

NUTRITIONAL VITAMINS IN DIABETES MANAGEMENT: KNOWLEDGE, ATTITUDE AND PRACTICE AMONGST DIABETIC OUT-PATIENTS IN A TERTIARY HOSPITAL IN NORTH CENTRAL NIGERIA

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Abstract

Background: Diabetes Mellitus (DM) is a state of chronic hyperglycemia, classically associated with symptoms of excessive thirst, increased urine volume, and, if severe enough, weight loss. In Africa, Nigeria is the fourth country with the highest burden of diabetes, with an estimated figure of over 1.7 million people living with the disease. Some vitamins are effective in the management of diabetes mellitus. Therefore, determining the knowledge, attitude and practice of out-patient diabetics concerning these vitamins is essential.

Objectives: This study was designed to assess the knowledge and attitudes of adult out-patients diabetics towards nutritional vitamins in diabetes management.

Methods: A structured questionnaire was shared among selected eighty-eight (88) diabetic patients in the tertiary institute via a cross-sectional design. The sample size was determined using Cochran's formula. A simple random sampling technique was used to select the participants on consecutive clinic days. Data analysis was done using simple percentages, means and Chi-square. The significance level was measured at 95% confidence interval ($p=0.05$).

Results: Overall, 83% of the participants knew about nutritional vitamins in managing diabetes. This was considered high, as shown by a mean value of 3.03 on a scale of four. Despite accepting that nutritional vitamins were helpful in diabetes management, only 55.7% accepted that they take nutritional vitamins. A vast number (68.2%) of the participants felt the vitamins were too expensive. Those on them explained that they had experienced significant changes in their symptoms since the commencement of these nutritional vitamins.

Conclusion: This study demonstrated high knowledge of nutritional supplements among diabetic patients. The participants showed a positive attitude towards taking diabetic supplements even though the cost was considered a challenge. The study also revealed the positive effect of nutritional vitamins on improving diabetic symptoms and the general wellness of diabetic patients. There is a significant relationship between educational qualification and the level of awareness of nutritional vitamins among people with diabetes ($p=0.017$).

Keywords: Nutritional vitamins, diabetes, knowledge, attitude, practice, diabetic patients

Introduction

Nigeria is the fourth country, in Africa, with the highest burden of diabetes, with an estimated figure of over 1.7 million people living with the disease. However, various reports indicate different prevalence rates^(1;2). Researchers have raised the alarm over the increasing rate of diabetes among Nigerians, saying over 5.5 per cent of the country's population was suffering from the ailment.⁽³⁾ It is more prevalent in Nigeria's middle-aged adults than younger adults.⁽⁴⁾ The role of dietary supplements in glucose control has been investigated in basic research and observational studies^(5;6) to address inadequate nutrition and chronic diseases. Nutrients with proposed benefits in glucose homeostasis include vitamin D, K, calcium, magnesium, zinc, chromium, and omega-3 fatty acids^(7;8).

Supplements Effective in the Management of Diabetes Mellitus

Vitamin D: Vitamin D deficiency has been linked to the onset and progression of Diabetes Mellitus⁽⁹⁾. It plays a functional role in glucose tolerance through its effects on insulin secretion and sensitivity.

Vitamin E: This essential fat-soluble vitamin functions primarily as an antioxidant. It may play a role in preventing and treating common complications of diabetes.

Vitamin B3: One supplement, which has been investigated in the prevention of T1DM, is nicotinamide or vitamin B3. Nicotinamide can have protective effects on beta cells that can be helpful for those at high risk for T1DM. In addition, nicotinamide has been shown to have a positive effect on animal models. One study, which investigated non-obese rats, looked at treatment with subcutaneous nicotinamide at a dose of 0.5 mg/g body weight and showed promising results. The rats in the treatment arm no longer showed glycosuria and had improved glucose tolerance. This therapeutic outcome suggests that nicotinamide may have the same effect in humans⁽⁶⁾.

Magnesium: The mineral magnesium functions as an essential cofactor for enzymatic activities. It is essential for all energy-dependent transport systems and glycolysis.

Chromium: Chromium is often marketed to help patients with diabetes control their blood sugars. It has also been thought to help the prevention of T2DM. Chromium improves the action of insulin by improving tyrosine kinase activity on the insulin receptor⁽⁶⁾.

