

Complementary and alternative medicine use among ambulatory diabetes patients in a South-Western tertiary hospital in Nigeria

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ABSTRACT

Background: Diabetes mellitus (DM) is a chronic disease with an increasing incidence and prevalence worldwide while complementary and alternative medicine (CAM) is an emerging aspect in DM management. The use of CAM among DM patients has not been widely studied in Nigeria.

Objectives: To study the prevalence and pattern of use of CAM and to identify reasons for their use among DM patients in a University Teaching Hospital in South-Western Nigeria.

Method: Semi-structured questionnaire was administered to 119 diabetes patients. Socio-demographic data, prescribed medications, pattern of CAM use and patient's disclosure of CAM were documented. Data was organized using SPSS statistics version 20 and analysis was done using chi-square test.

Result: A response rate of 95% was obtained. Age range of study participants was 40-90 years with 72.6% above 60 years of age. Duration of use of DM medication among patients ranged from 4 months to 33 years. The prevalence rate of CAM use was 69% with biological based therapies being the only form of CAM used. Patients who had been on DM medication for more than 4 years made up 75.3% of CAM users and used more CAM combinations. Patients were introduced to CAM mainly by friends (41%) and neighbours (38.5%). Only 9% of CAM users told their physicians about their use of CAM.

Conclusion: CAM is becoming an important aspect in the management of DM which should be studied and explored. Healthcare practitioners need to be open-minded about the use of CAM so as to give adequate information to help patients make informed decision for the goal of achieving better therapeutic outcomes.

Keywords: Diabetes mellitus, Complementary and alternative medicine, Nigeria.

Usage de la médecine complémentaire et alternative chez les patients atteints de diabète ambulatoire dans un hôpital tertiaire du sud-ouest du Nigéria

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RESUME

Contexte: Le diabète sucré (Diabète mellitus: DM) est une maladie chronique dont l'incidence et la prévalence augmentent dans le monde entier, tandis que la médecine alternative et complémentaire (MAC) est un aspect émergent de la prise en charge du DM. L'utilisation de MAC chez les patients de DM n'a pas été largement étudiée au Nigéria.

Objectifs: étudier la prévalence et le mode d'utilisation de la MAC et identifier les raisons de leur utilisation chez les patients atteints de DM dans un centre hospitalier universitaire du sud-ouest du Nigéria.

Méthode: Un questionnaire semi-structuré a été administré à 119 patients diabétiques. Les données sociodémographiques, les médicaments prescrits, le mode d'utilisation des MAC et la divulgation par les patients des MAC ont été documentés. Les données ont été organisées à l'aide de la version 20 de SPSS et l'analyse a été effectuée à l'aide du test du chi carré.

Résultat: Un taux de réponse de 95% a été obtenu. La tranche d'âge des participants à l'étude était de 40 à 90 ans avec 72,6% de plus de 60 ans. La durée d'utilisation des médicaments DM chez les patients variait de 4 mois à 33 ans. Le taux de prévalence de l'utilisation des MAC était de 69%, les thérapies biologiques étant la seule forme de MAC utilisée. Les patients qui avaient pris des médicaments DM pendant plus de 4 ans constituaient 75,3% des utilisateurs de MAC et utilisaient plus de combinaisons de MAC. Les patients ont été initiés à la MAC principalement par des amis (41%) et des voisins (38,5%). Seulement 9% des utilisateurs de MAC ont parlé à leurs médecins de leur utilisation de la MAC.

Conclusion: La MAC devient un aspect important dans la gestion du DM qui devrait être étudié et exploré. Les professionnels de la santé doivent faire preuve d'ouverture d'esprit quant à l'utilisation de la MCA afin de fournir des informations adéquates pour aider les patients à prendre une décision éclairée dans le but d'obtenir de meilleurs résultats thérapeutiques.

Mots-clés: Diabète sucré, médecine complémentaire et alternative, Nigéria.

