Prevalence and Predictors of Traditional, Complementary/Alternative Medicine Use, and Types of Herbal Remedies used for COVID-19 in the South West Region of Cameroon

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Received date: 15 September, 2021; **Accepted date:** 29 September, 2021; **Published date:** 06 October, 2021

Abstract

Background: Up to the 21st century, Traditional, Complementary and Alternative Medicine (TCAM) is still used despite the wide spread of orthodox medicine. The magnitude, predictors and types of herbal remedies used for COVID-19 are assessed to tailor evidence based policy and drug formulation against COVID-19.

Methods: A community based cross sectional study was conducted among 1100 respondents from nine (9) communities selected in three health districts from May to July 2020. Pretested structured questionnaires were used to collect data from selected households on the use of TCAM, predictors as well as on the herbal preparations used for COVID-19. Nineteen (19) traditional healers were also interviewed on the types of herbal preparations use on patients tested or suspected for COVID-19 and the signs and symptoms observed. P-value <0.05 were considered to be statistically significant in multivariate logistic regression analysis. Atlas ti V 7.5 was used for types of herbal species reported.

Results: Of the 1100 participants sampled, 754 (68.5%) had used TCAM in the last 12 months, 95%CI: 66.3-71.5. A total of 24.4% (95%CI: 20.6-29.1) of the participants used herbal remedies for COVID-19. *Allium sativum, Azadirachta indica, Zingiber officinale, Artemisia annua* were most commonly used herb for COVID-19. Cough, catarrh and fever were the main symptoms of COVID-19. Herbalists 79.7% (95% CI: 77.3-82.1) and bone setters 14.9% (95% CI: 12.8-17.0) were mostly visited. Logistic regression analysis showed age >41 years (95% CI: 1.09-4.91), being a farmer (95% CI: 1.99-5.34), income levels between 185-370 USD (95% CI: 1.33-4.55), participants who resided in a rural setting (95% CI: 1.04-3.98), being knowledgeable on TCAM (95% CI: 1.54-6.45) and having a positive attitude towards TCAM (95% CI:1.94-6.45) were predictors for TCAM use.

Conclusion: TCAM is widely used even in the era of orthodox medicine, and many factors contribute to its use in the Southwest Region of Cameroon which should be taken into consideration in healthcare interventions that are sensitive to TCAM. Herbal preparations used during the COVID-19 pandemic can serve as baseline for drug development through efficacy and toxicity tests.

Keywords: Prevalence • Predictors • TCAM • COVID-19

Abbreviations: TCAM: Traditional, Complementary and Alternative Medicine; TM: Traditional Medicine; COVID-19: Coronavirus Disease 2019; THP: Traditional Health Practitioners; OHPs: Orthodox Health Practitioners; OM: Orthodox Medicine; WHO: World Health Organization; UHC: Universal Health Coverage; SSA: Sub-Saharan Africa.

Introduction

Traditional, Complementary and Alternative Medicine (TCAM) are a group of healthcare practices (indigenous or imported) that are delivered outside of the mainstream healthcare system [1]. In the African context TCAM may include the use of local herbal medicines or products, indigenous healthcare practices (such as traditional bone setting, traditional birth attendants), as well as imported complementary and alternative medicine products and practices (eg, acupuncture or chiropractic) [2]. According to the world health organization, TCAM can contribute to improving quality of healthcare services through integration, regulation of TCAM products/services used by communities, strengthening sustainability and resilience through maximizing potentials of TCAM [3]. WHO estimates that more than 80% of the African populations rely on traditional medicine for their healthcare needs [4]. A systematic survey from 32 countries from non-Sub-Saharan Africa region shows a TCAM provider use prevalence of 34.7% in Australia, in Europe ranging from under 10% in Bulgaria, Poland and Slovenia to 35.4% in France, in Asia from 16.7% in Russia, to over 50% in China mainland, the Philippines and Republic of Korea, and over 20% in the USA, Chile and South Africa [5]. A recent systematic survey conducted in SSA shows traditional, complementary and alternative medicine use in the general population, reporting substantial prevalence ranging from 4.6% (urban settlement in Ethiopia) to 94% (semi urban settlements in Nigeria and Ethiopia), with an estimated average of 58.2% [6]. Various prevalence was also observed among 10 articles that reported on TCAM practitioner utilization (1.2%-67% (mean, 28.8%)) across four identified studies with smaller sample sizes. The with higher prevalence reported in Tanzania (77.1%) [6]. Reports from world health organization show TCAM use in Uganda and Tanzania at 60%, in Benin and Rwanda at 70%, and in Ethiopia at 90% [6].

In low-and middle-income countries, TCAM use has been associated with lower educational and socio-economic status [7,8], relative low cost and flexibility of payment of TCAM products and services, accessibility, perception of TCAM being natural and therefore safe as well as effective compared with orthodox healthcare. In another study patient's trust and confidence in their traditional medicine practitioners were factors associated with TCAM product and practitioner use [6].

Unsurprisingly, there has been an uptick in the amount of research being conducted at the intersection of TCAM and COVID-19 [9]. Several doctors and researchers have already attempted to use herbal medicines on clinical trials against SARS-CoV-2 [9].The longstanding use of dietary therapy and herbal medicine to prevent and treat diseases cannot be overemphasized, as several herbs exhibit antiviral activity [10]. Types of herbal medicine to prevent SARS-CoV-2 infections could serve as a baseline for drugs development [11].