Alpha-Lipoic Acid (ALA) is an essential cofactor in mitochondrial respiration and a potent antioxidant. It possesses various metabolic benefits, including ant obesity, glucose-lowering, insulin-sensitising, and lipid-lowering effects.⁽¹⁰⁾ ALA was found to cause a decrease in HbA1c at a dose of 600mg/per day in adult patients with T₂DM though the decrease was not significant⁽¹¹⁾.

Zinc: A meta-analysis of the effect of zinc supplementation on glucose control in patients with type 2 diabetes showed that zinc significantly reduced the concentrations of both Fasting Blood Glucose (FBG) and Glycosylated Hemoglobin (HbA1c)⁽¹²⁾.

The fatality rate of diabetes in Nigeria is high, with new cases daily. This is alarming and requires urgent intervention. Some people with diabetes experience nutrient deficiencies, some of which may be due to the side effects of some anti-diabetic drugs, e.g. metformin. Numerous nutritional vitamins have been proven to be effective in the management of diabetes. However, no data showed their use amongst people with diabetes in Benue State. This study ascertained the awareness, attitude, and practice of these nutritional vitamins among people with diabetes.

Methods

Study Setting

The study area for the research was the out-patient endocrinology clinic in Federal Medical Centre, Makurdi, a tertiary institution in Benue State, North Central, Nigeria. FMC, Makurdi is a 400 bedded hospital that serves as a referral centre for primary and secondary health institutions in both the public and private sectors. The endocrinology clinic of the hospital is a specialist clinic that manages patients with endocrine disorders and holds once a week, specifically on Mondays.

Study Design

A cross-sectional study that employed structured questionnaires to collect data from participants who accessed diabetic care within five months. Construct validity testing, using a panel of experts, was used to validate the test instrument. The study population was unknown; therefore, the Cochran formula was used to calculate the sample size⁽¹³⁾. Participants were randomly selected using Simple random sampling. Only adult diabetic patients who had attended follow-up clinics for six months or more were included in the study.

Data Collection

Data was collected from Eighty-Eight (88) patients attending the Diabetic Clinic in the tertiary institution using a questionnaire via face-to-face interaction with the respondents. The questionnaire contained the Socio-demographic profiles, including age, educational qualification, marital status and others, and the main item stems addressing KAP of nutritional vitamins among out-patients diabetics.

Method of Analysis

Frequencies, simple percentages and means were used to analyse data. Chi-square was used to test the relationship between knowledge and educational qualification.

Ethical Consideration

Ethical approval for the study was obtained from the ethical committee of FMC, Makurdi, before the study commenced. Only patients who consented to participate in the study were included. Confidentiality of the respondents' information was strictly observed.

Results

Table 1: Demographic characteristics of the Respondents

Variables	Frequency	Percentage
Gender		
Male	63	71.6
Female	25	28.4
Total	88	100.0
Age		
20-30 years	7	8.0
40-59 years	31	35.2
60-79 years	25	28.4
80 years and above	7	8.0
Undisclosed	18	20.5
Total	88	100.0
Occupation		
Civil servant	15	17.0
Farmer	40	45.5
Retirees	8	9.1
Student	1	1.1
Teacher	4	4.5
Trader	17	19.3
Corper	2	2.3
Undisclosed	1	1.1
Total	88	100.0
Educational Qualification		
FSLC	27	30.7
WAEC	17	19.3
B.Sc.	41	46.6
Diploma	1	1.1
M.Sc	1	1.1
No formal training	1	1.1
Total	88	100.0

Table 1 above represents the social demographics of respondents. The study revealed that males (71.6%) were more affected by DM than females (28.4). In addition, most respondents were between the ages of 49 and 79.