INTRODUCTION

Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia resulting from defect in insulin secretion, insulin action, or both.¹ DM is associated with altered metabolism of lipids, carbohydrates, and proteins and an increased risk of complications from vascular disease.² Most patients fall into two broad etiopathogenetic categories; type 1 or type 2 DM.¹ Diabetes mellitus has an increasing incidence and prevalence and is assuming pandemic proportions worldwide with greater burden in developing countries such as Nigeria.³ According to 2015 World Health Organization (WHO) data, a total of 150 million patients have been diagnosed with DM worldwide and this figure is likely to double by 2025.⁴ Some factors that have been identified to contribute to this include; population increase, aging of population, unhealthy dietary habits and sedentary lifestyles.⁴ The estimated prevalence of diabetes in Africa is 1% in rural areas and 5-7% in urban sub-Saharan Africa⁵ while the current prevalence in Nigeria is in the region of 8%-10% of the population and it is one of the most common reasons for medical admissions and deaths in Nigerian hospitals.³ Lifestyle modification is the first recommended step in the management of DM. This includes exercise, weight control and/or medical nutrition therapy, smoking cessation, reduction of alcohol consumption and stimulants such as caffeine. These have been proven to be effective means of improving glucose homeostasis.⁶ Pharmacological treatment is indicated when fasting glucose level exceeds 140mg/dL or post-prandial glucose level exceeds 160mg/dL or HbA1c exceeds 8.0 percent.¹ Oral glucose-lowering drugs are used conventionally in patients with type 2 DM where lifestyle modification has failed to give acceptable glycemic control. Pharmacological approach (oral or parenteral) is known to be associated with some unpleasant side effects. This is one of the many reasons why patients with chronic diseases like type 2 DM seek complementary and alternative means of managing their disease condition.⁶

As a result of the various complications of diabetes mellitus, adjunct therapies for the prevention and/or treatment of these complications are prescribed for patients in addition to their anti-diabetic medication(s). This is responsible for drug burden or poly-pharmacy often noticed among diabetes patients. Patient counselling and education on the need for compliance with dietary and lifestyle modification, compliance to prescribed medications and regular visits to clinic for

routine check-up and tests is key in the prevention of the complications associated with diabetes mellitus.

The National Centre for Complementary and Alternative medicine (NCCAM) defines complementary and alternative medicine as a group of various medical and health care systems, practices and products that are generally not considered to be part of conventional medicine.⁷ Complementary Medicine are healthcare approaches, interventions or products that are used together with conventional medicine while alternative medicine are used instead of conventional medicine.⁷ The use of complementary and alternative medicine (CAM) is now common practice globally especially among people with chronic health problems.⁸ The use of herbal remedies is the most common form of CAM being used in Africa⁹ while solitary prayer is not really considered CAM medicine since most people believe that prayers are necessary for good health.¹⁰ Biological based therapies include herbs, dietary supplements, health foods, aromatherapy and vitamins are the commonest form of CAM in Nigeria,^{9,11} of which the use of herbs is most prevalent in Africa and Nigeria in particular.⁹ More than 400 plants have been reported to be useful in the management of diabetes some of which are readily available in Nigeria including; Aloe vera, Ocimum sanctum, Vernonia amygdalina, Panax ginseng, Allium sativum, Coccinia indica and Momordica charantia.¹² The use of CAM among diabetes mellitus patients in Nigeria is on the increase,⁹ there is therefore the need to study the use of complementary and alternative medicine among diabetes mellitus patients. The objectives of this study was to determine the prevalence of CAM use, determine the types of CAM used and pattern of use, identify the reasons for their use among diabetes mellitus patients.

METHODS

Study Design and Setting

A cross-sectional study using a semi-structured questionnaire to identify the type of CAM used by diabetes mellitus patients receiving out-patient care at the Endocrinology Clinic, medical out-patient unit of the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria which is a major tertiary health care facility in Osun State, South-Western Nigeria. The Endocrinology Clinic, Ife Hospital Unit, documents about 150 new cases of DM annually and is easily accessible to patients in Ile-Ife community, Osun State, parts of Ekiti and Ondo State. Consecutive sampling method was used as the patients came in for their weekly clinic. Available

patients were approached and recruited for the study. The questionnaire was interviewer-administered among these patients between the period of July and August, 2017.