Recently the Madagascar Institute of Applied research linked the use of *Artemisia annua* (sweet wormwood) in COVID-19 [11]. Zimbabwean

government was reported to have authorized herbalists to treat patients with COVID-19 symptoms raising concerns among national public health experts [9]. There is a lack of adequate data on the use of TCAM during the COVID-19 pandemic in Africa and in Cameroon in particular.

There is dearth of research and data from Cameroon on the extend and predictors of TCAM use, as well as types of herbal preparations use in the general population for COVID-19 which is very necessary for policy formulation/population based healthcare interventions that are sensitive to TCAM, regulation and further research on the efficacy and toxicity of these herbals use for COVID-19.

Materials and Methods

Study area

Cameroon has about 90% of the African ecosystems which includes; the Sahelian, Sudan, humid tropical forest, afro mountains, coastal and mountain eco-regions [12]. This study was conducted in the Fako Division in the Southwest Region of Cameroon. Fako Division lies in the coastal region between 4°28´30"N and 3°54´26"N latitudes, and 8°57´10"E and 9°30´49" E longitudes. The land area is approximately 203,071.27 ha and has a population of 534854 people. Most inhabitants practice agriculture as the main economic activity [12]. The region has two seasons: the dry season from October to March and the wet season from April to September. Almost all ethnic groups in Cameroon are represented in the region, attracted by the fertile volcanic soil for agriculture. The study was conducted in nine (9) communities (Isokolo-Limbe, Mile 4-Limbe, Down Beach-Limbe, Buea town, Muea-Buea, Mile 16-Buea, Likumba-Tiko, Water tank-Tiko (Camp) and Small Ekange-Tiko (Camp) i.e 3 communities selected from the Buea, Tiko, and Limbe Health Districts in the Southwest Region of Cameroon.

Study design

This was a cross-sectional survey conducted in 9 communities in the South west region Cameroon. Nine communities were selected within the 3 health districts and semi-structured questionnaires administered to examine traditional, complementary and alternative medicine use from May to July 2020. In the nine communities' traditional healers were also interviewed on the type of herbal preparations used for COVID-19, mode of preparation and also on the signs and symptoms of COVID-19.

Study population

The population of the study included households from the nine communities. The study population included individual from the age of 21 years and above who were living for not less than six months in the community. The sampling units were households, while the study units were adult individual available in the household during the interview. The study population also included traditional healers residing in the communities.

Sample size determination

The Cochran formula was used to determine the minimum sample size required in this study. It allows for calculation of the best possible size with preferred precision and confidence level.

Sample size was calculated based on the prevalence of TCAM use following assumptions: p=50% (prevalence of TM use).

$n=(z)^2\alpha p(1-p)d/i^2$

Where n=sample size; Za=constant; Confidence interval, 95%=1.96 at a=0.05; d=2.8 correction factor; i=Precision of the event of interest; degree of accuracy=0.05; p (population prevalence)=50%.

The prevalence of TCAM use in the Fako Division is unknown, therefore maximum heterogeneity was assumed (ie, a 50/50 split in users and non-users) with p=0.5.

$n=(1.96)^2\ \alpha 0.5(1-0.5)2.8/0.05^2$

1078 participants

Considering a 2% non-response rate, a total of 1100 respondents were included in this study. Probability proportionate to size was used to determine the number of respondents that were recruited from each health district.

Sampling procedure

Systematic random sampling technique was used to select households in the nine communities. The first household per community was selected from the list of initial n households by balloting method. Then every nth household was selected and an adult in the household was interviewed. In the presence of more than one adult, balloting was done to choose one adult who was interviewed. Traditional healers were purposively selected to take part in the interview sessions from the study communities to assess herbal remedies used for COVID-19, mode of preparations well as the signs and symptoms (Table 1).

Table 1. Sample size per health district based on probability proportionate to size.

District		
Buea	1,73,526	360
Tiko	1,54,690	320
Limbe	202, 831	420
Total	5,31,047	1100

The sample size per community, n/community=(Adult population of community/Total adult population of the 3 communities per district) × n (sample size per district) (Table 2).

Table 2. Sample size per study site based on probability proportionate to size among community participants.

Study site	Total adult population	Number of participants per site (Proportionate sample)
Buea Town	15,272	138 (38.3%)
Muea	13,161	119 (33.3%)
Mile 16	11,321	103 (29.0%)
Total	39,754	360 (100%)
Water Tank	2,338	136 (42.4%)
Likumba	2,743	159 (49.7%)
Small Ekange	428	25 (8.0%)
Total	5509	320 (100)
Mile 4	25,859	360 (85.7%)
Isokolo	812	12 (3.0%)
Down beach	3,469	48 (11.5%)
Total	30,140	420 (100)

Data collection procedures

Data was collected by trained data collectors using pre-tested semi-structured questionnaires through face-to face interview. Structured closed and open ended questionnaire was adapted from standardized questionnaires such as the I-CAM (International questionnaire for CAM use) [13] and published articles in peer-reviewed journals. The questionnaire was divided into three sections: first section dealt with respondent's information on the socio-demographic characteristics, the second section dealt with the use of TCAM in the past 12 months and for various ailments while the third section captured information on the community use of TCAM against COVID-19 and other ailments. Out of the 1119 copies of the questionnaire distributed, 1100 were returned in the community-based survey, giving a response rate of 98%. Interview guides were designed to capture information of the types of herbal preparation used by traditional healers for COVID-19 patients as well as the signs and symptoms for COVID-19.

