



Complementary and Alternative Medicine Utilization among Pregnant Women Attending Antenatal Care Clinics in Tongaren Sub-County, Kenya: a Cross-sectional Survey

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ABSTRACT

Background: In Kenya, Complementary and Alternative Medicine (CAM) has been used in almost every culture to manage intolerable symptoms of pregnancy since ancient times. However, studies in Kenya have focused on herbal medicine which is just one of CAM practices. In rural settings (such as Tongaren Sub-County), no studies have ever evaluated the prevalence and determinants of CAM use during pregnancy including the common CAM modalities used, and so there is need to bridge these knowledge gaps.

Purpose: This study aimed at determining the prevalence of CAM utilization and associated factors among pregnant women attending antenatal care clinics in Tongaren Sub-County, Bungoma County.

Methods: A cross-sectional descriptive study design was employed in collecting data from 340 pregnant women attending antenatal clinics in Tongaren, Kenya. Quantitative data was collected through semi-structured questionnaires. Chi-square test was used to establish the associations between socio-demographic variables and CAM usage, and multiple logistic regressions were used to examine the relative effects of the various aspects of the variables which were significantly associated with CAM usage.

Results: Among the 340 participants, 50.7% indicated using CAM modalities during pregnancy, indicating that CAM use prevalence in Tongaren is about 50%. 55.80% of CAM users concomitantly use CAM and conventional medicine. The high CAM use prevalence among participants was motivated by the preference of CAM over conventional medicine for certain illnesses (31.4%) and the perceived lack of response to conventional medicine (20.1%). It was noted that marital status, educational attainment of the spouse, employment status, occupation type, and household monthly income level are the major determinants of CAM usage. From the logistic regression analysis, the variables positively associated with CAM use among pregnant women were married status (Odds ratio (OR) = 2.341, $p = 0.008$), having a spouse with informal education (OR = 5.371, $p < 0.001$), self-employed status (OR = 0.415, $p = 0.028$), farming occupation (OR = 2.777, $p = 0.206$), and household monthly income higher than 35,000 Kshs (OR = 0.093, $p = 0.012$).

Conclusions: Due to the widespread trust in the safety and efficacy of CAM, the utilization of CAM during pregnancy is common among women in Tongaren Sub-County, which is a rural setting, and therefore CAM can be regarded as the backbone of rural health care in Kenya.

Keywords: *Complementary and Alternative Medicine; Conventional medicine; Pregnant women; Predictors of CAM use; Kenya*

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Submitted: 6 November 2021; Accepted: 16 January 2022; Published: 17 February 2022

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ISSN: 2775-4448

DOI: <https://doi.org/10.36749/wmm.2.1.65-83.2022>

BACKGROUND

Complementary and alternative medicine (CAM) is a set of different medical and healthcare systems, procedures, and supplies that are not typically regarded to be part of mainstream medicine (Medicine, 2013; Steel & Adams, 2012). Since ancient times, CAM has been used in almost every culture of the world, to manage intolerable symptoms of pregnancy apart from its therapeutic effect on both severe and acute illnesses (Hall et al., 2013; Strouss et al., 2014). Currently, the CAM modalities commonly used during pregnancy in various places around the world include plant products/herbal medicine (Adams et al., 2003; Frawley, 2015; Kalder et al., 2011; Peng et al., 2014; Steel et al., 2014) vitamins and mineral supplements aromatherapy, alternative/relaxation therapies such as yoga, massages, meditation, chiropractic, acupuncture, and spiritual remedies (Haun, 2017; Pettigrew et al., 2004; Steel et al., 2014; Strouss et al., 2014). These forms of CAM therapies are often self-prescribed by women themselves (Kennedy et al., 2013), and used during pregnancy to treat some pregnancy-related ailments such as severe headaches (Adams et al., 2003; Sibbritt & Adams, 2010), stress (Bishop et al., 2011), back pains (Steel & Adams, 2012) nausea or vomiting (Anwar et al., 2015), colds and other respiratory diseases, skin problems such as skin ulcers, and infections. (Dal'Beló et al., 2006; Hwang, Kim, et al., 2016; Nordeng & Havnen, 2004)