Inclusion and Exclusion Criteria

Inclusion criteria includes patients 18 years or above that consented to participate in the study while exclusion criteria includes patients less than 18 years of age, non-ambulatory patients and patients that did not consent to participate in the study. Sample size was calculated using sample size equations by Araoye, (2003) which gave 119 subjects after adding 10% non-response consideration to the calculated sample size.13

Data Collection Tool

The questionnaire was designed to comprise of two sections; demographic data (age, ethnicity, marital status, literacy level) and documentation of their use of complementary and alternative medicine and possible reasons for this use. Patients who used at least one of the listed CAM agents (or any other agent considered as CAM in Nigeria) at any point in time was said to be a CAM user.

Ethical Approval

Ethical approval with reference number OSHREC/PRS/569T/134 was obtained from Osun State Ethics and Research Committee. Informed consent form was administered before questionnaires were administered by interview to selected consenting patients. Data collected was treated with strict confidentiality; patient's name was not used on the questionnaire to maintain anonymity. The study conformed to accepted scientific principles and international ethical guidelines required of studies involving human subjects.

Data Analysis

Analysis involved summary statistics of the data using frequency distribution tables and bar charts. Pearson Chi-square, Fisher's exact test and linear-by-linear relationship were used to analyze the relationship between patients' use of CAM and anti-diabetic dosage forms, duration, drug burden, perceived benefit from anti-diabetic medications and socio-demographics. Level of statistical significance was set at $p < 0.05$.

RESULTS

Socio-demographic characteristics of study participants
A total of 119 participants were recruited for the study of which 113 participants provided the full information

required to complete the study giving a 95% response rate. Male and female participants were recruited with 74 (65.5%) being female. They were between ages 40 and 90 years with a mean age of 65.52 ± 10.69 years. Eighty-two (72.57%) study participants were geriatric patients (> 60 years of age). Ninety-eight percent of the participants were of Yoruba ethnicity from South-west region of Nigeria while only 2% were from the south-south region. Fifty-three participants (46.9%) had at least secondary school education.

Distribution of participants' drugs use pattern, duration and perceived drug benefit

A hundred and ten (97.4%) participants had been on at least one anti-diabetic medication (oral hypoglycemic agent, insulin injection or both) for more than a year. The observed duration of anti-diabetic drug use ranged from 4 months to 33 years (8.53 ± 7.18 years), with 74.3% on oral hypoglycemic agents alone while 25.7% were on either insulin injection alone or both oral medication and injection. Majority of the participants (80.5%) were on more than a single prescribed medication the average daily number of total prescribed medication being 4.11 ± 1.87 drugs, while the average number of anti-diabetic medication was 1.92 ± 0.73 drugs. Seventy-seven (68.1%) participants were convinced that they derived a lot of benefit from their anti-diabetic medication prescribed by their physicians, 33 (29.2%) participants reported they got only some benefit from their medication while 3 (1.8%) participants reported they got no benefit at all from their medications.

Pattern of use of CAM by study participants

The proportion of study participants found to be CAM users was 69%. The pattern of use of complementary medicine among the CAM users is represented in Figure 1. The complementary medicines identified include; Moringa plant parts, bitter leaf, Aloe leaf, garlic, basil leaf, ginger, quail egg, local herbs, ginseng, mineral and vitamin supplement with the highest used CAM being bitter leaf (82.1%) followed by basil leaf (60.3%) and Moringa oleifera (48.7%). The least used complementary medicine identified are quail egg (1.3%), vitamin and mineral supplements (2.6%) and Aloe vera (5.1%). Majority of CAM users used more than one CAM at a time. The maximum number of CAM used was six.

