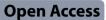# Traditional complementary and alternative medicine (TCAM) use among PLHIV on antiretroviral medication

Mawulorm KI Denu[1*], Maame Araba E. Buadu[2], Frederick Adrah[3], Cornelius A. Normeshie[4] and Kofi Poku Berko[5]

Abstract

Background Traditional complementary and alternative medicine (TCAM) are products and practices that differ from conventional allopathic medicine. There continues to be an increase in the use of these methods of treatment in developed and developing countries worldwide. This often owes to the perceived ability of these treatment methods to cure chronic medical conditions like HIV. However, TCAM use among PLHIV may be associated with reduced compliance with antiretroviral medications, resulting in poor viral load suppression and increased risk for opportunistic infections. The concomitant use of antiretroviral drugs and TCAM practices may be influenced by some sociodemographic and health-related factors.

Objective To determine the prevalence of TCAM use and examine the sociodemographic and health-related factors associated with its use among PLHIV on antiretroviral medications at the Infectious Disease unit of Korle-Bu Teaching Hospital in Ghana.

Methods A cross-sectional study was conducted among attendants at an adult HIV clinic. 420 study participants were selected by systematic sampling. Data related to TCAM use, sociodemographic and health-related factors were collected using a standardized questionnaire and patient chart review. Multivariate logistic regression model was used to determine the association between TCAM use, sociodemographic and health-related factors.

Results Of the 420 study participants, majority were female (76.2%) and urban community dwellers (77.9%). 77.4% of participants had been diagnosed with HIV for $\geq$ 5 years and had been on anti-retroviral medications for more than 5 years. The prevalence of TCAM use among PLHIV was 25.2%. No sociodemographic or HIV-related health factor was significantly associated with TCAM use in the study population.

Conclusion TCAM use was high among PLHIV. No sociodemographic or health-related factor was found to be associated with TCAM use. Further studies employing a qualitative approach using key informant interviews and focused group discussions are needed to explore reasons for its use. Care providers and policy-makers should look beyond sociodemographic and health-related factors in addressing TCAM use among PLHIV.

Keywords HIV/AIDS, Traditional, complementary and alternative medicine, Antiretroviral medications

*Correspondence:
Mawulorm KI Denu
Mawulorm.denu@umassmed.edu

Full list of author information is available at the end of the article

Background

Traditional, complementary and alternative medicine (TCAM) refers to products and practices that differ from conventional medicine. They consist of biological-based products like plant herbs, faith-based or spiritual/religious healing practices and mind-body healing techniques such as acupuncture, yoga, and massage [1, 2]. TCAM use is widespread globally, with an estimated prevalence between 76% and 80% in the general population [3, 4]. The use of this nonconventional method of medicine continues to grow, especially across the African continent. This has led to the establishment of research centers and the introduction of curricula in universities in countries such as Ghana, Nigeria, and South Africa for the purpose of studying these methods [1]. This is similar to the trend noted in Europe and other Western countries [5, 6]. In Ghana, the use of TCAM among the general population is estimated to be between 70% and 86% [7, 8].

The practice of TCAM use is particularly common among individuals with chronic medical conditions [9]. The advent of antiretroviral medications has significantly reduced morbidity and mortality associated with Human Immunodeficiency Virus and Acquired Immune Deficiency Syndrome (HIV/AIDS), essentially rendering it a chronic medical condition [10].

The use of TCAM among persons living with HIV(PLHIV) is known to be relatively high, with a worldwide average prevalence of 50-95% [11]. Previous studies estimate the prevalence of TCAM use among persons living with HIV (PLHIV) in developed countries such as the USA to be about 60% [12], and about 53.2% in developing countries like Ghana [8]. The availability and affordability of TCAM, especially in poor rural communities of developing countries, have contributed to their high level of acceptance [13].