Studies indicate that there's high CAM use prevalence among pregnant women from both developing and developed nations (Frawley, 2015). In the UK, 57.1% of women were reportedly utilizing CAM during pregnancy (Hall & Jolly, 2014). In Germany, (Kalder et al., 2011) determined that 50.7% of pregnant women were using CAM. In the US, surveys by (Pettigrew et al., 2004) and (Strouss et al., 2014) established respectively, that 68.2% and 72% of pregnant women in the US utilize CAM for pregnancy-related illnesses. In Australia, (Skouteris et al., 2008) reported that 73% of women use CAM during pregnancy. In the Middle East, which is part of the developing world, studies have indicated that CAM utilization among pregnant women is 75% in Jordan (Amasha & Jarrah, 2012) 22.3% in Iran (Sattari et al., 2012), 56.7 % in Iraq (Hwang, Cho, et al., 2016) and 40% in Palestine (Jaradat & Adawi, 2013). Generally, the (World Health Organisation, 2019) estimates indicate that above 80% of the population in the developing world rely on CAM use for their health improvement and disease treatments.

Regionally, in the developing countries of the Sub-Saharan Africa, recent studies have reported varied but high CAM utilization rates among pregnant women. For instance, a prevalence rate of 45% has been registered among pregnant women in DRC (Mbarambara et al., 2016) 52% has been recorded among 398 pregnant women surveyed in Zimbabwe (Mureyi et al., 2012) 55% rate was found among 235 pregnant women surveyed in South Africa (Hillary, 2013), 55% has been observed among 400 pregnant women surveyed in Tanzania (Godlove, 2011), and 80% was noted among 258 pregnant women surveyed in Ethiopia (Laelago et al., 2016). Generally, on average, most studies have estimated that over 70% of pregnant women in this region use CAM during their pregnancies (WHO, 2020; World Health Organisation, 2019; World Health Organization, 2008; Zakarija-Grkovic & Stewart, 2020). From all these statistics, it is clearly evident that CAM use during pregnancy is highly pervasive in most regions around the world.

In Kenya, an estimated 70% of women utilize CAM as their main healthcare during pregnancy (Gama – Sitosterol, 2019). This is an indication that despite the current progress in modern healthcare systems, CAM use is still common among populations in both urban and rural settings of the country. While few studies in Kenya have evaluated CAM use during pregnancy, the majority of them focused only on herbal medicine which is just one of the components of CAM practices. And in rural settings (such Tongaren

Sub-County), no studies have ever evaluated the prevalence and determinants of CAM use during pregnancy, and so there is need to bridge this knowledge gap.

OBJECTIVE

The purpose of this present study is to determine the prevalence of CAM utilization and associated factors among pregnant women attending antenatal care clinics in Tongaren Sub-County, Bungoma County.

METHODS

I. Study Area

The study was undertaken in Tongaren Sub-County, located in Bungoma County, Kenya. The County borders Trans-Nzoia County to the south, Uasin Gishu County to the south-west, and Kakamega County. This region was initially a white settlement scheme before the end of the colonial period hence it is currently a multi-tribe context consisting of immigrants from other Kenyan counties. The Tongaren Sub-County is divided into six political wards namely Naitiri-Kabuyefwe, Ndalul, Mbakalo, Milima, Tongaren, and Soysambu-Mitua. The population of this area is 186,279 with 90,610 males and 95,669 females ((KNBS), 2014). Residents in this constituency have an illiteracy level of 17% which is the lowest in the whole county of Bungoma ((KNBS), 2013)

Tongaren Sub-County has one Sub-County Hospital, two public health centres, fourteen dispensaries, and numerous privately-owned clinics. The distribution of these health facilities in the Tongaren Sub-County is shown in Figure 1.

