects, long waiting times and delays, and stigma.

The patient is expected to reveal their relevant medical history, expose their bodies for examination and act on the instructions given by their healthcare provider upon giving out consent. The patient must trust their health care givers with these, for their own good. According to Goold, (2002), “trust, in the healer is essential to healing itself. Trust, at least to some minimal extent, is undoubtedly a prerequisite to seeking care at all”.

A critical issue of concern in the study was the high rate of non disclosure of *M. oleifera* use to the health care providers. This rate of not disclosing is consistent with findings from other studies which indicate that a majority of people living with HIV are usually very hesitant to discuss, let alone inform their physicians on their use of herbal medicine. A study by Furler *et al.*, (2003) in Ontario, Canada found out that 53% of the HIV-infected outpatients did not disclose their usage of complementary and alternative medicine. Another study in Malaysia found a non disclosure of 68% among the patients with HIV/AIDS. Several reasons could explain this including the physicians not enquiring about the use of *M. oleifera* or the fear among patients of disapproval of the use by the physicians or punished by being denied treatment.

4.2 Conclusions

The results have made it evidently clear that *M. oleifera* is highly used (75.5%) among HIV positive patients attending comprehensive care clinics (CCC) at Migori County Referral Hospital. The socio-demographic profile indicates that, age was the only significant factor associated with the use of *M. oleifera* among HIV positive patients attending comprehensive care clinics (CCC) at Migori County Referral Hospital. The findings indicate that distance to the health facility was the main challenge faced by majority (59.8%) of the HIV patients attending comprehensive care clinics (CCC) at Migori County Referral Hospital while other challenges included drug side effects, long waiting times and delays, and stigma. The most commonly used part of the *M.oleifera* tree was the leaves which was used in crushed and powdered form.

4.3 Recommendations

The Ministry of Health should sensitize HIV positive patients on health implications and potential for interactions of using herbal medicines such as *M. oleifera* together with conventional medicine. Ministry of Health should ensure decentralization of health facilities offering Comprehensive Care Clinic (CCC) services near the people and sensitize people against stigma. The findings of this study are a basis for a clinical trial to ascertain the benefits of *M. oleifera* to people living with HIV/AIDS. Further studies should be carried out to determine the effects of *M. oleifera* on human beings particularly after long term use.

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