Age, sex, marital status, educational background, rural or urban residence, and other sociodemographic factors have been associated with TCAM use among PLHIV [9, 11, 14]. Some health-related factors such as duration of HIV diagnosis, duration of ART treatment and comorbid medical conditions have also been associated with its use. TCAM use is often associated with poor adherence to ART [10, 15]. Because the efficacy of antiretroviral treatment may be dependent on strict adherence, TCAM use may be problematic among PLHIV. An adherence rate of at least 95% is needed to maintain optimum viral load suppression and other positive treatment outcomes [16]. There has been concern about poor ART compliance with increase in adverse outcomes and drug resistance among PLHIV in communities with high levels of TCAM use.

With no previously published study on TCAM use among PLHIV from the southern parts of Ghana and at the Korle Bu Teaching Hospital, Ghana's biggest teaching hospital, this study examined the level of TCAM use among attendants of an HIV at the Korle Bu Teaching Hospital in Ghana and explored the association between TCAM use and sociodemographic and health-related factors.

Materials and methods

Study design and data collection

This was a facility-based analytic cross-sectional study among attendants of the adult HIV clinic at Korle Bu Teaching Hospital between June and August 2020. The study was limited to PLHIV aged 18 years and above who had been on antiretroviral treatment for at least 6 months. A researcher-designed questionnaire was used for data collection on TCAM use, sociodemographic and health factors associated with its use among PLHIV that access care at the unit. Specific types of TCAM asked about were herbal mixtures and capsules, balms ointments and oils. A pilot study of 20 participants was conducted to validate and refine the questionnaire after initial design. In addition, participant health information such as duration of diagnosis, duration on antiretrovirals, HIV-typing, ART regimen, and viral load within the past year were extracted from health records and documented in the questionnaire.

Self-adherence to medications was ascertained for all participants using the Brief Adherence Rating Scale (BARS) and medication recall for 30 days. The study protocol (KBTH-IRB/00047/2020) was reviewed and approved by the Korle Bu Teaching Hospital Institutional Review Board on 27th May 2020. All enrolled participants provided a signed written consent and all the data collected were deidentified and kept confidential and accessible to approved study team members only.

Dependent and explanatory variables

The dependent variable of interest was TCAM use. This was assessed in the survey by the response to the question, "Do you currently use traditional or alternative forms of medicines aside from the ones that your doctor prescribed?"

Sociodemographic factors

Data were collected on sociodemographic factors such as age, education, sex, religion, marital status, occupation, and region of residence using a standardized questionnaire. The region of residence was categorized into: "Rural," "Peri-urban," and "Urban."

Health-related factors

Health-related factors examined in this study were HIV type, HIV viral load, duration of HIV diagnosis, duration of ART treatment, ART regimen, ART adherence rate,

Table 1 Sociodemographic characteristics of study participants

Baseline Characteristics (*N* = 420)	*n* (%)
Gender	
Male	100 (23.8%)
Female	320 (76.2%)
Age Category	
< 40 years	75(17.9%)
≥ 40 years	345(82.1%)
Education	
Primary	151 (35.9%)
Secondary	141 (33.6%)
Vocational/Technical	31 (7.4%)
Tertiary	32 (7.6%)
None	65 (15.5%)
Residence	
Rural	11 (2.6%)
Urban	327 (77.9%)
Peri-urban	82 (19.5%)
Employment Status	
Formally employed	49 (11.7%)
Informally employed	323 (76.9%)
Unemployed*	38(9.0%)
Retired	10 (2.4%)
TCAM use	
Yes	106(25.2%)
No	314(74.8%)
Type of TCAM used[a]	
Herbal supplements	89(84)
Non-herbal supplements	15(14.2)
Faith based (e.g. spiritual oils)	2(1.8)
Comorbid medical conditions[b]	
Hypertension	74(67.3)
Diabetes	12(10.9)
Asthma	5(4.5)
Liver disease	3(2.7)
Others	16(14.6)