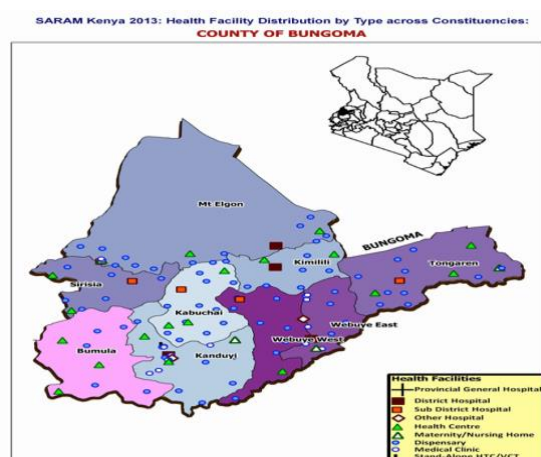


Figure 1: Map showing the distribution of health facilities in Tongaren Sub-County in Bungoma County, Kenya.

II. Study Design and Participants

A descriptive cross-sectional survey was conducted among pregnant women attending antenatal care clinics in Tongaren Sub-County, of Bungoma County, Kenya. All consenting pregnant women between the ages of 18 to 49 years were included in the study. Pregnant women who were below 18 years and did not consent to participate were excluded from the survey.

III. Sampling procedure and sample size

The formula used for determining the sample size was the Cochran's formula $n = \frac{z^2 p (1-p)}{d^2}$, where n is the requisite sample size, z represents the standard normal deviation 1.96 at 95% confidence level, p is the Proportion of the population with the desired characteristic which is estimated to be 70% of Kenyans who use CAM, and represents 0.05 margin error. From this equation, a sample size of 340 was determined for this survey as shown:

$$n = \frac{1.96^2 \times 0.7 (1 - 0.7)}{(0.05)^2} = 340.$$

The 340 pregnant women were chosen through a systematic random sampling approach.

IV. Data Collection Instruments

The data required for this survey was primarily collected using semi-structured questionnaires. The questionnaire contained both open-ended and closed questions. To ensure the validity of the questionnaire, the questionnaire was subjected to expert scrutiny to ensure that the questionnaires were valid for the test. The questionnaire was then pre-tested on a sample of 35 respondents drawn from Namarambi Dispensary in Bungoma East Sub - County.

V. Data Collection Procedure

Data collection was conducted in the months of May and June 2021 in public health facilities within the study area. During the actual data collection exercise, pregnant women attending antenatal care clinics were approached as they were about to leave the health facility. They were then given a detailed explanation of the purpose of the study, willingness to leave the study, and an assurance on the confidentiality of information to be collected. They were then asked to fill and sign a consent form indicating their willingness to participate in the study. The questionnaire was then administered to the respondents for data collection.

VI. Data Processing, Analysis, and presentation

Data was organized in MS Excel 2016 before it was exported to the SPSS Version 24.0. Percentages, frequencies, means, and standard deviation were employed in describing the survey variables. Chi-square test of independence was carried out to compare statistical associations between nominal variables whereby a p-value of ≤ 0.05 was considered significant. The variables whose p-value was less than 0.05 in the chi-square analysis were transferred to multinomial logistic regression analysis to examine the relative effects of selected socio-demographic variables on CAM use.

VII. Ethical considerations

Before data collection, ethical clearance was obtained from the ethical review committee of the University of Eastern Africa, Baraton. After which, a research permit was obtained from the National Commission on Science, Technology, and Innovation (NACOSTI). Written consent from the informed respondents who met the inclusion criteria was obtained before the administration of the questionnaire. The information obtained was kept confidential.

RESULTS

I. Response rate

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

II. Socio-Demographic characteristics of the study participants

The average age of the respondents was 26.9 ± 7.2 . Of the majority of the respondents, 46.5% of were from Naitiri-Kabuyefwe ward, 77.9% were from the Luhyas ethnic, 49.4% had attained up to secondary education, 38.2% had spouses who were holders of college diplomas, and 95% professed the Christian faith (Table 1).