Data quality control

Trained data collectors (postgraduate and undergraduate students) were used for the data collection process. The training involved a systematic and comprehensive explanation of the research process through extensive discussions. Included in these were questions and answers and demonstrations. The training also enabled the data collectors to acquaint themselves with field operations techniques. Pre-testing was done to validate consistency of the questions and data collection tool.

Study variables

The outcome variables of the study were prevalence of TCAM use and types of herbal remedies used for COVID-19 in the study area. The explanatory variables were age, location, monthly family income, educational status, religion, and ethnicity.

Data management and analysis

Questionnaires from the field were cross checked each time they were brought for unfilled and unanswered questions. Coding was also checked to ensure the use of correct codes by the principal investigator. Data was entered into excel, cleaned, and analyzed using SPSS Version 25 (Statistical Package for the Social Sciences) for Windows. The results were presented using simple frequencies with percentages in appropriate tables to display the descriptive part of the result. Multivariate logistic regression was used to determine the predictors associated with TCAM use. Atlas ti 7.5 (Scientific Software Development GmbH, Berlin) was used to code and analyze types of herbal preparations used for COVID-19 as well as the signs and symptoms. All statistical tests were performed using two-sided tests at the 0.05 level of significance.

Results

Sociodemographic characteristics of respondents

A total of 1100 respondents, with a response rate of 98.3%, were studied. Table 3 describes their sociodemographic characteristics. Of the 1100 participants sampled, 420 (38.2%) (95% CI: 34.9-42.7) were drawn from Limbe, 320 (29.1%) (95% CI: 25.4-33.9) from Tiko and 360 (32.7%) (95% CI: 26.6-36.9) from Buea Health Districts following the principle of probability proportionate to size. Half (50.3%) (95% CI: 47.3-53.3) of the community members sampled were males. The mean age of the community members was 35.2 (SD=5.2) years and ranged from 21-78 years. Majority of the community members were either married or cohabiting 517(51.3%) (95% CI: 48.2-54.4), were self-employed 391(35.7) (95% CI: 31.8-40.0), had attained secondary school 572(53.7%) (95% CI: 50.7-56.6) and were Christians 1033(97.4%) (95% CI: 96.2-98.1). Majority 785(81.0%) (95% CI: 78.4-83.4) of the community members had an average monthly income less than 185 USD. Natives (Bakwerians) constituted only 202(18.5%) (95% CI: 16.3-20.4) of the sample. The mean number of people residing in a household was 5.67 (SD=1.2) and most 489 (44.7%) (95% CI: 41.8-47.7) of the households had between 4-6 members. Majority 786(76.0%) (95% CI: 73.3-78.5) of the community members resided in rural areas.

Table 3. Sociodemographic characteristics of participants.

Variables	Frequency no (%)	95% CI
Age (years)		
21-30	286 (26.2)	23.7-28.9
31-40	363 (33.2)	30.5-36.1
≥ 41	443 (40.6)	37.7-43.5
Total	1092 (100)	
Gender		
Male	538 (50.3)	47.3-53.3
Female	532 (49.7)	46.7-52.7
Total	1070 (100)	
Marital status		
Single	438 (43.4)	40.4-46.6
Married	517 (51.3)	48.2-54.4
Widow/Divorced	53 (5.3)	4.0-6.8
Total	1008 (100)	
Occupation		
Civil servant	151 (13.8)	11.9-15.9
Private sector employee	32 (2.9)	2.1-4.1
Self-employed	391 (35.7)	31.8-40.0
Student	392 (35.8)	33.0-38.9
Unemployed	129 (11.9)	8.7-15.3
Total	1095 (100)	
Religion		
Christian	1033 (97.4)	96.2-98.1
Muslim	17 (1.6)	1.0-2.5
Traditionalist	11 (1.0)	0.6-1.8
Total	1061 (100)	
Education		
No formal education	35 (3.2)	2.4-4.5
Primary	280 (26.3)	23.7-28.9
Secondary	572 (53.7)	50.7-56.6
Tertiary	179 (16.8)	14.7-19.5
Total	1066 (100)	
Ethnicity		
Native (Bakwerian)	202 (18.5)	16.3-20.4
Others	893 (81.5)	79.2-83.5
Total	1095 (100)	
Monthly income (USD)		
<185	785 (81.0)	78.4-83.4
185-370	160 (16.5)	14.3-18.9
>370	24 (2.5)	1.7-3.7
Total	969 (100)	
Household size (persons)		
1-3	348 (31.9)	29.1-34.7
4-6	489 (44.7)	41.8-47.7
>6	256 (23.4)	21.0-26.0
Total	1093 (100)	
Health district		
Buea	360 (32.7)	26.6-36.9
Tiko	320 (29.1)	25.4-33.9
Limbe	420 (38.2)	34.9-42.7
Total	1100 (100)	
Environmental setting		
Rural	786 (76.0)	73.3-78.5
Urban	99 (9.6)	7.9-11.4
Semi-urban	149 (14.4)	12.4-16.7
Total	1034 (100)	

USD: United States Dollars.

Prevalence of TCAM utilization by community members in the Fako division

Of the 1100 community respondents sampled, 754 (68.5%) (95%CI: 66.3-71.5) had used TCAM in the last 12 months, 95%CI: 66.3-71.5. A majority of the participants from the Tiko Health District 415(72.2%) (95% CI: 70.6-73.6) use TCAM therapy followed by Buea Health District 328(69.9%) (95% CI: 72.6-72.6) and lastly by the Limbe Health District 284 (63.9%) (95% CI: 62.0-66.7) (Figure 1).

