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Research Article

Prevalence and Determinants of Complementary and Alternative Medicine (CAM) Use Among Subjects with Diabetes Mellitus (DM) in a Tertiary Institution in South East Nigeria

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Abstract

Background: There is limited data on the use of complementary and alternative medicine (CAM) among patients with diabetes mellitus (DM) in Nigeria. This study aims to examine the prevalence, types, and determinants of CAM use among T2DM patients in Southeast Nigeria.

Methods: This is a cross-sectional study of 250 diabetic patients who attended the DM clinic in a tertiary institution in South East Nigeria. Each participant completed a questionnaire which had sections on demography, diabetes-related information, and CAM use details. Data collated was analyzed using SPSS version 26.0 for windows.

Results: The prevalence of CAM use in this study was 34%. After adjustment; the logistic regression results showed that CAM use was significantly associated with age, and place of residence. The most commonly used type of CAM by participants were bitter leaf (Vernonia amygdalina) (56.5%), followed by bitter cola (Garcinia kola) (47%), scent leaf (African basil) (40%), moringer (20%), utazi (*Gongronema latifolium*) 17.7%), and aloe vera (7.1%) before the rest. The majority of CAM users were referred to use CAM by friends (68.2%), family members (25.9%), or media (14.1%). Most subjects (75.5%) used CAM concurrently with orthodox medications and only 32.9%% knew the constituents of the CAM they were using. However, gender, marital status, occupation, educational level, income, and DM duration did not significantly associate with CAM use in this study.

Key words. Complementary and Alternative Medicine. Diabetes Mellitus

Conclusions: The prevalence of CAM use was high among diabetics. Further studies to isolate and purify the constituents responsible for the anti-glycemic activity of each compound may be needed in the future.

INTRODUCTION:

Diabetes mellitus is one main segment of chronic non-communicable diseases with increasing prevalence, that is more pronounced in developing countries[1]. Overall, the global burden of diabetes had increased significantly since 1990. Both the trend and magnitude of diabetes related diseases burden varied substantially across regions and countries. In 2017, global incidence, prevalence, death, and disability-adjusted life-years (DALYs) associated with diabetes were 22.9 million, 476.0 million, 1.37 million, and 67.9 million, with a projection to 26.6 million, 570.9 million, 1.59 million, and 79.3 million in 2025, respectively[2]. The current prevalence in Nigeria is between 1.7-12%[3]. This increasing prevalence is fueled by rapid urbanization, nutrition transition, increasingly sedentary lifestyles, and the worldwide rise in obesity[4]. The general consensus on treatment of type 2 diabetes is that life style management is at the forefront of therapy options. In addition to exercise, weight control and medical nutrition therapy, oral glucose lowering drugs, and injections of insulin are the conventional therapies[5]. Oral medications are indicated in patients in whom diet and exercise fail to achieve the desired glycemic control[6]. Although initial response may be good, oral hypoglycemic drugs may lose their effectiveness in a significant percentage of patients[6]. The drug categories include sulfonylurea, biguanide, alpha-glucosidase inhibitors, thiazolidinedione, meglitinide, dipeptidyl peptidase-4 (DPP-4) inhibitors, Dopamine-2 agonist (example bromocryptin), Sodium-glucose transporter (SGLT) 2 inhibitors and Glucagon-like peptide-1 (GLP-1) receptor agonists. The side effects of these medications include weight gain from hyperinsulinaemia for sulfonylureas, lactic acidosis and depletion of vitamin b_{12} by biguanides, diarrhoea with the use of alpha glucosidase inhibitors, while thiazolidinediones may increase LDL-cholesterol level as well as being associated with weight gain and osteoporosis[7,8,9,10]. DPP-4 inhibitors are associated with increased serum creatinine, acute pancreatitis, headache, hypoglycemia, and urinary tract infection while SGLT-2

inhibitors could cause fungal vaginosis, urinary tract infection, increased urine output, bone fracture (8%), and renal impairment[11]. Bromocryptin is associated with hypotension, headache, psychosis, fibrosis (retroperitoneal, pleural, cardiac valve) and cardiovascular incidents (valvular damage, stroke, myocardial infarction)[12].

Limitation of currently available oral antidiabetic agents either in terms of efficacy/safety coupled with the emergence of the disease into global epidemic have encouraged worldwide increase in the use of alternative therapy to manage diabetes[5,13,14]. Alternative therapies with antidiabetic activity have been researched relatively, extensively, particularly in India[5]. Recently, medicinal plant-based bioactive compounds have been found to be a good choice for better diabetes management with fewer side effects[15]. Overall research indicates that most people who use CAM therapies do so in addition to, rather than in place of conventional medical treatment[16,17]. There is limited data on the use of CAM in subjects with T2DM in South-East Nigeria. Previous studies were conducted on the general population[18]. as well as on cancer patients in another tertiary institution in Enugu[19]. This study aimed to determine the prevalence and determinants of CAM use among T2DM subjects in a tertiary institution in Enugu, South-East Nigeria.