Table 1: Social characteristics of the survey respondents

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
Educational status	No formal education	4	1.2
	Informal education	2	0.6
	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 the spouse	No formal education	2	0.9
	Informal education	1	0.4
	Primary education	31	13.8
	Secondary education	81	36
	Diploma holder	86	38.2
	Degree holder	24	10.7
	Total	225	100
Religion	African Traditional Religion	1	0.3
	Christian	323	95
	Islam	16	4.7
	Total	340	100

Sixty-five percent of the respondents were married or cohabited while thirty-four percent were single/widowed/divorced (Figure 2).

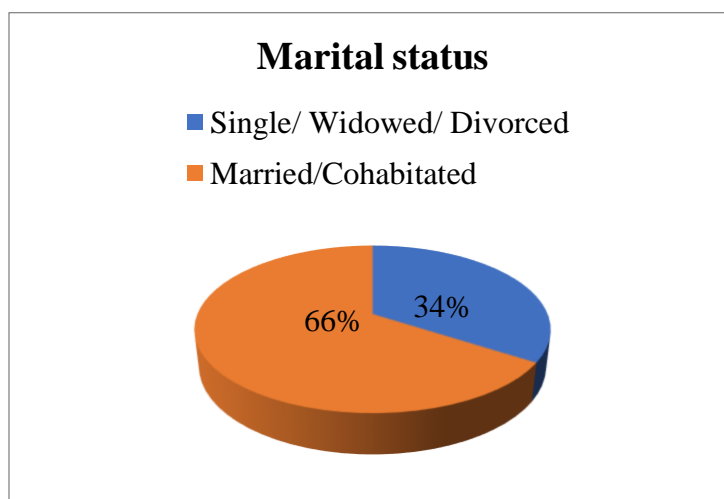


Figure 2: Respondents marital status

Nearly half of the participants (n=162; 47.6%) were unemployed, 37.9% (n=129) were self-employed, and only 14.4% (n=49) were employed (Figure 3).

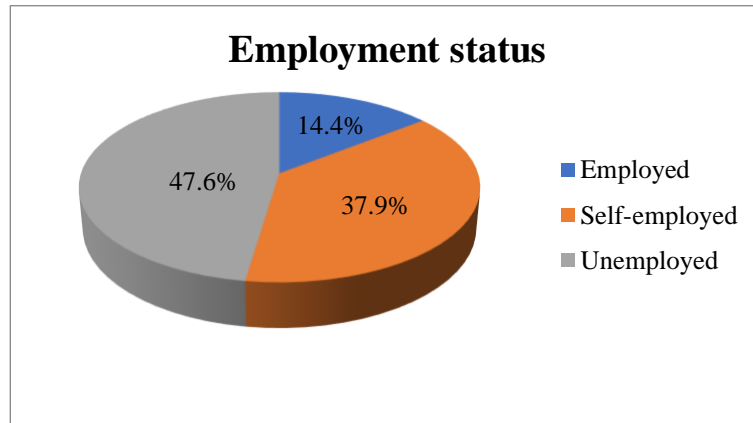


Figure 3: Respondents employment status

Many of the survey participants (n=122; 35.9%) were farmers, followed by 102 (30%) respondents who were students, 80 (23.5%) were involved in trading, and 36 (10.6%) were working as civil servants (Figure 4).