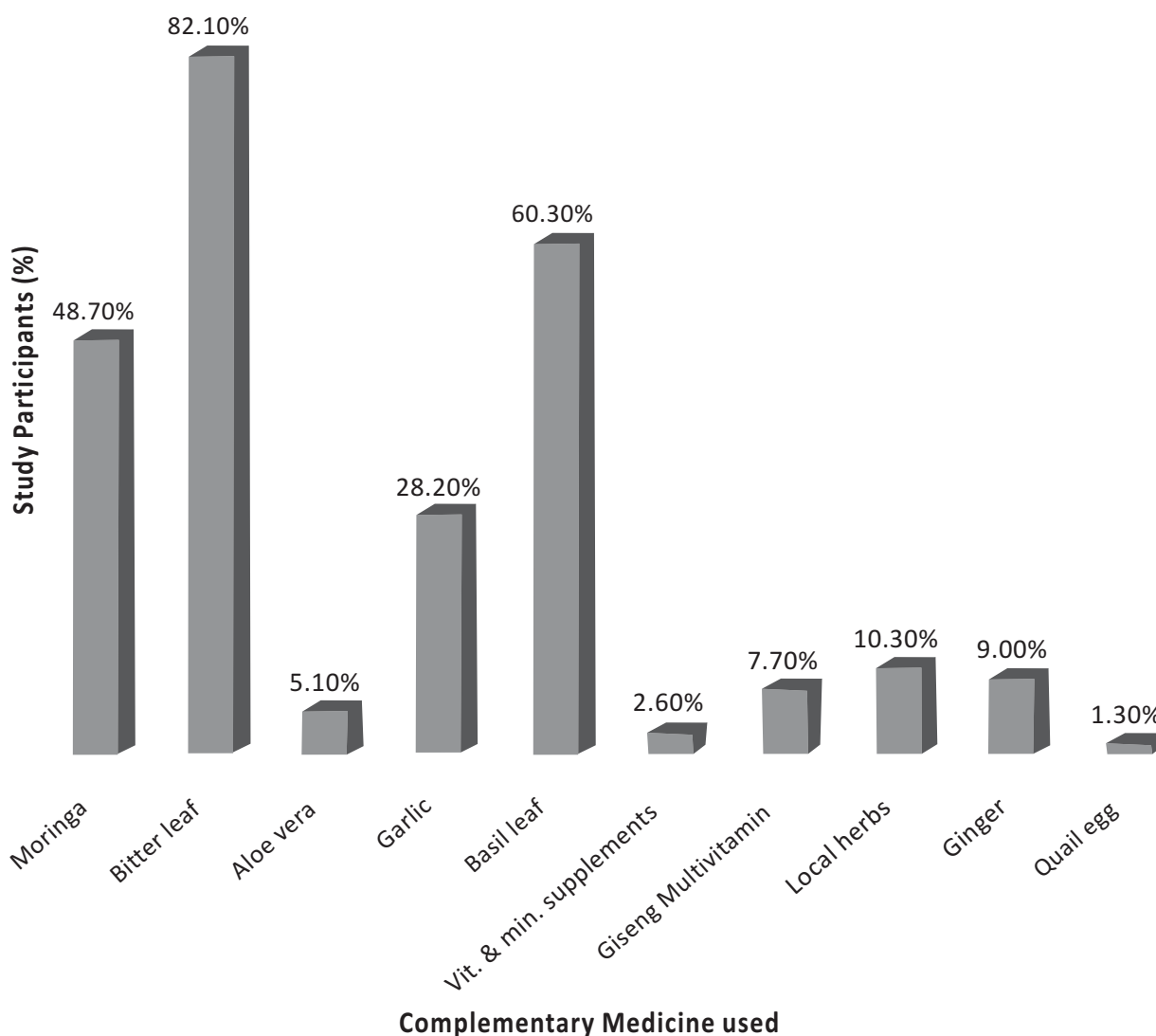


Figure 1: Pattern of CAM use by study participants

Reasons for CAM use among study participants

Several beliefs and factors were given by participants as reasons for their use of complementary medicine among which is that CAM are devoid of side effects common with conventional medicines (2.6%), cheaper than conventional medicines (7.6%), work better than conventional medicines (12.8%), ease of availability (16.7%), gives better potency when combined with conventional medicines (26.9%) and that CAM is part of our tradition and should not be discouraged or discontinued (51.3%).

Disclosure to health care provider on the use of CAM

Only 9% of participants identified to be CAM users disclosed the use to their physicians. Others did not inform their physicians because of various reasons like fear of being discouraged, rebuked or fear of being

instructed to stop the use of complementary medicine all together. Other reasons given was that their physician did not ask about it therefore, they did not see the need to discuss it with them.