METHODS

This cross-sectional study was conducted at the DM clinic of the ESUT Teaching hospital, Parklane Enugu in South-East Nigeria between 1st September to 31st October 2023. Diabetic subjects aged 30 years and above were recruited for the study. 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. A validated interviewer-administered questionnaire was used to collect data from each participant. The questionnaire was developed from previous studies on CAM use. It was used to obtain sociodemographic data on age, gender, residence, tribe, marital status, education, income, and religion. Data were also obtained on the forms of CAM products consumed, co-administration of CAM with conventional medicine, reasons for CAM use, duration of DM, frequency of clinic visits, presence of DM complications, 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. All outpatients 30years and older, diagnosed with T2DM for one year and more, and who reported to the hospital for treatment were included. Participants were excluded if they were diagnosed with T2DM for less than one year or were below the age of 30years at the time of diagnosis.

STATISTICAL ANALYSIS:

Data collated was analyzed using SPSS version 26.0 for windows. Descriptive statistics which include frequency and percentages were used to summarize categorical variables while means and standard deviations were obtained for continuous variables. Associations between categorical variables were done using logistic regression. P-value < 0.05 was considered significant and results were presented in tables.

RESULTS:

Table 1: Socio-demographic characteristics of the study participants

	Frequency	Percent
Age		
Less than 45 years	23	9.2
45-64 years	138	55.2
Greater than or equal to 65	89	35.6
Gender		
Male	65	26.0
Female	185	74.0
Religion		
Christianity	249	99.6
Atheist	1	0.4
Tribe		
Ibo	248	99.2
Igala	2	0.8
Residence		
Urban	192	76.8
Rural	58	23.2
Marital status		
Single	9	3.6
Married	231	92.4
Separated	10	4.0
Occupation		
Civil servant	43	17.2
Business/ trader	82	32.8
Farmer	17	6.8
Artisan	25	10.0
Unemployed	83	33.2
Educational background		
Illiterate	30	12.0
Primary	90	36.0
Secondary	60	24.0
Tertiary	70	28.0
Monthly income		
Less than 100000 naira	196	78.4
100000-500000 naira	53	21.2
Greater than 500000 naira	1	0.4
Dm duration		
Less than a year	28	11.2
1-5 years	89	35.6
5-10 years	48	19.2
Greater than 10 years	85	34.0
Frequency of clinic visits		
Monthly	104	41.6
twice monthly	89	35.6
3-6 monthly	27	10.8
greater than six monthly	30	12.0
Type of conventional treatment		
Orals	244	97.6
Insulin	6	2.4
Presence of DM complications		
No	92	36.8
Yes	158	63.2

Table 1 shows that more than half of the study participants (55.2%) were aged between 45 and 64 years, with about three quarters being female. Almost all the participants were Christians and of Igbo extraction. About three quarters reside in urban areas while about a third were unemployed. Most of them (92.4%),17.2% civil servants, 32.8% business/traders, 6.8% farmers and 10% artisans. The study participants comprised of people with tertiary (28%), secondary (24%) and primary (36%) levels of education. About three quarters earn less than 100,000 Naira while about a third them have DM duration of 1 to 5 years and more than 10 years. Less than half of the DM patients (41.6%) visit the clinic monthly while 35.6% visit twice monthly. Most of them (97.6%) take oral type of conventional treatment while 63.2% have DM complications.

