Original Article

Patterns of adherence to management among patients with type 2 diabetes mellitus in South-South Region of Nigeria

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ABSTRACT

Aims: The study investigated the pattern of adherence to medication and dietary treatment among type 2 diabetes mellitus patients. **Settings and Design:** A cross-sectional study conducted among 350 consented patients with type 2 diabetes mellitus from a secondary public healthcare facility. **Materials and Methods:** A semistructured questionnaire was interviewer-administered to obtain information on respondents' sociodemographic characteristics, level of adherence to medication and dietary treatment, and suggestions on ways of improving adherence to treatment. Descriptive statistics, chi-square test, and logistic regression were used to analyze the data with level of significance set at 0.05. **Results:** Mean age of respondents was 57.9 ± 9.8 years, 60.9% were females and 78.0% were married. Some respondents exhibited total adherence to medication (58.9%) and dietary (67.4%) treatment, respectively. Determinants of nonadherence to medication and dietary treatment include using alternative traditional medicine (herbs) for the treatment of the disease (odds ratio (OR) = 0.42, 95% confidence interval (CI) = 0.568-1.916) and consuming foods more than recommended quantity (OR = 6.28, 95% CI = 3.919-10.083). One of the suggested ways by the respondents to improve adherence to treatment was self-discipline (46.9%). Lack of awareness on the seriousness of the disease (42.6%) was a major challenge confronting patients with type 2 diabetes mellitus. Creation of awareness on the seriousness of the disease was suggested by 39.1% of respondents. **Conclusions:** Use of alternative medicine (herbs) and eating more than the recommended quantity of foods remain a challenge among patients with type 2 diabetes mellitus. Comprehensive health promotion and education strategies including patient counseling on diabetes care with emphasis on adherence to medication and dietary treatment regimen should be organized regularly for diabetes patients.

Key words: Adherence, medication and dietary treatment, Type 2 diabetes mellitus

INTRODUCTION

Diabetes is the sixth leading cause of death worldwide,[1] while the number of diabetes cases worldwide has increased significantly in the last decade.[2] Each year, 3.2 million people around the world die from complications associated with diabetes.[3]

In Africa, the traditional rural communities still have low prevalence of 1-2% (except in specific high risk groups), while 1-13% or more adults in urban communities have diabetes.[4,5] Current prevalence rate estimates of diabetes in Nigeria have been tagged at 2.5% compared to its 2.2% rate in 2003.[6] Diabetes is one of the chronic illnesses for which self-management plays a central role in care, and poor management of glucose level which is paramount in developing countries like Nigeria[7] will result in complications that will be detrimental to the patient's health.

Thus, this study was designed to investigate the pattern of adherence to medication and dietary treatment among type 2 diabetes mellitus patients.

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MATERIALS AND METHODS

A cross-sectional survey design was used for this study, involving the consented patients attending the Central Hospital based in Warri, South-South region of Nigeria, which is a secondary healthcare facility. Central Hospital is the largest referral hospital within the Warri metropolis. It operates outpatient diabetes clinic twice every week with an average of between 50 and 60 type 2 diabetes patients visiting the hospital per diabetes clinic day. The target population was all the consented male and female type 2 diabetic patients from 35 years and above who attended the outpatient diabetic clinic within the study period of 4 months (May-August). Thus, 350 type 2 diabetic patients who met the inclusion criteria were recruited for the study. The inclusion criteria were confirmed type 2 diabetes mellitus, aged at least 35 years, attending the diabetic clinic during the study period and giving informed consent to participate in the study. The questionnaire was pretested among 20 type 2 diabetes patients in another secondary hospital in a different location. After the pretesting, some questions in the questionnaire were modified and reframed to ensure validity of the instrument and facilitate patients' understanding. The final semistructured questionnaire was interviewer-administered to solicit respondents' sociodemographic characteristics, adherence to medication and dietary regimen, determinants of nonadherence to medication and dietary regimen, and ways of improving medication and dietary treatment. Cronbach alpha test reliability was used to determine the reliability of the instrument. The Cronbach alpha reliability statistics gave 0.821. Level of adherence to medication was measured on 18-point scale graded; partial (0-10) and strict (>10), while level of adherence to dietary treatment was measured on a 6-point scale graded partial (0-3) and strict (>3). Ethical approval was obtained from Delta State Ministry of Health, Asaba. The collected data was entered into Statistical Product and Service Solutions (SPSS) version 15.0 anddescriptive statistics was used to evaluate frequency distribution, while chi-square test and logistic regression were performed to test for associations between variables of interest with level of significance set at $P < 0.05$.

RESULTS

Of the 350 respondents, most were females (n = 213, 60.9%), than males (n = 137, 39.1%). Overall mean age of the respondents was 57.9 ± 9.8. Majority, were married (n = 273, 78.0%). More than one-fourth (n = 98, 28.0%) had post-secondary education, while more than one-third (n = 133, 38.0%) were traders [Table 1].

Furthermore, in Table 1, 71 (20.3%) respondents from age group 55-65 strictly adhered to medication, while almost one-fourth (n = 79, 22.6%) of age group 45-54 strictly adhered to dietary treatment. There was an association between the various age groups, educational status, and adherence to medication and dietary treatment, respectively.