There was no association between the documented socio-demographic factors and participant's use of complementary medicine (Table 1), Participants were introduced to CAM mainly by friends (41%) and neighbors (38.5%) (Figure 2). Most CAM users were geriatrics (88.2%) and no significant association between CAM use and age group (Table 2). Participants who had been on anti-diabetic medication for more than 4 years used more of CAM combinations (> than 1 CAM at a time) as compared with participants who had only been on medication for shorter period of time (Table 2). Also, participants who had been on anti-diabetic

medication(s) for more than 4 years made up 75.3% of CAM users. Details is provided in Table 3.

Table 1: Influence of socio-demographic factors on CAM use

Variable		CAM Use Frequency (Percent)		X ²	p-value
		Yes	No		
Gender	Male	29 (74.4)	10 (25.6)	0.792	0.373
	Female	49 (66.2)	25 (33.8)		
Level of education	No formal education	15 (75.0)	5 (25.0)	1.030	0.813
	Primary	20 (66.7)	10 (33.3)		
	Secondary	15 (62.5)	9 (37.5)		
Religion	Tertiary	28 (71.8)	11 (28.2)	0.023	0.880
	Christianity	66 (68.8)	30 (31.2)		
Age	Islam	12 (70.6)	5 (29.4)	0.420	0.512
	< 60 years	23 (74.2)	8 (25.8)		
	≥ 60 years	55 (67.9)	26(32.1)		

Test statistics: Pearson Chi-square

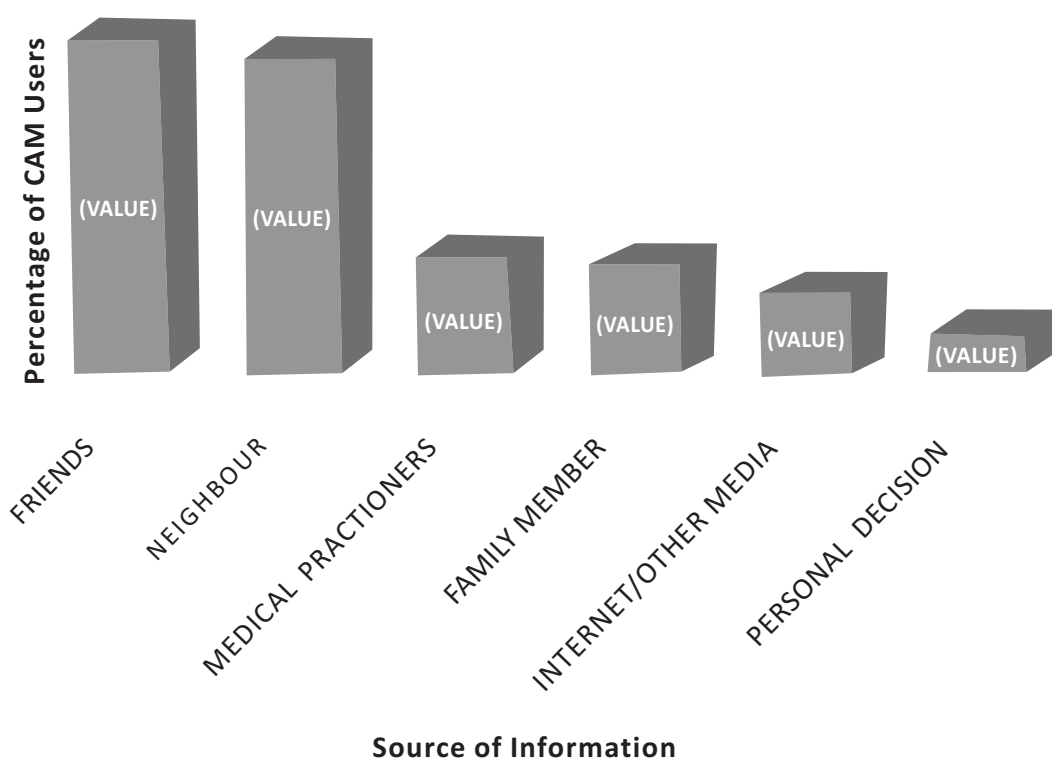


Figure 2: Source of study participants' information on CAM

Participants on oral hypoglycemic agent had the highest proportion of CAM users (74.7%) followed by participants on both orals and insulin (65%) while participants on insulin injection alone had the lowest group of CAM users. The benefit participants perceive to derive from their anti-diabetic medications is not associated with CAM use. Detail is shown in Table 3.