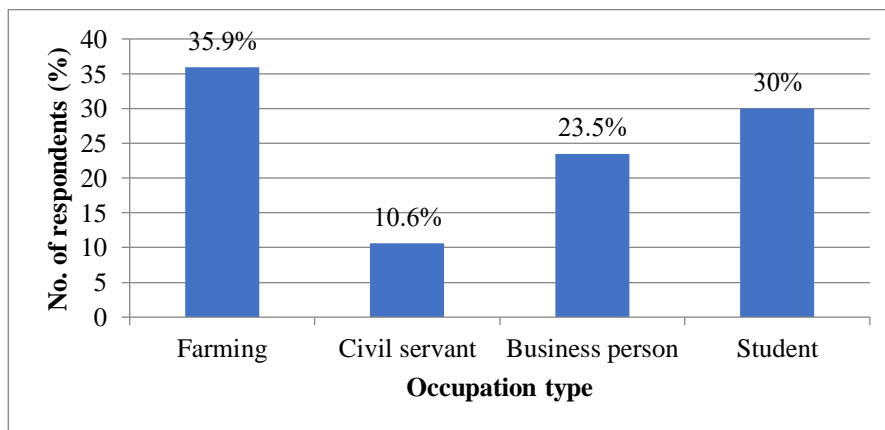


Figure 4: Respondents occupation type

Results of the income distribution indicated that majority of the survey participants (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 5000 Kshs. Only a few respondents (n=73; 21.5%) were from households having an average monthly income above 15000 Kshs (Figure 5).

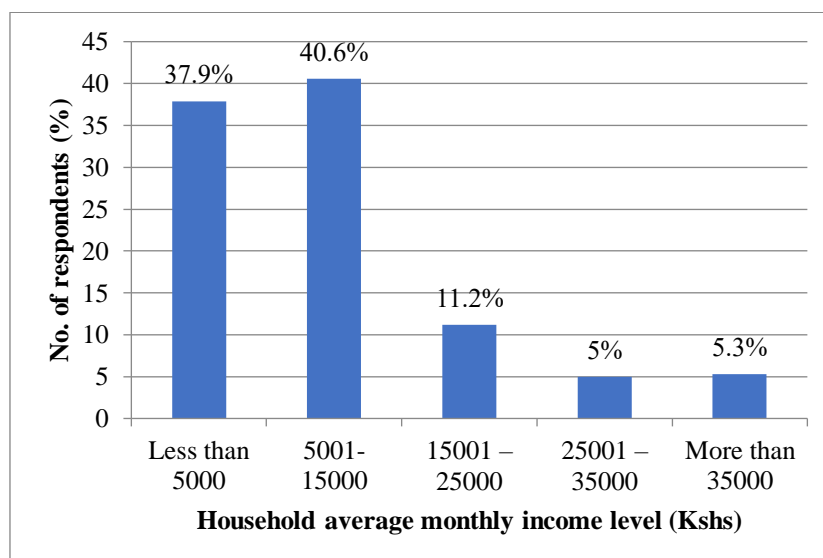


Figure 5: Respondents monthly income range

Of the majority of the respondents, 50.3% were living 5-10 km away from the nearest health facility, 54.4% had attended the ANC twice during the current pregnancy, and 94.7% had *Linda Mama* insurance cover offered freely by the Kenyan government for women in maternity (Tables 2).

Table 2: Health services access characteristics of the survey respondents

Variable	Category	Frequency N=340	Percent (%)
Distance to the nearest health facility	Less than five km (not far)	153	45
	Five to ten km (a bit far)	171	50.3
	More than ten km (far away)	16	4.7
	Total	340	100
The number of ANC attendance for the current pregnancy?	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
Registered for the Linda Mama program?	Yes	322	94.7
	No	18	5.3
	Total	340	100

The mean age of pregnancy of the respondents was 5.3 ± 1.9 months. The mean number of times of the respondents being pregnant was 2.3 ± 1.8 . For those who had been pregnant before the current one, the average number of living children was 1.3 ± 1.7 (Table 3).

Table 1: Pregnancy-related information about participants

Variable	Mean	Std. Deviation
Age of pregnancy	5.3	1.9
Parity	2.3	1.8
Number of live children	1.3	1.7

III. Prevalence of CAM utilization

Half (50.7%) of the participants had used CAM products at least once during past or present pregnancy. Of the 172 CAM users, 23.5% were from the Naitiri-Kabuyefwe ward, 40.9% were from the Luhya ethnic group, 39.7% were married or cohabitated, 22.4% had attained up to secondary education, 27.1% had spouses having college diplomas, 47.9% professed the Christian faith, 25.3% were self-employed, 25.6% were from households receiving an average monthly income of between 5001 and 15000 Kenyan Shillings, 24.7% were living less than 5 km away from the nearest health center, 25.9% had attended the ANC more than three times, and 47.3% had Linda Mama insurance offered freely by the government for women in maternity (Tables 4,5 and 6).