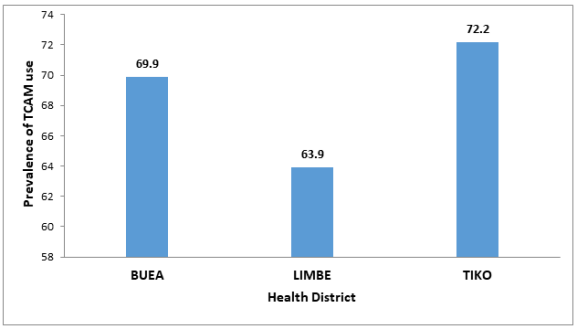

Figure 1. Prevalence of TCAM use per health district.

Category of persons using TCAM products and practitioners

Regarding the proportion of community members using TCAM, 42.8% (95% CI: 39.9-45.7) were adults, 23.8% (95% CI: 21.3-26.3) were elders, 18.6% (95% CI: 16.6-20.9) were pregnant women and 14.8% (95% CI: 12.7-16.9) were children (Figure 2).

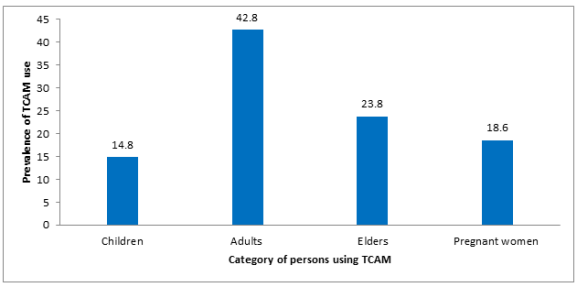

Figure 2. Category of persons using TCAM in the study communities.

Of the 754 community members using TCAM, 463 (61.4%) (95% CI: 58.5-64.3) used TCAM products (self-care and over-the-counter use), 141 (18.7%) (95% CI: 16.4-21.0) visited a TCAM practitioner and 150 (20.0%) (95% CI: 17.6-22.4) used both TCAM products and practitioner services in the past 12 months (Figure 3).

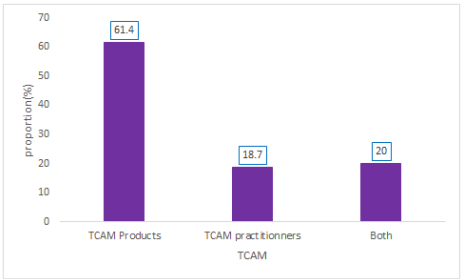

Figure 3. Proportion of community members using TCAM products/practitioner.

Based on the type of TCAM practitioner visited by the community members, 79.7% (95% CI: 77.3-82.1) visited herbalists, 14.9% (95% CI: 12.8-17.0) visited traditional bone setters, 3.4% (95% CI: 2.3-4.5) visited diviners, 1.3% (95% CI: 0.6-1.9) visited traditional birth attendants and 0.7% (95% CI: 0.2-1.2) visited massage therapists (Figure 4).

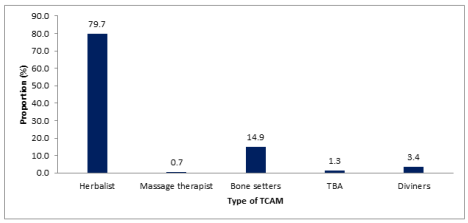

Figure 4. TCAM practitioners visited by community members.

Based on the type of diseases for which community members visited TCAM practitioners, 44.6% (95% CI: 41.7-47.5) consulted because of acute diseases (disease <3 months), 43.4% (95% CI: 40.5-46.3) visited traditional healers for chronic diseases (disease >3 months) and 12.0% (95% CI: 10.1-13.9) for health promotion and disease prevention (Figure 5).

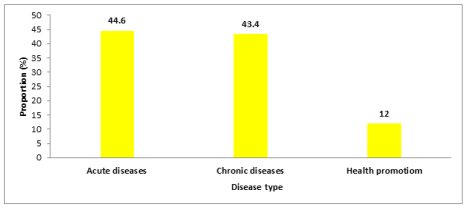

Figure 5. Types of diseases consulted for by community members.

Use of TCAM to prevent COVID-19

The proportion of community members reported they used herbal medicine to prevent COVID-19 was 24.4% (95%CI: 20.6-29.1). Of the 91 community respondents who used TCAM therapy, 22 (24.6%) (95%CI: 22.1-27.1) used garlics, 20 (22.5%) (95%CI: 20.0-24.9) used clove, 18 (20.1%) (95%CI: 17.7-22.5) used fever grass tea and 14 (15.4%) (95%CI: 17.5-17.5) used lemon tea (Figure 6).

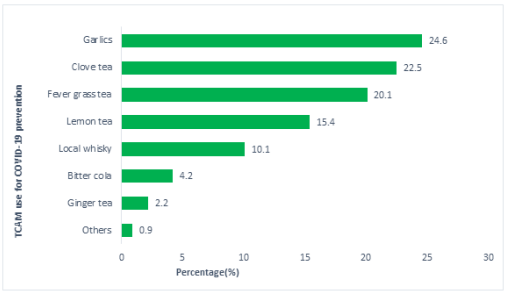

Figure 6. TCAM products used to prevent COVID-19.