Table 2: Knowledge of nutritional vitamins amongst diabetic out-patients

Variable	Frequency	Percentage	mean value
5. How long have you had diabetes?			
Less than one year	11	12.5	3.1
1-5 years	20	22.7	
6-10 years	40	45.5	
10 years and above	17	19.3	
Total	88	100	
6. Are you aware of any nutritional vitamin(s), e.g. vitamin b, vitamin c, vitamin d <i>and others</i> ?			
Yes	73	83.0	1.0
No	15	17.0	
Total	88	100	
7. From the list below, kindly tick the nutritional vitamins you know.			
Beberine	2	2.3	3.6
Cinnamone	8	9.1	
Vitamine B	47	53.4	
Vitamine D	12	13.6	
Vitamine E	9	10.2	
Others	10	11.4	
Total	88	100	
8. Generally, nutritional vitamins do the following			
a. Boost immunity			
Strongly agree	74	84.1	3.5
Agree	8	9.1	
Undecided	5	5.7	
Strongly disagree	-	-	
Disagree	1	1.1	
Total	88	100	
b. Regulate blood sugar level			
Strongly agree	49	55.7	3.4
Agree	9	10.2	
Undecided	26	29.5	
Disagree	3	3.4	
Strongly disagree	1	1.1	
Total	88	100	
c. Reduces diabetes symptoms			
Strongly agree	47	53.4	3.6
Agree	9	10.2	
Undecided	28	31.8	
Disagree	4	4.5	
Strongly disagree	-	-	
Total	88	100	
Average mean: 3.03			

Key: 0.00-1.9= Low, 2.0-2.9 =Moderate, 3.0-4.0= High

Table 2 shows knowledge of nutritional vitamins amongst out-patients diabetics. It also revealed that 83% of the respondents knew about nutritional vitamins such as vitamin B, vitamin C, vitamin D e.t.c. with a mean value of 3.03 on a scale of 4. However, knowledge of vitamin B was higher compared to the other vitamins in the study.

Table 3: Out-patient attitude towards intake of their nutritional diabetic vitamins

Variable	Frequency	Percentage	Mean value
9. Do you take nutritional vitamins/supplements?			
Yes			3.6
No	49	55.7	
Total	39	44.3	
	88	100	
10. I think daily intake of nutritional vitamins <i>is vital</i> .			
Strongly agree	50	56.8	
Agree	15	17.0	
Undecided	20	22.7	
Disagree	2	2.3	
Strongly disagree	1	1.1	
Total	88	100	
11. I think nutritional vitamins are unnecessary for my general wellness as a diabetic patient.			
Strongly agree	9	10.2	
Agree	2	2.3	
Undecided	32	36.4	
Disagree	16	18.2	
Strongly disagree	29	33.0	
Total	550	100	
12. Nutritional vitamins are expensive. I cannot afford them.			
Strongly agree	42	47.7	
Agree	18	20.5	
Undecided	20	22.7	
Strongly Disagree	4	4.5	
Neutral	13	14.8	
Total	88	100	
13. Taking anti-diabetic drugs alone is enough for my health condition.			
Strongly agree	40	45.5	
Agree	12	13.6	
Undecided	33	37.5	
Disagree	2	2.3	
Strongly disagree	1	18.1	
Total	88	100	

Key: 0.00-1.9= Low, 2.0-2.9 =Moderate, 3.0-4.0= High

Table 3 above shows why more participants agreed that nutritional vitamins are vital in diabetic management, but not all of them go on the vitamins. Some of the participants [60(68.2%)] felt that nutritional vitamins were too expensive, while others felt that anti-diabetic medications were just ok for their health [52 (59.4%)].

Table 4: Changes in symptoms and general wellness experienced by out-patient diabetics

Statements	SA	A	U	D	SD	\bar{X}
I have experienced a significant decrease in the frequency of urination since the commencement of vitamins for my diabetic condition	40 (45.5%)	12 (13.6%)	33 (37.5%)	2 (2.4)	1 (1.1%)	3.8
I have experienced a significant decrease in thirst since consuming vitamins for my diabetic condition.	41 (46.6%)	13 (14.8%)	32 (36.4%)	1 (1.1%)	1 (1.1%)	3.7
I have experienced no significant weight loss since taking vitamins for my diabetic condition.	41 (46.6%)	11 (12.5%)	35 (39.8%)	1 (1.1%)	-	3.9
I have experienced no fatigue since taking vitamins for my diabetic condition.	39 (44.3%)	13 (14.8%)	34 (38.6%)	2 (2.3%)	-	3.8
My craving for food has reduced since I started taking nutritional supplements for my diabetic condition.	39 (44.3%)	13 (14.8%)	35 (39.8%)	1 (1.1%)	-	3.8

\bar{X} = Mean Value, Average mean: 3.8

Table 4 above indicates that more than half of the study population experienced an improvement in symptoms and general well-being, with a mean score of 3.8 while taking these nutritional supplements in conjunction with their anti-diabetic drugs.