Table 4: Association between demographic factors and prevalence of CAM utilization

Socio-demographic variable	Category	Total	CAM Utilization During Pregnancy (N=340)		Chi-square Analysis		
			Users of CAM n (%)	Non-Users of CAM n (%)	χ^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)			
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)			
The 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)			
Are you registered for the Linda Mama program?	Yes	302 (94.7)	151 (47.3)	151 (47.3)	1.396	1	0.238
	No	17 (5.3)	6 (1.9)	11 (3.4)			
	Total	319 (100)	157 (49.2)	162 (50.8)			

Table 5: Association between social factors and prevalence of CAM utilization

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
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)			
Educational status	No formal education	4 (1.2)	3 (0.9)	1 (0.3)	8.242	5	0.143
	Informal education	2 (0.6)	2 (0.6)	0 (0.0)			
	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 the spouse	No formal education	2 (0.9)	2 (0.9)	0 (0.0)	12.086	5	0.034
	Informal education	1 (0.4)	1 (0.4)	0 (0.0)			
	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	5	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)			

Table 6: Association between economic factors and prevalence of CAM utilization

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
Employment 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)			
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)			

IV. Factors affecting CAM utilization

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, 5, and 6) and multiple logistic regression analyses (Table 7). 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 informal 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, $p = 0.206$).

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 35,000 Kshs 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 7: Multiple logistic regression analysis for determining factors impacting CAM utilization

Variable	Category	OR	p-value
Marital status	Single/ Widowed/ Divorced	1	RC
	Married/Cohabitated	2.341	0.008**
Educational status	No formal education	0.532	0.035**
	Informal education	0.257	0.042**
	Primary education	1.672	0.673

	Secondary education	2.605	0.014**
	Diploma holder	1.138	0.891
	Degree holder	1	RC
Education attainment of the spouse	No formal education	0.618	0.070
	Informal education	5.371	0.000**
	Primary education	0.583	0.600
	Secondary education	1.063	0.937
	Diploma holder	0.343	0.102
	Degree holder	1	RC
Occupational status	Employed	0.806	0.803
	Self-employed	0.415	0.028**
	Unemployed	1	RC
Occupation	Farming	2.777	0.026**
	Civil servant	1.197	0.885
	Trading	1.323	0.744
	Student	1	RC
Household average monthly income level	Less than 5000	0.123	0.059
	5001- 15000	0.093	0.012**
	15001 – 25000	0.097	0.013**
	25001 – 35000	0.174	0.059
	More than 35000	1	RC

RC: Reference Category; OR represent Odds Ratio; **statistical significance of interaction at $p \leq 0.05$.

V. Reasons for CAM utilization

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%) (Table 8). 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 at the health center.

Table 8: Reasons for CAM product(s) utilization

Variable	Category	Frequency (N=172)	Percent (%)
Reasons for CAM/TM product(s) utilization	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

VI. Utilization of CAM together with conventional medicine

55.80% of the CAM users reportedly utilize CAM and conventional medicine separately while 44.20% use CAM and conventional medicine together (Figure 6).