Boiling was the most common methods of preparing herbal medicine for the treatment of various ailments (Table 4). Most of the herbal medicines required a mixture of many plants (concoction). The treatment duration ranged from 1 day to 7 days and the dosage was in glasses or cups (ranging from 1 glass to 3 glasses daily). The plants used were mostly from the gardens, herbalist, market, and environment or forest.

Use of herbal medicines by traditional healers to treat COVID-19

The most common signs and symptoms of COVID-19 reported by traditional healers was cough, catarrh, fever and joint pain. Boiling (concoction) was the most common methods of preparing herbal medicine for their patients. Parts of plants used ranged from leaves, roots, and seeds to whole plants (Table 5).

Table 4. Plants used by community members based on the diseases treated as derived from this study.

Disease/ailments treated	Plant species use	Common name	Part of the plant use	Dosage form used	Route of administration	Method of preparation	Duration of treatment	Frequency	Source of plants
COVID-19, lung infections/Cough	*Azadirachta indica*	Dogoyaro (Neem)	Leaves	Fluid	Mouth	Boiling-water	3days	Twice daily	Herbalist
	Allium sativum	garlic	Roots	solid	Mouth	Mouth	3days	Twice daily	Market
	Zingiber officinale	Ginger	Roots	Solid	Mouth	Chewing	2 days	Once daily	Environment
	Artemisia annua	Quinine stick	Entire plant	Fever	Boiling-others	Mouth	3days	Twice daily	Garden
	Carica papaya	Pawpaw	Leaf	Fluid	Mouth	Boiling-others	7 days	Twice daily	Environment
Stomach/GIT disorders	*Barbados aloe*	Aloe vera	Leaf	Fluid	Mouth	Alone	1day	Twice daily	Garden
	Calpurnia aurea	-	Leaf	Fluid	Mouth	Alone	3days	Twice daily	Forest
	Garcinia kola	Bitter cola	Seed	Solid	Mouth	Alone	1day	Once daily	Market
	Senna alata	Eczema leaves	Leaf	Fluid	Mouth	Boil+moringa (seed)	2weks	Thrice daily	Garden
	Spilantes filicaulis	Eye for fowl	Leaf	Solid	Mouth	Chewing	3 days	Once daily	Garden
	Ocimum basilicum L	Masepo (Bakweri)	Leaf	Solid	Mouth	Chewing	2 days	Once daily	Environment
Fever (Febrile illnesses)	*Bidens Pilosa*	Black jack	Leaf	Fluid	Mouth	Boiling-water	3 days	Twice daily	Environment
	Moringa oleifera	Moringa	Leaf	Fluid	Mouth	Boiling-water	3 days	Twice daily	Herbalist
	Cinchona officinalis	Quinine stick	Bark	Fluid	Mouth	Boiling-others	4 days	Twice daily	Market
	Cymbopogon citratus	Fever grass	Leaf	Fluid	Mouth	Boiling-others	3 days	Twice daily	Garden
	Psidium guajava	Guava	Leaf	Solid	Mouth	Chewing	1 day	Thrice daily	Environment
	Helianthus annuus L	Sun flower	Leaf	Fluid	Mouth	Boiling-others	7 days	Twice daily	Environment
	Carica papaya	Pawpaw	Leaf	Fluid	Mouth	Boiling-others	7 days	Twice daily	Environment

Table 5. Common plants used by traditional healers for the treatment of COVID-19.

Plant sp	Common name	Part of plant used	Symptoms of patient	Mode of preparation
Allium cepa	Onion	Dried leaves	Cough, Catarrh	Boiling
Aloe barbadensis	Aloe vera	Leaves	Cough, Fever	Boiling
Anthocleista djalonensis	Unbrella leaf	Bark	Cough, Fever	Boiling-others
Artemisia annua	Quinine stick	Entire plant	Fever	Boiling-others
Azadirachta indica		Leaves, stem and bark	Cough, Fever, joint pain	Boiling-others
Cola nitida	Red cola	Leaves, seeds	Headache, Fever, Myalgia	Burn macerate+palm oil
Curcuma longa	Tumeric	Roots	Cough, Fever, body weakness	Boiling
Cymbopogon citratus, Fever grass		Leaves	Joint pain, fatigue, headache	Boiling
Eucalyptus globulus	Eucalyptus	Leaves	Catarrh/Runny nose	Boiling
Eugenia caryophyllata	Clove	Seeds	Cough, Catarrh, headache	Boiling
Psidium guajava	Guava leaves	Leaves	Cough, fever, headache, sore throat	Boiling
Jatropha curcas	Big nuts plant	Leaves and fruit (nuts)	sore throat, cough	Boiling
Mangifera indica	Mango	Bark, leaves	Cough, Fever, Catarrh	Boiling
Melissa ofcinalis	Lemon balm	Leaves	Catarrh, Cough, Fever	Boiling
Moringa Oleifera	Moringa	Leaves and seeds	Cough, Catarrh	Boiling
Panax ginseng	Ginseng	Roots	Cough, Fever	Boiling
Paw paw leaves		Leaves	cough, fever	Boiling-others
Pennisetumpurpureum Shum	King grass	Entire plant	Joint pain, fatigue	Boiling-others
Pimpinella anisum	Aniseed	Fruit	Cough	Boiling
Salvia officinalis	Sage	Leaves	Sore throat, cough	Boiling
Senna alata	Ezema leaf	Leaves	Cough fever, joint pain	Boiling-others
Thymus vulgaris	Garden thyme	Leaves	Cough, Catarrh	Boiling