*Includes students [a] − *n* = 106 [b] − *n* = 110

Table 2 Chi-square analysis of sociodemographic factors by TCAM use category

Variables	TCAM use		*p*-value (χ^2)
	Yes (*N* = 106)	No (*N* = 314)	
Sex			0.466
Male	28(26.4%)	72(22.9%)	
Female	78(73.6%)	242(77.1%)	
Age Category			0.525
< 40 years	17(16%)	58(18.5%)	
≥ 40 years	89(84%)	256(81.5%)	
Religion			0.215
Christian	91(85.8%)	280(89.2%)	
Muslim	14(13.2%)	26(8.3%)	
Other	1(1%)	8(2.5%)	`
Marital Status			0.585
Single	23(21.7%)	70(22.2%)	
Married	41(38.7%)	131(41.7%)	
Widow/Widower	21(19.8%)	55(17.5%)	
Separated	3(2.8%)	18(5.7%)	
Divorced	8(7.5%)	23(7.3%)	
Cohabiting	10(9.5%)	17(5.6%)	
Residence			0.885
Rural	3(2.8%)	8(2.5%)	
Peri-urban	19(17.9%)	63(20.1%)	
Urban	84(79.3%)	243(77.4%)	
Education level			0.856
None	15(14.2%)	50(15.9%)	
Primary	38(35.8%)	113(36%)	
Secondary	38(35.8%)	103(32.8%)	
Vocational/Technical	9(8.5%)	22(7%)	
Tertiary	6(5.7%)	26(8.3%)	
Employment Status			0.881
Unemployed	9(8.5%)	29(9.2%)	
Formally employed	10(9.4%)	39(12.4%)	
Informally employed	84(79.2%)	239(76.1%)	
Retired	3(2.9%)	7(2.3%)	

and comorbidities. These were obtained from patients using the questionnaire and review of patient health records.

ART adherence rate was assessed by a standardized 30-day recall of medications using the Brief adherence rating scale (BARS) and pill count. The low-cost, ease of administration, and minimal patient burden it offered made it favorable to carry out the study in an outpatient clinic [17].

Statistical analyses

Descriptive statistics were first produced for sociodemographic and health-related variables. Following this, Chi-squared tests were performed to examine the differences in the independent variables between the two TCAM use categories of respondents. Multiple logistic regression was then utilized to examine the association between TCAM use and the predictor sociodemographic and health-related variables. All analyses were done with STATA (version 16). Statistical tests were 2-sided, and the significance level was set at 0.05.

Results

Sociodemographic characteristics of the Study Population

Table 1 summarizes the sociodemographic characteristics of respondents. Of the 420 participants enrolled in this study, 76.2% of respondents were female, and 82.1% were above 40 years old. The prevalence of TCAM use among study participants was 25.2%.

Sociodemographic factors and TCAM use

Table 2 summarizes the chi-square analysis results to examine the differences in sociodemographic factors between the two TCAM use categories. There was

no significant difference in sociodemographic factors between respondents who used TCAM and those who did not.

Health-related factors and TCAM use
Table 3 summarizes the results of the chi-square analysis to examine the differences in health-related factors between the two TCAM use categories. Again, there was no significant difference between the two TCAM use categories.

Adjusted multivariate logistic regression for the association between TCAM use and sociodemographic, health-related factors
The results of the logistic regression are summarized in Table 4. No sociodemographic and health-related factor was found to be significantly associated with TCAM use.