Table 2: Use of CAM

	Frequency	Percent
Currently on CAM		
No	165	66.0
Yes	85	34.0
CAM duration		
less than a year	19	22.4
1-2 years	23	27.1
2-5 years	15	17.6
greater than 5 years	28	32.9
Type of CAM		
Bitterleaf (Vernonia amyghdalina)	48	56.5
Scent leaf (African basil)	34	40.0
Bitter cola	40	47.0
Garlic	9	10.6
Moringa	17	20.0
Supplements	5	5.9
Olive oil	3	3.5
Onion	4	4.7
Date	2	2.4
Honey	0	0.0
Spiritual healing	1	1.2
Aloe vera	6	7.1
Ginger	1	1.2
Utazi (Gongronema latifolium)	15	17.7
Who introduced you to CAM		
Friends	58	68.2
Media	12	14.1
Family members	22	25.9
Medical Journal	3	3.5
CAM use before DM diagnosis		
Yes	33	38.8
No	52	61.2
Do you know the constituent of the CAM you are using		
Yes	28	32.9
No	57	67.1
Pattern of CAM use		
Concurrently with conventional medicines	64	75.3
Alternate use	10	11.8
Stopped conventional meds when using CAM	10	11.8
Reduce dose of conventional treatment	85	100.0
Reasons for using CAM		
To manage DM	59	69.4
To manage DM complications	4	4.7
To reduce symptoms	3	3.5
To maintain body health	27	31.8
Emotional well-being	8	9.4
To achieve cure	3	3.5
Clinic visit while on CAM		
Yes	77	90.6
No	8	9.4
Disclosure to your HCP		
Yes	11	12.9
No	74	87.1
Reason for nondisclosure		
HCP did not ask	57	67.0
Never thought of it	11	12.9
HCP will discourage me	9	10.6
HCP will be angry	0	0.0
CAM is safe	7	8.2
No sufficient time with the HCP	0	0.0
HCPs don't have knowledge of CAM	1	1.2

Table 2 shows that the prevalence of Cam use among the DM patients is 34%. CAM duration is greater than 5 years for about a third, 1 to 2 years for 27.1% and less than a year for 22.4% of the subjects. More than half of the participants took bitter leaf while slightly less than half took bitter cola. The rest took Scent leaf (40%), Moringa (20%), Utazi (17.7%) and Garlic (10.6%) in that order. The table shows that two thirds of the participants (68.2%) were introduced to CAM by their friends while about a quarter (25.9%) were introduced by family members. About a third of the participants used CAM before DM diagnosis and knew the constituent of the what they are using. All the DM patients who use CAM reduce dose of conventional treatment, while about three quarters used CAM concurrently with conventional medicines while 11.8% each used as alternatives and stopped conventional medications when using CAM. Major reasons for using CAM includes to manage DM (69.4%) and to maintain body health (31.8%). Most of the patients (90.6%) visit clinic while on CAM while 12.9% disclose it to their HCP. The major reason for non-disclosure to their HCP is that the HCP did not ask.

Table 3: Association between Socio-demographic factors and CAM use

	Currently on CAM use				
	Yes	No	P value	OR	95% C.I for OR
Age					
<45 years	2 (8.7)	21 (91.3)	0.017	0.165	0.038 – 0.722
≥45 years	83 (36.6)	144 (63.4)			
Gender					
Male	18 (27.7)	47 (72.3)	0.214	0.674	0.363 – 1.254
Female	67 (36.2)	118 (63.8)			
Residence					
Rural	30 (51.7)	28 (48.3)	0.001	2.669	1.461 – 4.876
Urban	55 (28.6)	137 (71.4)			
Marital status					
Single/separated	4 (21.1)	15 (78.9)	0.223	0.494	0.159 – 1.537
Married	81 (35.1)	150 (64.9)			
Occupation					
Employed	56 (33.5)	111 (66.5)	0.825	0.939	0.540 – 1.635
Unemployed	29 (34.9)	54 (65.1)			
Educational level					
None/primary	38 (31.7)	82 (68.3)	0.455	0.818	0.484 – 1.384
Post primary	47 (36.2)	83 (63.8)			
Income					
<100,000 naira	70 (35.7)	126 (64.3)	0.277	1.444	0.744 – 2.804
≥ 100,000 naira	15 (27.8)	39 (72.2)			
DM duration					
≤5 years	39 (33.3)	78 (66.7)	0.835	0.946	0.560 – 1.598
>5 years	46 (34.6)	87 (65.4)			

Table 3 shows that age is significantly associated with CAM use among DM patients. DM patients less than 45 years of age are less likely to use CAM than those above 45 years old (p = 0.017, OR = 0.165, 95% C.I = 0.038 – 0.722). Area of residence is significantly associated with CAM use among DM patients. DM patients that reside in the rural areas were 3 times more likely to use CAM than those that reside in urban areas (p = 0.001, OR = 2.669, 95% C.I = 1.461 – 4.876). However, gender, marital status, occupation, educational level, income, and DM duration are not significantly associated with CAM use among DM patients (p > 0.05).