Predictors of TCAM use in the communities

Multiple logistic regression model showed that age more than 41 years old had 2.23 (95% CI: 1.09-4.91) times the odds of using TCAM than people between 21-30 years. A farmer had 3.05 (95% CI: 1.99-5.34) times the odds of using TCAM than people from other occupations. Haven attained tertiary education 0.33 (95% CI: 0.16-0.88) were less likely associated with TCAM use compared to those with no formal education. Community members having between 100,000-200,000 FCFA as monthly income had 2.06 (95% CI: 1.33-4.55) times the odds of using TCAM than those with income levels below 100,000 Fcfa. Participants who resided in a rural setting had 2.30 (95% CI: 1.04-3.98) times the odds of using TCAM than those residing in an urban setting, being knowledgeable on TCAM had 3.10 (95% CI: 1.54-6.45) times the odds of using TCAM than not being knowledgeable on TCAM and having a positive attitude towards TCAM had 3.47 (95% CI: 1.94-6.45) times the odds of using TCAM than those with a negative attitude towards TCAM (Table 6).

Table 6. Determinants of TCAM use in the communities.

Variable	Use of TCAM				
	TCAM use	TCAM non-use	AOR	(95% CI)	p-value
	N (%)	N (%)			
Age (years)					
21-30	177 (62.1)	108 (37.9)	1		
31-40	239 (65.8)	124 (34.2)	1.11	0.81-3.68	0.138
≥ 41	336 (75.8)	107 (24.2)	2.23	1.09-4.91	0.018*
Total	752	339			
Gender					
Male	385 (71.6)	153 (28.4)	1		
Female	354 (66.7)	177 (33.3)	0.71	0.45-2.15	0.113
Total	739	330			
Marital status					
Single	287 (65.7)	150 (34.3)	1		
Married/cohabiting	364 (70.4)	153 (29.6)	1.09	0.84-1.42	0.512
Widow/divorced	43 (81.1)	10 (18.9)	1.13	0.15-1.23	0.124
Total	694	313			
Employment status					
Employed	395 (68.8)	179 (31.2)	1		
Unemployed	359 (69.0)	161 (31.0)	1.01	0.80-3.09	0.534
Total	754	340			
Occupation					
Others	700 (66.9)	346 (33.1)	1		
Farming	54 (87.1)	8 (12.9)	3.04	1.99-5.34	0.002*
Total	754	354			
Education					
None	26 (74.3)	9 (25.7)	1		
Primary	197 (70.4)	83 (29.6)	0.85	0.74-4.23	0.173
Secondary	405 (70.9)	166 (29.1)	0.95	0.26-4.15	0.236
Tertiary	105 (58.7)	74 (41.3)	0.33	0.16-0.88	<0.001*
Total	733	332			
Household size (persons)					
1-3	228 (65.5)	120 (34.5)	1		
4-6	336 (68.7)	153 (31.3)	0.81	0.65-1.15	0.243
>6	188 (73.7)	67 (26.3)	1.01	0.87-3.21	0.255
Total	752	340			
Religion					
Christians	717 (69.5)	315 (30.5)	1		
Muslim	9 (52.9)	8 (47.1)	0.66	0.45-1.07	0.163
Traditionalist	5 (45.5)	6 (54.5)	0.78	0.54-2.35	0.235
Total	731	329			
Monthly income (USD)					
<185	527 (67.2)	257 (32.8)	1		
185-370	127 (79.4)	33 (20.6)	2.06	1.33-4.55	0.004
>370	10 (41.7)	14 (58.3)	0.41	0.23-0.98	0.012*
Total	664	304			
Ethnicity					

Native (Bakwerian)	140 (69.3)	62 (30.7)	1		
Others	614 (68.8)	278 (31.2)	0.87	0.34-2.45	0.97
Total	754	340			
Environmental setting					
Urban	558 (71.1)	227 (28.9)	1		
Semi-urban	69 (69.7)	30 (30.3)	1.12		0.541
Rural	86 (57.7)	63 (42.3)	2.3	0.89-2.35	0.022*
Total	713	320		1.04-3.98	
Knowledge on TCAM					
Incorrect	212 (64.4)	117 (35.6)	1		
Correct	542 (70.3)	229 (29.7)	3.1		0.010*
Total	754	346		1.54-6.45	
Attitude towards TCAM					
Negative	404 (66.0)	208 (34.0)	1		
Positive	350 (71.7)	138 (28.3)	3.47		0.010*
Total	754	346		1.94-6.45	

Discussion

Prevalence and pattern of TCAM use in the study communities

This study revealed some interesting findings, some of which tally with literature and some that do not tally with prevailing trends of Traditional, Complementary and Alternative Medicine (TCAM) use. This study shows the prevalence of TCAM therapy use to be 68.5% which is lower than the 74.22% reported in Ethiopia, 77.5% reported in Nigeria [14] and also less than the 80% reported by the WHO. It was however greater than the prevalence of 58.2% obtained in a systematic survey for Sub Saharan Africa [6], and greater than the 60.0% TCAM use among respondents in Zimbabwe [15] and the 592 (55.5%) reported in Malaysia [16]. Differences in prevalence may be due to differences in study sites and in the sample sizes, as most studies in the systematic survey for SSA had sample sizes less than 500. The prevalence of TCAM use in Cameroon was much higher than that reported elsewhere in the industrialized world, ranging between about 29% in the USA to about 49% in Australia [17,18].

