



# **Prevalence and Determinants of Complementary and Alternative Medicine Use in Subjects with Hypertension in a Tertiary Centre in South East Nigeria**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

## **Article Information**

### **Open Peer Review History:**

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/115024>

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## ABSTRACT

**Objective:** To study the prevalence and determinants of the use of complementary and alternative medicine (CAM) in patients with hypertension (HTN).

**Methods:** Two hundred and fifty patients visiting the medical outpatient Clinic at Enugu State University Teaching Hospital in Southeast Nigeria were interviewed. Information was obtained on the patients' demographics, type(s), duration, pattern and disclosure of CAM use, sources of recommendation and reasons for using CAM.

**Results:** The prevalence of CAM use was 4.4%. The most commonly used CAM was biologic-based therapy; bitter leaf (*Vernonia amigdalina*) (90.9%), Ginger (90.9%), garlic (72.7%), Cinnamon (45.5%), bitter kola (*Garcinia kola*) (36.4%), lemon grass (9.1%), green tea (9.1%), guava (9.1%) and mango leaves (9.1%). This was followed by manipulative and body-based (exercise and relaxation), and then spiritual method (fasting and prayer). Most subjects used CAM concurrently with orthodox medicine (63.6%), and neither knew the constituent of what they were taking (72.7%) nor revealed to their healthcare provider (HCP) that they were on CAM (81.8%). The most common reason for the non-disclosure is that the HCP will discourage them (66.7%). Most subjects used CAM to manage hypertension (54.5%).

**Conclusion:** A proportion of patients receiving orthodox medication for HTN also use CAM. A better treatment outcome would emanate from education of HCP and the general public on CAM use, legislation on the control of unwholesome and harmful use of CAM, and well-funded research on proven and potential CAM modalities for the benefit of humanity.

**Keywords:** Hypertension; complementary and alternative medicine; prevalence.

## 1. INTRODUCTION

"Hypertension (HTN) is associated with a large global burden of cardiovascular disease (CVD) and premature death. In 2015, the estimated number of all-cause deaths that were associated with systolic blood pressure (BP)  $\geq 110$ –115 mmHg was 10.7 million (19.2% of all deaths) and with systolic BP  $\geq 140$  mm Hg was 7.8 million (14.0% of all deaths)" [1]. "Essential HTN, which is not curable, is the most frequent type of HTN in adults (95%) and is diagnosed when there is sustained elevation of BP at  $\geq 140/90$  mm Hg and when no etiology can be determined" [2,3]. "Side effects of commonly used antihypertensives include dizziness, fatigue, headache, confusion, depressed mood, chest pain, difficulty breathing, constipation, diarrhoea, swelling in parts of the body, reduced sex drive, erectile dysfunction, persistent cough, increased frequency of urination, rash and difficulty sleeping" [4,5] These side effects and the incurable nature of the ailment markedly reduce adherence to antihypertensive medications, with the attendant risk of increased cardiovascular morbidity and mortality [6,7]. This has also encouraged

hypertensive subjects to seek other seemingly safer and more effective treatment modalities of treatment.

"The frequency of utilization of complementary and alternative medicine (CAM) is increasing worldwide, and is well documented in both African and global populations to be between 20 – 80%" [8,9]. "The National Institute of Health (NIH) classifies CAM into five major categories: *alternative medical systems* (e.g. traditional oriental medicine, acupuncture, Ayurveda, naturopathy, homeopathy, Native American healing, Tibetan medicine), *mind-body interventions* (meditation, hypnosis, dance, art and music therapy, spiritual healing, and prayer), *biologic – based therapies* (herbal medicine and dietary supplements, special diets, and orthomolecular medicine), *manipulative and body-based methods* (chiropractic, massage, the Feldenkrais method, other "body work" systems, and aspects of osteopathic medicine such as craniosacral work), and *energy therapies* (reiki, therapeutic touch, and other methods of affecting the "bioelectric field" of the body)" [10]. "There is limited data on the use of CAM among subjects

with HTN in South East Nigeria. Previous studies on CAM use were done on cancer patients at a tertiary centre in Enugu” [11], another was a community-based study done among adult residents of 3 local governments in Enugu urban [12], while a recent one was on DM subjects [13]. This study sought to determine the prevalence and correlates of CAM use among subjects with HTN in a referral centre in Enugu, Southeast Nigeria.