There was no association between gender and disclosure of CAM use to physicians. Details is provided in Table 4. Six out of 7 participants who told their physicians about their CAM use were in the geriatric age group, however, the difference was not significant. Details is provided in Table 4. There was no association between duration of CAM use and disclosure of CAM use to physicians. Details is provided in Table 4.

Table 2: Relationship between age group, duration of drug use and CAM use

Variables	Frequency (Percent) of CAM Users			Total	X ²	p value
	0-1 CAM	2-3 CAM	> 3 CAM			
Age group	< 60 years	13(41.9%)	13(41.9%)	5(16.1%)	31	0.10
	≥60 years	36(43.9%)	35(42.7%)	11(13.4%)	82	0.75
Duration of DM medication use	0-2 years	10 (52.6%)	7 (36.8%)	2(10.5%)	19	1.85
	3-4 years	12 (57.1%)	6 (28.6%)	3 (14.3%)	21	
	>4 years	27 (37.0%)	35 (47.9%)	11 (15.1%)	73	0.17

Test statistics: Pearson Chi-square

Table 3: Relationship between type of DM drug, perceived drug benefit and CAM use

Variables		CAM Use Frequency (Percent)		X ²	p value
		Yes	No		
Duration of medication use	0-2 years	12 (63.2)	7 (36.8)	3.528	0.171 ^a
	3-4 years	11 (55.0)	9 (45.0)		
	>4 years	55 (75.3)	18 (24.7)		
Type of drug	Oral only	62 (74.7)	21(25.3)	9.629	0.052 ^b
	Injection only	2 (22.2)	7 (77.8)		
	Both	13 (65.0)	7 (35.0)		
Perceived drug benefit	No Benefit	1 (33.3)	2 (67.3)	2.548	0.237 ^b
	Some Benefit	25 (75.8)	8 (24.2)		
	A lot of benefit	52 (67.5)	25 (32.5)		

Test statistics: Chi-square (Linear-by-linear association)

Table 4: Influence of gender, age and duration of drug use on participants' disclosure of CAM use to physicians

Variables		Participants' disclosure of CAM use to physicians Frequency (Percent)		X ²	p value
		Yes	No		
Gender	Male	3 (10.7)	25 (89.3)	0.182	0.670
	Female	4 (7.8)	47 (92.2)		
Age group	< 60 years	1 (4.3)	22 (95.7)	0.667	0.338
	≥60 years	6 (10.7)	50 (89.3)		
Duration of CAM use	0-2 years	2 (16.7)	10 (83.3)	1.013	0.314
	3-4 years	1 (9.1)	10 (90.9)		
	> 4 years	4 (7.1)	52 (92.9)		

Test statistics: Chi-square (Linear-by-linear association)

Participants in the geriatric age range used larger number of prescribed medications than participants less than 60 years of age. The difference was however, not significant. Details is provided in Table 5. Also, participants with longer duration of anti-diabetic

medication use had larger number of prescribed medications. For instance, 57.9%, 81% and 82.2% of participants who had been on DM medication for < 2 years, 3-4 years and > 4 years respectively used 3 or more prescribed medications daily. Details is provided in Table 5.

Table 5: Relationship between age group, duration of medication use and number of prescribed medications

Variables	Participants' total number of prescribed medication Frequency (percent)			X ²	p value	
	<3 medications	3-5 medications	>5 medications			
Age group	< 60 years	9 (29.0%)	18 (58.1%)	4 (12.19%)	3.912	0.141 ^a
	>59 years	16(19.5%)	41(50.0%)	25(30.5%)		
Duration of DM drug use	< 2 years	8 (42.1%)	9 (47.4%)	2 (10.5%)	4.591	0.032 ^b
	3–4 years	4 (19.0%)	11 (52.4%)	6 9 (28.6%)		
	> 4 years	13 (17.8%)	39 (53.4%)	21 (28.8%)		