Based on the use of TCAM therapy by health District, Tiko (72.2%) and Buea (69.9%) Health districts recorded the highest users of TCAM therapy as compared to Limbe (63.9%) and this difference was statistically significant(X=5.632, p=0.056). This might be due to differences in location with the availability and accessibility to natural plants, coupled with mount Fako in Buea which is rich in diverse plant flora compared to Limbe. The majority of TCAM users were adults (42.8%), Elders (23.8%) and pregnant women (18.6%) while children (14.8%) were the least TCAM users. These population category was slightly different from that in Ethiopia where by complementary and alternative medicine was most commonly given to the elderly (32.62%), adults (24.11%), followed by children (17.02%) and pregnant women (2.13%) [19]. The prevalence of herbal medicine use among pregnant women was 18.6% which was less than that obtained in Nigeria 36.8% but greater than the 2.13% obtained in Ethiopia [20,21]. This can be due to the differences in the spatial distribution of the sample population. TCAM is highly use among the young adults despite their level of education and access to orthodox health services, which show that the knowledge and usage of TCAM is evergreen regardless of the ancient age of TCAM. Among the users of TCAM therapy, 61.4% use TCAM products while 18.7% visited TCAM practitioners only, while 20.0% use both. Studies conducted in Africa shows the prevalence of TCAM product use in the general population ranging from 4.6% (urban settlement in Ethiopia) to 94% (semi urban settlements in Nigeria and Ethiopia) with an estimated average of 58.2% [22-27]. Some studies reported on TCAM practitioner utilization (1.2%-67% (mean, 28.8%) [28-32]. A lower prevalence (1.2%-44.1% (average, 12.6%) of TCAM practitioner services use was observed in studies with large sample sizes compared with other studies with smaller samples (37.5%-67% (mean, 53.0%) [32-37]. This was in line with our study with a large sample size of 1100 participants in the general population recording an 18.7% of TCAM practitioner use compared with smaller size sample sizes. This prevalence of TCAM practitioner use may be higher in disease specific subpopulations compared to the general population. Peltzer, et al. obtained prevalence of TCAM provider use, in Australia 34.7%, in Europe ranging from under 10% in Bulgaria, Poland and Slovenia to 35.4% in France, in Asia from 16.7% in Russia to over 50% in China mainland, the Philippines and Republic of Korea, and over 20% in the USA, Chile and South Africa [5]. The majority of the community members mostly use the services of herbalists, bone setters, followed by diviners. Similar findings were obtained in the Northwest Region of Cameroon where mostly the services of herbalists, traditional bone setters, diviners and traditional birth attendants where sorted for by the general population [38]. Our findings were similar to that in Tanzania where diviners, herbalists, traditional birth attendants, and bone setters were mostly visited by the general population [39]. Close to half of the population use TCAM for acute conditions (44.6%) or for chronic (43.6%) conditions while a small proportion use TCAM to maintain wellbeing. Our findings were not congruent with that obtained by Peltzer, et al. in which 53.7% of the participants used TCAM for treating a chronic or long-term health condition, 40.0% used TCAM in order to improve well-being and 6.3% for treating an acute illness [40]. According to Bannerman RH et al. complementary and alternative medicine is used by the people for the management of chronic conditions that are costly to society, such as chronic pain and arthritis, and more life-threatening diseases such as heart disease and cancer, which gives strength to the TCAM than orthodox, thus a need for integration to overcome the weaknesses of each [41].

Community use of TCAM to prevent COVID-19

Allium sativium (garlic)*, Azadirachta indica, Zingiber officinale, Artemisia annua, Carica papaya* were mostly used in combination with other plants to prevent COVID-19 in the communities. Our findings were similar to that obtained in previous studies i.e., in Madagascar a combination of artemisia, neem leaves, paw leaves, garlic, ginger, lime and oranges has been adopted as a notable anti-COVID agent [42]. These herbs are boiled together for 30 min and steam-inhaled. Expectedly the steam inhalation clears the lungs of the virus [42]. Our findings were also in line with that obtained in Nigeria in which phenolic compounds and antioxidant properties of these herbal remedies are known to contribute to their therapeutic effects [43]. Consumption of these Nigerian herbal remedies increase the anti-oxidant molecules and enzymes in the body and protect the cells and its membrane from being damaged by the toxic substances [43,44]. Phenolic moieties boost the body's immunity and defense against the threatening virus [45]. Scientists from the academia and Research Institutes have also supported the use of these herbal remedies as anti-COVID agents.

Herbal preparations used by traditional healers for COVID-19

This study brings out a number of herbal remedies used by traditional healers for COVID-19 which was congruent with that obtained by Fongnzossie, et al. [46] who reported the use of herbal remedies including *Azadirachta indica, Zingiber officinale, Artemisia annua, Carica papaya* for the treatment of COVID-19 with symptoms such as sore throat, cough, catarrh, fever and jointpains. *Azadiracta indica* (neem) is one of the most used plants in the treatment of malaria in many parts of Africa and Asia where malaria is endemic. Roger, et al. provides proof that the neem plant can provide anti-viral effects for COVID-19 [47]. Similar plants species were reported as potential agents for COVID-19 in Ethiopia [48]. These included *Lepidium sativum, Azadirachta indica, Osyris quadripartite* and *Allium sativum* [48-51]. *Citrus aurantium* L., *Citrus limon* (L.), *Capsicum annuum* L., *Eucalyptus globulus, Osyris quadripartite, Amaranthus hybridus* Linn were also cited as effective against COVID-19 [51].