## 2. METHODS

This cross-sectional study was conducted at the Medical Outpatient clinic of the ESUT Teaching hospital, Parklane Enugu in South-East Nigeria between 1<sup>st</sup> November 2023 to 30<sup>th</sup> January 2024. Subjects with HTN who were aged 18 years and above were recruited for the study. “A validated interviewer-administered questionnaire was used to collect data from each participant. The questionnaire was developed from previous studies on CAM use” [14,15]. “Sociodemographic data on age, gender, residence, tribe, marital status, educational background, occupation, income, and religion was obtained from each participant. The questionnaire also had a section on the type, form and method of preparation of CAM products consumed, co-administration of CAM with conventional medicine, reasons for CAM use, knowledge and duration of HTN, frequency of clinic visits, presence of complications of HTN, and disclosure of CAM use to health care providers. The questions were both open and closed ended. For participants who were not literate, the questionnaire was interpreted to them in the local dialect. CAM use was considered in this study as the use of it either as a complement or an alternative therapy according to the classification of CAM by the National Institute of Health [10]. All outpatients 18 years and older, diagnosed with HTN for one year or more, and who reported to the hospital for treatment were included. Participants were excluded if they were diagnosed with HTN for less than one year, were below the age of 18 years at the time of diagnosis, had incomplete

data on their medical records, or had diabetes mellitus (DM)” [50].

## 3. RESULTS

Table 1 shows that more than half of the study participants were in the middle age and were female. The participants were predominantly Christians, of the Igbo tribe extraction and were resident in urban area. Most were married, and about half were businessmen/women while about a third were civil servants. About a third of the study participants comprised of people with secondary and primary education while a quarter had tertiary education. About two thirds of the respondents earned less than 100,000 Naira, had duration of HTN of 1 to 5 years and a positive family history of HTN. Majority of the patients perceive hypertension as preventable, curable, stress-induced, associated with poor sleep and familial.

Table 2 shows that the prevalence of Cam use among hypertensive patients is 4.4%. CAM duration is less than a year for about half of the patients, and 1 to 2 years for about a quarter. The type of CAM mostly taken by the patients are bitter leaf, ginger, garlic and cinnamon. Most of the CAM users reported that they were introduced it by their friends, and neither used it before the diagnosis of hypertension, nor knew the constituent of the CAM they are taking. About two thirds of the subjects used CAM concurrently with conventional medicines, while less than a third used it alternatively. Their major reasons for use of CAM included to manage hypertension in about half of the subjects while about a third used it to maintain body health. Poor clinic visits while on CAM were reported by about three quarters of the patients, while most subjects did not disclose that they were on CAM, with about two thirds not disclosing because of fear of discouragement by the HCP.

Table 3 shows no significant association between Socio-demographic factors of the hypertensive patients and CAM use ( $p > 0.05$ ).

**Table 1. Socio-demographic characteristics of the study participants**

	Frequency	Percent
<b>Age</b>		
< 45 years	36	14.4
45-64 years	131	52.4
≥ 65	83	33.2
<b>Gender</b>		
Male	103	41.2

	<b>Frequency</b>	<b>Percent</b>
Female	147	58.8
<b>Religion</b>		
Christianity	249	99.6
Traditional	1	0.4
<b>Tribe</b>		
Igbo	249	99.6
Igala	1	0.4
<b>Residence</b>		
Urban	193	77.2
Rural	57	22.8
<b>Marital status</b>		
Single	21	8.4
Married	228	91.2
Separated	1	0.4
<b>Occupation</b>		
Business/trader	121	48.4
Civil servant	77	30.8
Artisan	15	6.0
Farmer	27	10.8
Unemployed	10	4.0
<b>Educational background</b>		
Illiterate	17	6.8
Primary	88	35.2
Secondary	82	32.8
Tertiary	63	25.2
<b>Monthly income</b>		
< 100000 naira	198	79.2
100000-500000 naira	52	20.8
>500000 naira	0	0.0
<b>Duration of hypertension</b>		
<1 year	0	0.0
1-5 years	164	65.6
5-10 years	62	24.8
>10 years	24	9.6
<b>Family history of hypertension</b>		
Yes	157	62.8
No	93	37.2
<b>Knowledge of hypertension</b>		
Spiritual problem	12	4.8
Preventable	210	84.0
Curable	181	72.4
Stress	205	82.0
Obesity	49	19.6
Poor sleep	178	71.2
Runs in the family	194	77.6
High salt intake	107	42.8
Bad luck	7	2.8
Poison	3	1.2

**Table 2. Use of CAM**

	<b>Frequency</b>	<b>Percent</b>
<b>Currently on CAM</b>		
Yes	11	4.4
No	239	95.6
<b>CAM duration</b>		
<1 year	5	45.5