Test statistics: ^aPearson Chi-square^bLinear-by-linear association

DISCUSSION

Sixty-nine percent of patients in this study were complementary medicine users which was higher compared to a similar study that was carried out among diabetes mellitus patients in Nigeria. Ogberaet al recorded a prevalence of 46% among diabetes patients in Lagos State, Nigeria.⁹ Onyapatet al., however, reported a much higher CAM prevalence of 84.7% among adult population in Enugu, Nigeria irrespective of their health status.⁷ The prevalence of use of CAM varies in literature depending on the country, geographical region, cultural and social background of the population in focus. Garrowet al., recorded a prevalence of 47% in a national survey among adults with diabetes in the United States while prevalence among diabetes patients attending outpatients' clinic in the UK was reported to be 17%.¹⁴ Twenty-five percent was recorded in Canada.¹⁵ Prevalence in the developed countries cited above were lower than the value gotten from this study which was carried out in a developing country. Prevalence from the present study is comparable to those recorded in Mexico, India and Korea which were 62%, 67.7% and 65% respectively.^{16,17}

Diabetes mellitus is a chronic metabolic disease that usually affect both male and female adults above the age of 40 years but occasionally affect younger patients.⁶ This was demonstrated in this study as the youngest participant seen was 40 years old with majority above 60 years of age (72.6%). Type 2 diabetes mellitus is usually managed throughout the lifetime of the patient with oral hypoglycemic agents alone or in combination with insulin injection or sometimes, insulin injections alone. The ethnicity of the participants was as expected since Obafemi Awolowo University Teaching Hospital is a tertiary healthcare facility located in Osun State, South-West Nigeria, equipped to take care of specialized healthcare needs of people living in this region and its

environs.

Sixty-eight percent of participants from this study believed that they derived a lot of benefit from their anti-diabetic medications yet, 69% of participants were CAM users giving several reasons and beliefs why they used complementary medicine such as: complementary medicine is our tradition and it should be used, CAM supports orthodox medicine to give better outcome (complements), CAM are always available and CAM works better than orthodox medicine. Although, none of the CAM users identified in this study abandoned their conventional anti-diabetic medication prescribed by their physicians for alternative medicine, they only supplemented with CAM.

Upchurch and Rainisch (2012) established that the pattern of use of CAM in a population is highly affected by race and ethnicity.¹⁸ Ethnicity determines culture, traditional beliefs and core values of an individual which will affect the individual's disposition to the use of complementary medicine. The higher prevalence of CAM use recorded in this study when compared with similar study in the same geopolitical zone in Nigeria (survey conducted by Ogberaet al in Lagos, Nigeria)⁹ may be attributed to the dominant ethnic group (Yoruba, 97.4% of study population) which believe strongly in the healing power of herbs and other alternative forms of therapy.¹⁹ The influence of socio-demographic factors on participants' use of CAM was not significant in this study. The factors explored were gender, educational background, religion and age group. Among these factors Ogberaet al found age to be the only significant predictor for the use of CAM in diabetes patients⁹ while Najaet al noted that marital status had a significant association with patients' use of CAM.²⁰ Presence of disease complication and positive family history of the disease were other factors documented to be significantly associated with CAM use.²⁰ Unlike other studies,

proportion of male patients that used CAM were more than proportion of females in this study.

Only biological based therapies like herbs, folk foods, vitamins and mineral supplements were used by patients in this study. This was the observation of Ogbera *et al* (2010) and Yehet *et al* (2002) when they established that herbal remedy was the most common form of complementary and alternative medicine being used in Africa and solitary prayer is not really considered as CAM since most people believe that prayers is necessary for good health.^{9,10}

Patients on CAM followed recommendations from friends, neighbours, medical personnel, family members, internet, social media and personal initiative. Concerned friends and neighbours were the most prominent source of CAM recommendation. This is similar to the report documented by Ogbera *et al* in a study conducted in another part of Nigeria.⁹

Majority of the patients (97%) had been on a prescribed anti-diabetic medication for more than a year because diabetes is a chronic disease therefore, patients often have to be on medication throughout their lifetime after diagnoses. Patients who had been on anti-diabetic medication(s) for more than 4 years made up 70.5% of CAM users and used combinations of CAM more than patients who had only been on medication for shorter period of time. Naja *et al* reported a significant association between CAM use and longer duration of disease.²⁰ Patients who had been on medication for less than a year (recently diagnosed) were the least to use CAM, the proportion of CAM users increased with increasing duration of drug use. Saydah *et al* (2006) noted that adults suffering from chronic diseases are more likely to use CAM than those without chronic diseases.²¹ The proportion of CAM users however, did not increase but rather dropped among patients who had been on medication for more than 10 years. The relationship between period of medication use and CAM use was not statistically significant.