Determinants of TCAM use in the general population

Age above 41 years, farming as occupation, having attained tertiary education, having a monthly income above 185 USD, residing in a rural setting, being knowledgeable on TCAM and having a positive attitude towards TCAM were strongly associated with the use of TCAM. However, age group was different compared with other study as ages between 18-28 and 29-38 years were associated with the use of TCAM in Ethiopia [52]. Similar findings were obtained in the Bui-Division of Cameroon where most patients reported visiting the traditional healers because of the low cost (69%) and low level of income [53].

Our findings were also congruent with Karl, et al. in which middle age, being a female, lower educational status, not having a religious affiliation, larger household size, not having a health insurance, could not pay for medical treatment when needed it were associated with TCAM provider use [40]. Also the authors showed that having a chronic condition or disability, and having positive attitudes towards TCAM (TCAM being better than mainstream medicine and TCAM does not promise more than it can deliver) significantly increased the odds of TCAM provider use. However, our findings were different from that obtained from Cambodia whereby being a female (AOR=1.42, 95% CI=1.12-2.67), haven completed less schooling (AOR=0.66, 95% CI=0.45-0.96), unemployed or homemakers (AOR=0.23, 95% CI=0.13-0.52) and have a gastrointestinal illness (AOR=0.49, 95% CI=0.39-0.62) were associated with TCAM use [54]. Findings were similar to that obtained in Ethiopia whereby age (P=0.02), especially age group between 18 and 28 and 29 and 38 ((P=0.02 and 0.004, resp.), educational status was also significantly associated with TCAM use (P=0.00). Moreover, occupation (P=0.00) and effectiveness of TCAM (0.002) were found to be associated with TCAM use [52]. Our findings were however different from study in the general population in Ghana which shows that TCAM use was predicted by having low-income levels (Odds Ratio (OR) 2.883, Confidence Interval (CI) 1.142-7.277), being a trader (OR 2.321, CI 1.037-5.194), perceiving TCAM as effective (OR 4.430, CI 1.645-11.934) and safe (OR 2.730, CI 0.986-4.321), good affective behavior of traditional medical practitioner (TMP) (OR 2.943, CI 0.875-9.896) and having chronic ill-health (OR 3.821, CI 1.213-11.311) were associated with TCAM use [55]. Differences in the predictors of TCAM use may be due to difference in study population.

Prevalence of TCAM use was measured within a standard pattern of TCAM use within the past 12 months. As a limitation to this study there is the possibility of recall bias and thus an under or over reporting of prevalence for TCAM use. Thus to overcome this, further questions were asked and a large sample size to overcome such limitations.

Conclusion

Our study found that TCAM are broadly used among community members in the Fako Division of Cameroon. More than half of the population having used TCAM in the last 12 months. The most commonly used TCAM was herbals. *Allium sativum, Azadirachta indica, Zingiber officinale, Artemisia annua* were most commonly used TCAM for COVID-19. Occupation, level of education, monthly income, environmental setting, good knowledge and positive attitudes were associated with TCAM use. Since the importance of TCAM is well accepted and used by the population and officially supported by WHO, integration of TCAM into the primary health care system should be further encouraged through policy, efficacy and safety and supported by more specific research in Cameroon. Based on our findings it can be concluded that medicinal plants can be promising resources for the management of COVID-19 based on population utilization and by traditional healers on their patients for COVID-19 which can further be tested for efficacy and toxicity as potential COVID-19 regimens. Also, policies and healthcare interventions sensitive to TCAM should be tailored mindful of the wide use of TCAM products and traditional healers in the general population of Southwest Region of Cameroon.

Declarations

Ethics approval and consent to participate

Ethical clearance was obtained from the Faculty of Health Sciences Institutional Review Board (FHSIRB) (Reference Number: 2018/952-03) of the University of Buea. Following the review and approval of the research proposal by FHSIRB, an administrative authorization was obtained from the Regional Delegation of Public Health, South West Region. Each study participant agreed to participate voluntarily. Participants were allowed to discontinue the interview when they needed. All participants of the study declared their willingness to participate and approved by their written and verbal consents. Participant's information was kept confidential and codes were used on the questionnaire and interview guides.

Consent for Publication

Not applicable.

Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing Interests

This study was conducted independent of employment and the author declares no financial assistance was given nor any financial gain is promised as a result of publication. The authors declare that they have no competing interests.

Authors' Contribution

ACW participated in the conception, designing, conducted the data collection, analysis and drafting of manuscript. NNT participated in the drafting, read and corrected the manuscript; ANJC participated in design, supervision, drafting of the manuscript and substantially revised the manuscript for academic content. NDS participated in the conception, oversaw the data collection process and analysis, supervised the work and substantially revised the manuscript for academic content. All authors read and approved the final copy of the manuscript.

Acknowledgement

The authors will like to express their sincere appreciation to the community respondents, the community leaders including some local chiefs that were visited as bottle necks and the Regional Delegation of Public Health for the South west Region who have contributed in making this study possible and successful.

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Cite this article: Ayima CW, et al. Prevalence and Predictors of Traditional, Complementary/Alternative Medicine Use, and Types of Herbal Remedies used for COVID-19 in the South West Region of Cameroon. J Biol Today's World, 2021, 10(6), 001-010.