Discussion
The results of this study indicate that approximately one out of every four persons who seek HIV care at the Infectious Diseases unit uses some form of TCAM. Although moderately high, this rate is lower than that observed in a similar study conducted at Komfo Anokye Teaching Hospital in the Ashanti region of Ghana, which reported

Table 3 Chi-square analysis of health-related factors by TCAM use category

Variables	TCAM use		*p*-value (χ^2)
	Yes (N = 106)	No (N = 314)	
HIV type			0.985
Type 1	103(97.2%)	305(97.1%)	
Type 2	3(2.8%)	9(2.9%)	
Duration of HIV diagnosis			0.769
<5 years	25(23.6%)	70(22.2%)	
5–10 years	40(37.7%)	110(35%)	
>10 years	41(38.7%)	134(42.8%)	
Duration on ART			0.906
<5 years	25(23.6%)	70(22.2%)	
5–10 years	38(35.8%)	109(34.7%)	
>10 years	43(40.6%)	135(43.1%)	
HIV viral load			0.154
$\leq$ 1000cp/ml	97(91.5%)	299(95.2%)	
>1000cp/ml	9(8.5%)	15(4.8%)	
Comorbidity			0.653
Yes	26(24.5%)	84(26.8%)	
No	80(75.5%)	230(73.2%)	
ART adherence rate			0.355
$\leq$ 95%	29(27.4%)	101(32.2%)	
>95%	77(72.6%)	213(67.8%)	
ART Regimen			0.886
NNRTI-based	83(78.3%)	238(75.8%)	
INSTI-based	17(16%)	57(18.2%)	
PI-based	6(5.7%)	19(6%)	

the use of TCAM in 50% of clinic attendants [8]. The difference noted in rate between these two studies from different regions of the same country could be attributed to the difference in availability of TCAM and the number of rural communities located close to the centers where studies were conducted. The Ashanti region of Ghana has more rural communities where TCAM is more readily available for use, at a cheaper price. The prevalence rate from our study is also lower than the reported rates from similar studies from the Kwazu-Natal region of South Africa (51.3%) [18], Western Uganda (63.5%) [19], and Ethiopia(43.7%) [2]. Other literature in sub-Saharan Africa reported an average prevalence rate of about 45.8% [1]. However, the results were comparable to UK studies [4]. Most study respondents were from urban and peri-urban communities, where access to TCAM may be reduced, accounting for the relatively lower prevalence noted in our study. This prevalence, however remains considerably high, considering that all participants are HIV clinic attendants who have been on ARVs for at least 6 months, and have been previously counseled on ARV compliance and avoidance of TCAM use before starting ARV treatment. Commonly used TCAM types included herbal mixtures(66%), balms and oils(25%). These were used mainly to treat acute medical illnesses such as febrile illnesses, musculoskeletal conditions and common cold. Other study participants used them as an adjunct to manage chronic comorbid medical conditions like hypertension and diabetes, while some used TCAM as a way of boosting their immune systems. The sources of information regarding accessing TCAM was through word of mouth from other patients, television advertisement, radio and print media, which are assessable to all patients of all socio-demographic backgrounds.

Demographic factors have long been associated with TCAM use among PLHIV [1, 19, 20]. For example, the use of TCAM among PLHIV in some was previously reported to be associated with the female gender [1, 20]. Other studies have also shown an association between age and TCAM use among PLHIV [19]. The increased risk of comorbid conditions with age has been thought of as the main reason for this association [19]. However, neither gender nor age was found to be significantly associated with TCAM use in this study. Furthermore, other sociodemographic factors such as educational level, rural or urban settlement, and type of occupation were not found to be significantly associated with TCAM use in this study, although these were reported to be associated factors in a few studies in developed and developing countries [1].

Our results also show that comorbid disease conditions were not associated with TCAM use. This is a surprising finding as TCAM use was expected to be high among participants with chronic comorbid medical conditions

Table 4 Multivariate Logistic Regression for the association between TCAM use and sociodemographic, health-related factors