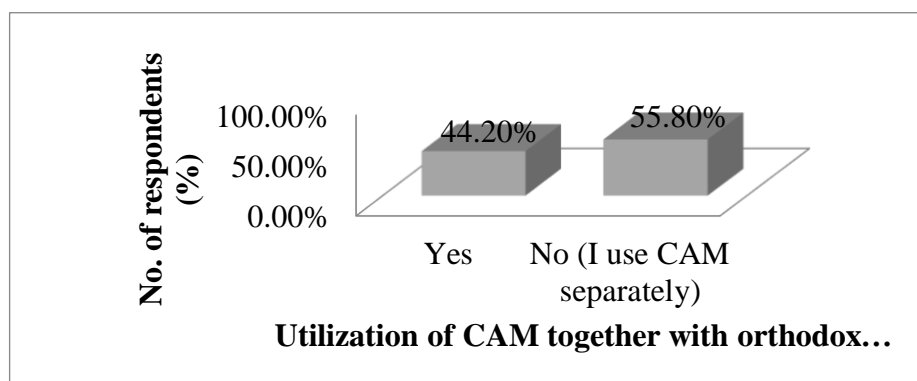


Figure 6: Utilization of CAM together with conventional medicine

VII. Potential CAM utilization in the future

The majority of the respondents (86.6%) plan to use CAM products and practices in their future pregnancies, 10% were not sure if they will use them in the future, and 2.7% stated that they don't intend to use them in their future pregnancies (Figure 7).

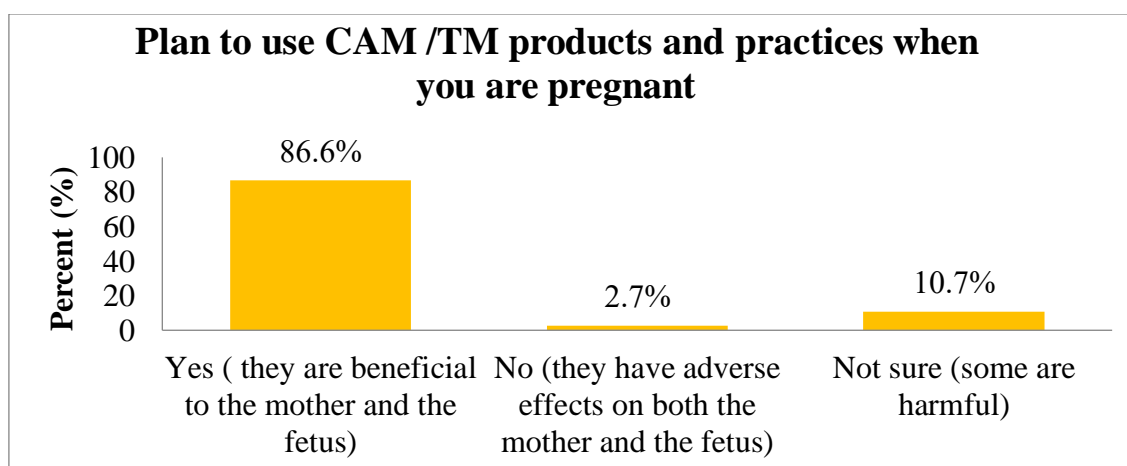


Figure 7: Percentage of pregnant women who plan to use CAM modalities in their future pregnancies

DISCUSSION

The study set out to determine the prevalence of CAM utilization and associated factors 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, 2015) 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 (Hillary, 2013). These high prevalence rates

imply that CAM is still heavily relied upon in most Kenyan societies to enhance, promote and restore human health.

The differences in the prevalence of CAM utilization among pregnant women from various parts of Kenya could be 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, Meru or any other ethnic groups in Kenya since they all have varied customs and traditions which usually shape their perceptions and practice. According to (Owumi, 2012), while acknowledging the cultural possession and origin of CAM practices, 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 them. In a nutshell, Africa is a cradle of human race with different cultures and abundant life as well as diverse therapeutic practices in different regions (Mahomoodally, 2013), thus these practices are indigenous to the people who observe them.

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% was found among 235 women surveyed in South Africa (Hillary, 2013) 55% has been observed among 400 women surveyed in Tanzania and 80% was noted among 258 pregnant women surveyed in Ethiopia. This study complements these previous pieces of literature in demonstrating that CAM use has been increasing in Kenya and 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. 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 et al., 2018).

This study established that 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, (Yekta et al., 2007) study had reported that non-response to modern medicine was one of the major reasons for CAM utilization among pregnant Iranian women. In Uganda, (Langlois-Klassen et al., 2007) found that most AID's patients use CAM 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, Kim, et al., 2016).