In Nigeria, about a fifth of persons (20%) with diabetes are on insulin therapy either singly or in combination with other hypoglycemic agents.²² This was comparable to 26% of study participants placed on insulin in this study. Oral hypoglycemic agents alone was the most prescribed form of anti-diabetic medication and metformin was the most used oral hypoglycemic agent. Mbanya *et al.*, stated that management of diabetes mellitus if diagnosed early may be simply managed by using a single oral hypoglycemic agent usually biguanides

(metformin), lifestyle and diet modification, exercise and blood glucose self-monitoring.²³ This was found to be consistent with results from this study.

Patients on oral hypoglycemic agent used CAM more than patients on both injection and oral medication while the latter group used CAM more than patients on only subcutaneous insulin. The dosage form of drug used in the management of type 2 diabetes mellitus may be an indicator of the severity of the disease which then influenced patients' CAM use. The relationship between the form of anti-diabetic drug used by patient and patient's CAM use was not statistically significant.

Complications in diabetes is the major source of disease burden and one of the reasons for polypharmacy among this group of patient. Geriatric patients also have a high predictor for co-morbidity leading to polypharmacy. Polypharmacy was noticed among the study participants with a patient using a total of 11 prescribed medications and 4 drugs was the average obtained from the study. The greater proportion of patients who used 3 or more prescribed medications were patients who had been diagnosed of diabetes for 3 years or more.

Most CAM users did not inform their physicians about their use of complementary medicine due to various reasons. Reports from similar studies also document even lower percentage of patients disclosing their use of CAM with their physicians. Naja *et al* noted that only 7% of patients using CAM disclosed their use of CAM to their physicians.²⁰ Six out of the 7 patients who told their physicians about their CAM use were in the geriatric age group although the statistical significance could not be explored due to the small number of patients in this group, it is important to note that despite the fact that older patients are strong believers of tradition, they also have high regard for their conventional healthcare providers. There was no association between duration of CAM use and disclosure of CAM use to physicians.

Some of the reasons given by patients for non-disclosure of CAM use is that their doctors did not ask them about it and they do not see reasons or need for them to inform their physicians. There is always a possibility of complementary medicine interacting with prescribed conventional medicine leading to unwanted or undesirable side effects.²⁴ Other reasons for non-disclosure of CAM status described by study participants was their fear of being discouraged or being instructed to stop altogether. There is a need for healthcare providers to come to an understanding that whether it is

recommended or not, a good percentage of patient population being managed for a chronic disease will use CAM, Kesavadevet al., documented in a study that many patients resort to complementary and alternative medicine at least once during their lifetime,²⁴ therefore, it is important for healthcare providers to ask their patients about the use of CAM and discuss the benefits, disadvantages and cautions patients need to be aware of as regards the specific CAM being used.

Studies on drug-herbal interaction will be helpful to both patients and healthcare providers in order to make informed decision on CAM especially herbal remedies to use while on prescribed anti-diabetic medications. Also more clinical trials need to be done to confirm the efficacy, safety and dose of the many acclaimed beneficial herbs in diabetes patients. More research on the use of other forms of CAM aside biological based therapies among diabetes patients in Nigeria should be explored like the benefit of mind-body interventions, energy therapies, manipulation and body based method in the management of type 2 diabetes mellitus and its complications. The extent of adherence to prescribed medications in patients with chronic diseases (such as diabetes, hypertension or cancer) who are complementary medicine users may be explored to know the effect of CAM use on patients' adherence to their conventional medications and long term control of their disease condition.

The self-reported nature of the research makes the findings dependent on the accuracy of information provided by the participants without any means of confirmation. Also, the research findings cannot be generalized since it was done in just a tertiary institution.

CONCLUSION

The observed prevalence of complementary medicine use by diabetes mellitus patients was high with most of them not seeking the opinion or recommendation of their physicians. Biological based therapies were the most common form of CAM used among study participants. Healthcare providers need to be open-minded about CAM use so as to give helpful information to patients to achieve better therapeutic outcomes.

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