DISCUSSION:

The prevalence of CAM use among DM subjects in this study was 34%. This adds to the available data on this important topic in Nigeria. Ogbera et al found prevalence of 46%[20]. while the prevalence was 62.1% in another multi-centre study in western Nigeria[21]. These differences in the prevalence with our study could have been from regional and tribal differences in herbal medicine use, as well as the methodology; the latter study had a higher sample size of 388 participants. The prevalence of CAM use among people living with DM is estimated to be as high as 80% in Africa[22]. It was found to be 73.7% in Ethiopia[23], 41.7%

in Egypt[24], 24.4% in Cameroun[25], 53% in South Africa[26], 33% in Guinea[27], 12.4% in Kenya[28], and 77.1% in Tanzania[29]. Other studies around the world showed varying prevalence of CAM use ranging from 8% to 70% and above, depending on the country. The reported prevalence rate of CAM usage in DM in the USA range between 8%– 52%[20], 25% in Canada[30], 62% in Mexico[31], >64% in India and Korea[23], 35.2% in Bangladesh[32], 30.1% in Saudi Arabia[33], 38% in Lebanon[34], 41% in Turkey[35], 63% in Bahrain[36], 18.4% in Germany[37], and 25% in Australia[38].

The most commonly used CAM in this study was bitter leaf (Vernonia amygdalina), followed by bitter cola (Garcinia kola) and scent leaf (African basil) before the rest. Previous studies by Ala et al found that the most commonly used CAM was biological therapy-Vernonia amygdalina (bitter leaf), garlic and Moringa oleifera[21], while Ogbera et al found that Vitamin usage was the commonly documented CAM used in the respondents, followed by herbal products Vernonia amygdalina (bitter leaf), aloe vera and a mixture of local herbs[20]. Nigerian researchers have reported a lowering of blood glucose in diabetic rats when they were fed with bitter leaf, and this lowering of glucose was comparable to that recorded in diabetic rats who had oral glucose-lowering agents administered to them[39]. Many DM patients in Nigeria believe that the bitterness in bitter leaf, bitter kola, aloe vera and utazi would dilute the sweetness of the sugar in their blood. This could explain why they are some of the most commonly used CAM in this study, as well as in other studies in Nigeria. As was the case in this study, individuals with diabetes tend to use CAM therapies to complement and not as an alternative to conventional therapy[20,21,40,41].

The majority of subjects on CAM users (87.1%) didn't disclose CAM use to their health care professionals (HCP). This high rate of non-disclosure was also found in previous studies[20,21,22,35]. The commonest reason for the non-disclosure in this study was that the HCP did not ask if subjects were using CAM. This underscores the importance of holistic communication while interacting with patients during assessment. It is known that medicinal plants reduce blood glucose through biochemical mechanisms such as restitution of pancreatic β-cell function, improvement in insulin sensitivity by receptors, stimulating rate of insulin secretion, inhibition of liver gluconeogenesis, enhanced glucose absorption, and inhibition of G-6-Pase, α-amylase, and α-glucosidase activities[14,42]. However, 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[36,43,44]. This problem is compounded by weak regulation of the production, distribution, and use of non-orthodox remedies in Nigeria[45,46].

In this study, middle-aged and elderly subjects are more likely to use CAM than younger subjects aged less than 45 years. This is similar to the findings in other studies done in a government hospital in Ethiopia[23], as well as in Nigeria[20]. The reason for this may be that older people who are more likely to have had DM for a longer period of time, may be disenchanted with the incurable nature of their condition or may have experienced side effects of orthodox medications. These may encourage them to use CAM as "second opinion". However, in other studies, done on cancer subjects in Enugu, Nigeria[19] as well as on Indians in a suburb in Chatsworth South Africa[47], age did not statistically associate with the use of CAM. The reason for this discrepancy may be because the latter studies were not done solely on DM subjects.

In this study, rural dwellers are three times more likely to use CAM than urban dwellers. The reason may be because rural dwellers have more access to herbs than subjects who live in urban areas. Furthermore, the dearth of healthcare professionals (medical specialists, pharmacists and qualified nurses) in rural communities in Nigeria also encourage the use of CAM.

Educational qualification and income did not positively associate with CAM use in this study. This is similar to the finding in another study done on asthmatic subjects in United States where the income status of the participants did not associate with the use of CAM[48]. Similarly, a recent multicentre study found that both the lowest and highest socioeconomic groups in China demonstrated an increased preference for CAM[49]. This further emphasizes the global increasing trend in the use of CAM that cuts across climes, races, religion and socioeconomic status.

CONCLUSION:

1. There is a high prevalence of CAM use among DM subjects in this centre.
2. Most subjects use CAM concurrently with orthodox medication.
3. Most HCP do not make enquiries on the use of CAM by their patients.

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 are knowledgeable enough to discuss the CAM therapies that the patients are using or thinking of using to more effectively communicate with them.
2. Guidelines should be created and regulatory bodies empowered to check the unwarranted and potentially 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. It is worthy of note that Metformin, the first choice in the treatment of type 2 diabetes, originated from the plant Galega offcinalis (French lilac or goats' rue) and was once considered a CAM.

CONFLICT OF INTEREST:

We declare no conflict of interest.

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