	Frequency	Percent
1-2 years	3	27.3
2-5 years	1	9.1
>5 years	2	18.2
<b>Biologic-based therapy (BBT)</b>		
Lemon grass (Cymbopogon)	1	9.1
Bitter leaf (Vernonia amygdalina)	10	90.9
Ginger	10	90.9
Garlic	8	72.7
Cinnamon	5	45.5
Bitter kola (Garcinia kola)	(4	36.4
Green tea	1	9.1
Guava leaves	1	9.1
Mango leaves	1	9.1
<b>Method of preparation</b>		
Heating	2	18.2
Boiling	3	27.3
Cooking	1	9.1
Chewing	1	9.1
<b>Spiritual method</b>		
Fasting	2	18.2
Prayer	2	18.2
Holy water	0	0.0
<b>Manipulative and body based</b>		
Exercise	5	45.5
Relaxation	6	54.5
Massage	0	0.0
<b>Who introduced you to CAM?</b>		
Friend	6	54.5
Media	2	18.2
CAM practitioner	1	9.1
<b>CAM use before diagnosis of HTN</b>		
Yes	2	18.2
No	9	81.8
<b>Do you know the constituent of the CAM you are using?</b>		
Yes	3	27.3
No	8	72.7
<b>Pattern of CAM use</b>		
Concurrently with conventional medicines	7	63.6
Alternative use	3	27.3
Stopped conventional medication when using CAM	1	9.1
<b>Reasons for use of CAM</b>		
To manage hypertension	6	54.5
To manage complications	2	18.2
To reduce symptoms	2	18.2
To maintain body health	4	36.4
Improve energy	2	18.2
Emotional well being	1	9.1
To reduce expenditure	1	9.1
<b>Clinic visit while on CAM</b>		
No	3	27.3
Yes	8	72.7
<b>Disclosure to your HCP</b>		
Yes	2	18.2
No	9	81.8
<b>Reason for non-disclosure</b>		
HCP did not ask	2	22.2
Never thought of it	1	11.1
HCP will discourage me	6	66.7

**Table 3. Association between socio-demographic factors of the hypertensive patients and CAM use**

	Currently on CAM use		P value	OR	95% C.I for OR
	Yes	No			
<b>Age</b>					
<45 years	2 (5.6)	34 (94.4)	0.716	1.340	0.277 – 6.470
≥45 years	9 (4.2)	205 (95.8)			
<b>Gender</b>					
Male	1 (1.0)	102 (99.0)	0.058	0.134	0.017 – 1.066
Female	10 (6.8)	137 (93.2)			
<b>Residence</b>					
Urban	8 (4.1)	185 (95.9)	0.718	0.778	0.200 – 3.036
Rural	3 (5.3)	54 (94.7)			
<b>Marital status</b>					
Single/separated	2 (9.1)	20 (90.9)	0.276	2.433	0.492 – 12.042
Married	9 (3.9)	219 (96.1)			
<b>Occupation</b>					
Employed	10 (4.2)	230 (95.8)	0.395	0.391	0.045 – 3.396
Unemployed	1 (10.0)	9 (90.0)			
<b>Educational level</b>					
None/primary	2 (1.9)	103 (98.1)	0.122	0.293	0.062 – 1.387
Post primary	9 (6.2)	136 (93.8)			
<b>Income</b>					
<100,000 naira	6 (3.0)	192 (97.0)	0.051	0.294	0.086 – 1.004
≥ 100,000 naira	5 (9.6)	47 (90.4)			
<b>HTN duration</b>					
≤5 years	10 (4.4)	216 (95.6)	0.953	1.065	0.130 – 8.696
>5 years	1 (4.2)	23 (95.8)			

#### 4. DISCUSSION

More than half of the participants in this study were female, buttressing the fact females have better health-seeking habits than men [16]. Apart from a considerable number who feel that hypertension is curable, and the few who associated it with spiritual problem, bad luck and poison, our patients generally had good knowledge of HTN regarding its aetiology and risk factors. The prevalence of CAM use among hypertensive patients in this study was 4.4%. A multicentre prospective study in Lagos, South-west Nigeria on 1,325 hypertensive patients found that 21% of the subjects feel strongly that they will achieve better blood pressure control and possible cure using CAM [17]. Another study done on 500 ambulatory hypertensive patients in the clinic of a secondary health care facility in Maiduguri, Northern Nigeria, found that 24% of the respondents were using herbal medicines [18]. A community-based study on 440 hypertensive subjects in Ibadan, South-west Nigeria found that 29% used CAM in the management of their hypertension [14], while another study carried out among 225 subjects in the hypertension clinic of a University Teaching