Variable	aOR (95%CI)	SE	*p*-value
Sex	*Ref*	0.41	0.322
Female	1.35(0.75,2.44)		
Male			
Age Category	*Ref*	0.41	0.322
<40 years	1.42(0.72,2.81)		
≥ 40 years			
Religion	*Ref*	0.71	0.114
Christian	1.84(0.86,3.90)	0.36	0.309
Muslim	0.33(0.04,2.81)		
Others			
Marital Status	*Ref*	0.42	0.417
Married	1.30(0.69,2.45)	0.45	0.424
Single	1.31(0.67,2.56)	0.41	0.466
Widow/Widower	0.62(0.17,2.26)	0.59	0.634
Separated	1.25(0.50,3.14)	1.18	0.054
Divorced	2.49(0.98,6.32)		
Cohabiting			
Residence	*Ref*	0.55	0.666
Rural	0.72(0.16,3.19)	0.52	0.654
Peri-urban	0.72(0.18,2.98)		
Urban			
Education	*Ref*	0.46	0.569
None	1.23(0.60,2.55)	0.56	0.301
Primary	1.48(0.71,3.09)	0.92	0.334
Secondary	1.69(0.58,4.89)	0.80	0.818
Vocational/Technical	1.17(0.31,4.48)		
Tertiary			
Occupation	*Ref*	0.75	0.420
Formally employed	1.50(0.56,4.01)	0.79	0.672
Informally employed	1.29(0.39,4.26)	1.50	0.465
Unemployed	1.82(0.36,9.15)		
Retired			
HIV Type	*Ref*	0.64	0.764
Type 1	0.78(0.16,3.90)		
Type 2			
Duration of HIV diagnosis	*Ref*	7.67	0.198
<5 years	5.69(0.40,79.99)	0.29	0.704
5–10 years	0.88(0.47,1.67)		
>10 years			
Duration on ART	*Ref*	0.22	0.180
<5 years	0.17(0.01,2.29)	-	-
5–10 years	1.00		
>10 years			
HIV viral load	*Ref*	0.90	0.595
≤ 1000 cp/ml	1.41(0.40,4.91)		
>1000 cp/ml			
Comorbid Condition	*Ref*	0.25	0.711
No	0.90(0.52,1.56)		
Yes			
ART adherence rate	*Ref*	0.33	0.383
≤ 95%	1.26(0.75,2.12)		
>95%			
ART regimen	*Ref*	0.27	0.551
NNRTI-based	0.82(0.43,1.57)	0.54	0.952
INSTI-based	0.97(0.32,2.89)		
PI-based			

seeking to cure or alleviate their symptoms with the use of TCAM. Hypertension was the most prevalent comorbid medical condition among study participants. The prevalence of hypertension in our study population was 21.2%, comparable to hypertension prevalence of 27% reported among PLHIV from studies in Nigeria and South Africa [21] and among the general population in Ghana of about 28% [22]. Although TCAM use among patients with hypertension in the general population is also well noted in other studies [23], a subgroup analysis of the comorbid disease conditions showed no association between hypertension and TCAM use in this study.

The use of TCAM in newly-diagnosed people with HIV was reported to be high, especially in the pre-ART era worldwide [24]. The impact of antiretroviral medications in improving treatment outcomes for PLHIV led to a gradual move away from the use of TCAM to treat HIV/ AIDS. Some studies suggest that patients living with HIV for extended periods have higher odds of TCAM use due to the onset of comorbid medical conditions like diabetes and dyslipidemia [25]. The duration since diagnosis was therefore considered a predictor of TCAM use among PLHIV [24, 26]. In this study however, we found no association between duration since diagnosis and TCAM use. We note, however, that all our study participants have been diagnosed for durations greater than 6 months.