Table 5: There is no relationship between educational qualification and level of knowledge of nutritional vitamins

Educational Qualification	Level of awareness of nutritional vitamins		Total	X^2	Df	p-value.	Remark
	yes	No					
FSLC	21 (77.8%)	6(22.2%)	27 (30.7%)	10.694	5	.017	Sig.
WAEC	15 (88.2%)	2(11.8%)	17 (19.3%)				
B.Sc	37 (90.2%)	4 (9.8%)	41 (46.6%)				
Diploma	1(100%)	-	1(1.3%)				
M.Sc	1 (100%)	-	1 (1.3%)				
Undisclosed	1(100%)	-	1 (1.3%)				

Level of significance measured at 95% confidence interval ($p = 0.05$)

Table 5 above shows a significant relationship between educational qualification and knowledge of nutritional supplements ($p = 0.017$). Knowledge of nutritional vitamins was higher amongst participants with higher degrees than those with FSLC.

Discussion

Diabetes is a prolonged disease with debilitating effects on men⁽¹⁴⁾. This study revealed that males were more affected by type 2 diabetes than females. These results were similar to the study by Bahendeka et al., 2019 who reported a prevalence of diabetes mellitus among males and females to be 1.6% and 1.1%, respectively⁽¹⁵⁾. NJCPT- 22 001CDC's National Diabetes Statistics Report 2015 states that diabetes is most predominant among adults aged 45years and above. In developing countries, 75% of diabetic patients are 45 years old and above, and 25% of adults with diabetes mellitus are under 44 years⁽¹⁶⁾. This study showed that the most affected age range is 40-79years. This is to some extent in agreement with findings by Cho et al., 2017 and WHO, 2014^(16;17).

Knowledge of nutritional supplements was high among the participants, and over half of the patients reported intake of nutritional vitamins. This is in line with Cortney M, 2018 whose study demonstrated that over half of the patients at an out-patient diabetes-care clinic use dietary supplements⁽⁵⁾. Adults with higher educational

attainment live healthier and longer lives compared to their less educated peers. This is because educational qualification exposes one's mind and has numerous opportunities for enhancing one's lifestyle. On the other hand, even in highly developed countries like the United States, it has been observed that adults with lower educational attainment suffer from poor health when compared to other populations⁽¹⁸⁾. This study showed that 99% of the participants had educational qualifications, which reflected in their awareness level; individuals with the highest qualifications had the highest level of awareness.

This study revealed a reduction in diabetes symptoms and improved general well-being among patients taking diabetic supplements concomitantly with their diabetes medication. Also, a decrease in the frequency of urination, thirst, weight loss, fatigue, and reduced craving for food while taking these nutritional supplements alongside anti-diabetic drugs was documented. Our study is similar to several studies that have proven that supplementation improves the general wellness of people with diabetes. For example, some study has shown that supplementation causes a decrease in retinal oedema and increases light sensitivity in diabetic patients with non-proliferative retinopathy⁽¹⁹⁾ and a lowered A1C⁽⁵⁾, thus improving their general wellness outcome. In addition, studies have shown that diabetic patients using metformin showed worse cognitive performance than those without metformin or non-diabetic individuals. Furthermore, it was observed that using vitamin B12 supplementation helps improve their cognitive performance⁽²⁰⁾.

Conclusion

The participants had good knowledge of nutritional vitamins effective in diabetes management. Many of the participants take these vitamins. Participants on these nutritional vitamins experienced positive changes in their symptoms and general well-being. Clinicians should include nutritional vitamins where applicable and affordable in diabetic patients' management. It is worth noting that while these vitamins may have positive effects on diabetic symptoms, they are not a substitute for anti-diabetic medications.

Authors' contribution

All the Authors made substantial contributions to the conduct of the study, approved the version for publishing and agreed to be responsible for all aspects of the work.

Conflict of interest

The Authors reported no conflict of interest.

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