Hospital in Lagos, South-west Nigeria found that the prevalence of CAM use was 39.1% [19]. In other countries in Africa, other researchers also found varying prevalence; Ghana 19.5% [20], South Africa 21% [21], Morocco 80% [22], Ethiopia 67.8% [23] and 33.5% in Kenya [24]. Beyond Africa, the prevalence was 40% in USA [25], 48.5% in Australia [26], 85.7% in Palestine [27] and 49.8% in India [28]. The varying differences in the prevalence could have been from tribal, cultural, ethnic, regional, racial, religious, socioeconomic differences between subjects, as well as differences in methodology among researchers. Other possible contributors to this variation include the different degrees of CAM regulation in different countries and the incorporation of CAM in orthodox medical practice and training, as well as insurance cover for CAM by some countries [29,30,31]. The very low prevalence found in this study could have been from the fact that, like in previous studies, most patients do not reveal to their healthcare provider (HCP) that they were on CAM [13,18,20,27,28]. The commonest reason for the non-disclosure in this study is the fear of discouragement, followed by the lack of enquiry by the attending HCP. The whole situation could

have been worsened by the fact that this study was hospital-based and the data was collected by doctors. Other researchers also found similar reasons for this non-disclosure by subjects [13,20,32].

The most commonly used CAM in this study is biologic-based therapy comprising bitter leaf (*Vernonia amigdalina*), ginger, garlic, cinnamon, bitter kola (*Garcinia kola*), lemon grass, green tea, guava and mango leaves which are all known to reduce blood pressure [33,34,35,36,37,38,39,40]. Most herbal medicines control and reduce HTN by exerting antioxidant, anti-inflammatory, and anti-apoptosis properties, stimulating the endothelial nitric oxide synthase-nitric oxide (eNOS-NO) signaling pathway, suppressing endothelial permeability, and activating angiogenesis [41]. Specifically, the components of garlic inhibit angiotensin converting enzyme (ACE) activity, diminish Angiotensin II-induced vasoconstrictor responses, prevent vascular smooth muscle cell (VSMCs) proliferation in smooth muscles, antagonize endothelin-1 prompted vasoconstriction, and inhibit the stimulation of nuclear factor-kappa B (NF-Kb) [35]. Moreover, ginger is considered to be a new Angiotensin II type 1 receptor antagonist while the antihypertensive effects of lemon grass has been ascribed to citral, its active phytochemical compound [36,40].

However, it should be borne in mind that the use of CAM is also fraught with many problems including drug-to drug interactions, side effects, dosing, limited knowledge of the various constituents of each CAM, and the possibility of causing further complications in the subjects taking them [13]. This problem is further compounded by weak regulation of the production, distribution, and use of non-orthodox remedies in Nigeria [42]. The second most common CAM in this study is manipulative and body-based therapy which is composed of relaxation and exercise. Exercise and relaxation are established to be effective in the prevention, treatment, and control of HTH [43,44]. Bringing up the rear in CAM modalities used by subjects in this study is spiritual methods (fasting and prayer). Mind/body interventions such as prayer and fasting were utilised by many CAM users in this study, which is consistent with similar findings in studies conducted in Ethiopia [23,45] and in the USA, especially among the non-white population [46]. This modality of CAM is cheap and easy to undertake, and may be effective

considering the fact that Wellness encompasses 8 mutually interdependent dimensions: physical, intellectual, emotional, social, spiritual, vocational, financial, and environmental [47]. Holistic "wellness" entails attending to all the aforementioned factors, without which one's health may be hampered in one way or the other.

In this study, the use of CAM was neither associated with socio-demographic factors nor with the duration of hypertension. This was similar to the findings by other researchers in Nigeria and India [19,48]. However, a community-based study among 440 subjects in Ibadan Southwest Nigeria found that gender, marital status and occupation were significantly associated with CAM use [14]. Similarly, a study on 450 subjects done in a general hospital in Debre Tabor town, Northwest Ethiopia found that age, residence, educational and income status, duration and family history of HTN positively correlated with CAM use [23]. Also, a population-based study done on 9,187 subjects in California USA found that age, gender, race, ethnicity and income associated with the use of CAM [49]. The differences with our studies could have been from regional, tribal, ethnic, racial and socioeconomic factors, as well as differences in methodology by other researchers.

## 5. CONCLUSION

1. The prevalence of CAM use by hypertensive subjects in this centre is relatively low.
2. Most subjects use CAM concurrently with orthodox medication.
3. Most participants in this study do not disclose the fact that they use CAM to their HCP, and were oblivious of the constituents of the CAM they were taking.

## 6. RECOMMENDATIONS

1. Awareness programs targeting HCPs and patients on the use of CAM should be created to educate them on the various aspects of this treatment modality. This will ensure that the HCPs have the requisite knowledge about CAM for more effective communication with patients.
2. Guidelines should be created and regulatory bodies empowered to check the unwarranted and harmful use of CAM.
3. Research on potential and proven beneficial medicinal plants should be

funded by the government and various organizations to explore different mechanisms of favourable metabolic effects these CAMs may harbor.

## CONSENT AND ETHICAL APPROVAL

Informed consent was obtained from each study participant who agreed to participate after the study had been explained in English or local dialect. The approval for the study was obtained from the ethics and research committee of the hospital.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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