Optimum adherence to antiretroviral medications is objectively assessed by patient viral load. The results show no association between TCAM use and viral load. This suggests that the study participants who use TCAM are also highly adherent to ART treatment. The adherence rates calculated for the study participants confirm a high level of ART adherence. A high proportion of the study participants demonstrated an adherence rate of at least 95% and greater. There was no statistically significant association between the level of adherence and TCAM use. This showed that even though most patients adhered to ARV treatment, some still used TCAM. This highlights the fact that PLHIV are not using TCAM primarily to manage or cure HIV, but for other ailments. This may be due to the relative high cost of orthodox medications compared to their counterpart TCAM. The public health policy program in Ghana for HIV/AIDS care makes antiretrovirals free at all point of care facilities. Hence cost of antiretrovirals are not a limitation to care as compared to medications for other ailments such as hypertension and diabetes. The high level of adherence at this HIV care clinic can be attributed to the level of health care staff and clinic health promotion and educative practices on adherence to ART. PLHIV who attend rural clinics were found to have a nine-fold likelihood of using alternative medicines compared to those that attended urban clinics, like the Korle Bu Fevers unit [27]. The high compliance to ARV treatment and significant

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TCAM use among PLHIV further raises concerns of increased drug interactions and increased adverse effects in the event of any drug interactions between ARV treatment regimen and TCAM.

This study was conducted among patients who are regular attendants of an HIV clinic in an urban teaching hospital with high levels of ART adherence. They are regularly seen and educated on avoidance of TCAM and strict ART adherence by various well-trained staff, including clinical psychologists, public health nurses, medical officers, and specialists in HIV. This may explain the lack of association between the sociodemographic factors and TCAM use seen in some previous studies. While there was no association observed between TCAM use and the sociodemographic and health-related variables we examined, the level of TCAM use among study participants is still a concern. There is a need to explore TCAM use further by healthcare providers and policymakers, especially with the ready availability of ARTs. New insights using a qualitative research approach are necessary to examine emerging factors that may drive TCAM use, especially among ART-compliant patients. Healthcare providers and policy makers must approach interventions to addressing TCAM use among PLHIV holistically, and examine other factors beyond sociodemographic and health-related factors in designing their interventions. This will help design more-targeted and effective programs or strategies aimed at reducing TCAM use while on ARV treatment.

Limitations

This was a single-site study with a cross-sectional design. A cause-effect relationship could therefore not be drawn for the association between TCAM use and the sociodemographic and health-related factors. In addition, a high proportion of participants had been diagnosed with HIV>5 years and had high levels of adherence to ART treatment. Therefore, the results may not indicate the level of TCAM use among newly diagnosed, non-attendant, or non-compliant persons living with HIV.

The interviews conducted during clinic hours in the presence of healthcare providers may affect respondents' willingness to disclose TCAM use. There may have also been recall bias among study participants.

Conclusion

This study's findings indicated that there remains a continuing high level of TCAM use among PLHIV on antiretrovirals. However, with no sociodemographic or health-related factor found to be associated with TCAM use, further studies employing a qualitative approach using key informant interviews and focused group discussions are needed to explore reasons for its use. In addition, care providers and policy-makers should look beyond sociodemographic and health-related factors in addressing TCAM use among PLHIV.

Abbreviations
TCAM   Traditional, Complementary and Alternate Medicine
PLHIV   Persons Living with HIV
AIDS   Acquired Immune Deficiency Syndrome
ARV   Anti Retroviral

Data availability
Data collected and analysed for this study are available from the authors on reasonable request.

Declarations

Ethics approval and consent to participate
The Korle Bu Teaching Hospital Institutional Review Board (IRB) reviewed and approved the study protocol on 27th May,2020. (Protocol number KBTH-IRB /00047/2020). All study methods were carried out in accordance with relevant guidelines and regulations including the Declaration of Helsinki. Informed consent was obtained from all study subjects.

Consent for publication
N/A.

Competing interests
The authors declare no competing interests.

Author details
[1]Department of Medicine, University of Massachusetts Chan Medical School, Worcester, MA, USA
[2]Department of Medicine, Massachusetts General Hospital, Boston, MA, USA
[3]Joint School of Nanoscience and Nanoengineering, University of North Carolina, Greensboro, NC, USA
[4]Department of Family Medicine, University of Virginia Medical School, Charlottesville, VA, USA
[5]Department of Infectious Diseases, Korle-Bu Teaching Hospital, Accra, Ghana

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