From the foregoing, it is 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 the lack of enough 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 to reach the hospitals. Trekking to the hospital for long distances is extremely challenging and unsafe to these women considering their fragile conditions;

hence they more often resort to CAM use, which is a more readily available alternative treatment method.

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. 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.

In determining factors that affect CAM use, this research established found several predictors of CAM. Marital status was significantly found to be associated with CAM use. This is contrary to the earlier studies (Addo, 2007; 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 (Gyasi, 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 spouses 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 partners and the use of CAM.

This study observed that women whose spouses had informal education were more likely to use CAM. This could be due to fact that these spouses lack enough knowledge on the effectiveness of conventional medicine and would be inclined to advise their pregnant wives to use the CAM which they are knowledgeable of and trust its efficacy since it is embedded in their socio-cultural backgrounds. In line with previous studies (Frawley, 2015; Strouss et al., 2014) 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 could be due to fact that exposure to only secondary education might not provide sufficient health literacy to these women on the efficiency of conventional medicine on pregnancy-related symptoms. Therefore, these pregnant women use CAM which they are profoundly knowledgeable of and trust its efficacy since it is naturally embedded in their socio-cultural backgrounds. This appears to be contrary to previous studies which had established those pregnant women who use CAM are more likely to be those having tertiary education especially university degrees (Bishop et al., 2011; Steel et al., 2014; Torri & Hornosty, 2017). It is, however, consistent with Torri and Hornosty's (2005) 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. (2011b) 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 (Biswas et al., 2020). 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 (2007) study which stated that increased CAM use was associated with respondents coming from lower socioeconomic statuses. Moreover, it was contrary to an earlier analysis by Frawley (2015) which observed that women who were unemployed (meaning they were neither self-employed nor in any formal employment) and earn low income were more likely to use CAM.

Of the 172 CAM users in this study, half of them indicated using CAM together with modern medicine while another half stated that they use CAM separately. Most CAM users indicated that they use CAM products for certain illnesses that are not "treatable" with modern medicine, which implies that if a pregnant woman 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 use herbal medicine to eliminate the skin problems and modern drugs for curing headaches. Pregnant women probably find it much more convenient to be able to utilize both types of medicine to combat the risks of certain health problems during pregnancy.

The 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 a 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 conventional medicine, expressed concern about using CAM in conjunction with conventional ones for certain ailments. This suggests that they are concerned that CAM treatments may interact with certain conventional medications, causing undesirable reactions which could be fatal. Gyasi (2014) asserts that, since CAM and conventional medicine arose from varying theoretical assumptions and methodological perspectives, issues are highly likely when the two components are used at the same time.

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) (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., 2009). 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" (Torri & Hornosty, 2017).

CONCLUSION

Due to the widespread trust in the safety and efficacy of CAM, the utilization of CAM during pregnancy is highly common among women in Tongaren Sub-County, and therefore CAM seems to form the backbone of rural health care in Kenya. The rural women use CAM during pregnancy to complement conventional medicine rather than as

an alternative, and this usage is highly influenced by their marital status, educational level, and employment status. Given the high prevalence of CAM use observed in this study, efforts should be directed towards validating the safety and efficacy of CAM modalities using accepted scientific principles. Moreover, since education was generally correlated with health seeking behaviour of pregnant women in Bungoma, more education programs such as peer group health education and community-based lectures should therefore be implemented to strengthen their health literacy which would be essential in guiding their safe utilization of CAM. Finally, the Kenya's Ministry of Health should collaborate with relevant stakeholders to develop a framework for strengthening recognition of CAM modalities as legitimate forms of healthcare and integrating them into the country's modern healthcare system.

ACKNOWLEDGEMENTS

The authors are grateful to the research assistants namely, Faith, Sarah, Isabell, and Macrose, for their assistance in coordinating the fieldwork for this research.

CONFLICT of INTEREST

The authors declare no conflict of interest.

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