As shown in Table 2, logistic regression on the determinants of nonadherence to medication treatment showed that taking alternative traditional medicines (herbs) for the

Table 1: Sociodemographic characteristics and level of adherence to medication treatment				
Variable	Frequency (%)	Level of adherence to medication and dietary treatment		P - value
		Partial (%)	Strict (%)	
Age (years)				
35-44	29 (8.3)	17 (4.9), 13 (3.7)*	11 (3.1), 15 (4.3)*	0.03, S
45-54	104 (29.7)	39 (11.1), 26 (7.4)*	61 (18.9), 79 (22.6)*	0.04, S*
55-64	113 (32.3)	42 (12.0), 36 (10.3)*	71 (20.3), 77 (22.0)*	
65-74	90 (25.7)	41 (11.7), 36 (10.3)*	49 (14.0), 54 (15.4)*	
>75	14 (4.0)	5 (1.4), 3 (0.9)*	9 (2.6), 11 (3.1)*	
Sex				
Male	137 (39.1)	58 (16.6), 44 (12.6)*	79 (22.6), 93 (26.6)*	0.59, NS
Female	213 (60.1)	86 (24.6), 86 (20.0)	126 (36.3), 43 (40.9)*	0.88, NS*
Marital status				
Single	1 (0.3)	0 (0.0), 0 (0.0)*	1 (0.3), 1 (0.3)*	0.61, NS
Married	273 (78.0)	111 (31.7), 7 (24.9)*	163 (46.6), 187 (53.4)*	0.62, NS*
Widow/Widower	76 (21.7)	33 (9.4), 27 (7.7)*	42 (12.0), 48 (13.7)*	
Educational Status				
No formal education	34 (9.7)	12 (2.4), 9 (2.4)*	22 (6.3), 25 (7.1)*	0.02, S
Primary education	75 (21.4)	30 (8.6), 29 (8.3)*	45 (12.9), 46 (13.1)*	0.01, S*
Secondary education	143 (40.9)	57 (16.3), 42 (12.0)*	86 (24.6), 101 (28.9)*	
Tertiary education	98 (28.0)	45 (12.9), 34 (9.7)*	53 (15.1), 64 (18.3)*	

S: Significant, NS: not significant, *Level of adherence to dietary treatment

treatment of disease was the major contributing variable at odds ratio (OR) = 0.425, 95% confidence interval (CI) = 0.568-1.916, while the least was taking incomplete doses of prescribed medicine OR = 11.201 95% CI = 6.927-18.112.

Similarly in Table 3, logistic regression on the determinants of nonadherence to dietary treatment showed that eating food in large quantity that should be taken in little quantity was the major contributing variable at OR = 6.286, 95% CI = 3.919-10.083; while the least was eating foods that one should stop taking because of the disease OR = 12.010, 95% CI = 7.422-19.435.

Figure 1 shows the level of adherence to medication treatment, with more than half (n = 206, 58.9%) strictly adhering to medication treatment. Similarly, Figure 2 shows the level of adherence to dietary treatment, with more than two-third (n = 236, 67.4%) strictly adhering to dietary treatment.
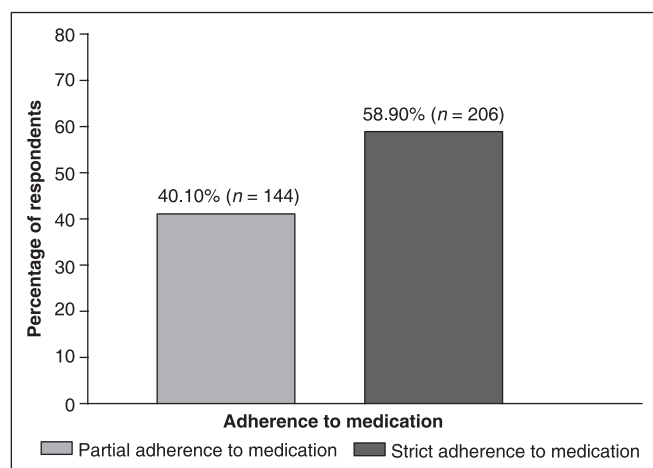
As shown in Table 4, less than half (n = 164, 46.7%) of respondents suggested patients exhibiting self-discipline, as a way of improving medication and dietary treatment, and the least was government should equip hospitals (n = 8, 2.3%); while less than half (n = 149, 42.6%) said lack of awareness about the disease was the major challenge confronting diabetic patients, and the least was food stuff is expensive (n = 4, 1.1%) [Table 5]. Similarly in Table 6, more than two-third (n = 229, 65.4%) suggested following recommended guidelines as a way of overcoming challenges confronting diabetic patients, while the least was doctors should prescribe drugs adequately (n = 32, 9.1%).

DISCUSSION

Results showed that most of the respondents were between the ages of 55 and 64 years of age, which is similar with previous studies.[8,9] This age range might be because the
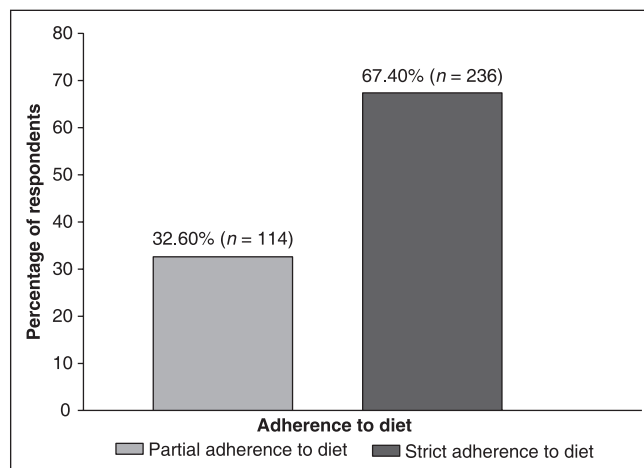

Figure 1: Level of adherence to medication treatment

Figure 2: Level of adherence to dietary treatment

Table 2: Determinants of nonadherence to medication

Variables	df	P - value	OR	95% CI
Use of alternative traditional medicines	1	0.00	0.425	0.568-1.916
Continuous use of drugs according to doctor's prescription	1	0.00	4.129	3.861-15.625
Side effects of the drug after use	1	0.00	4.965	3.346-7.367
Sense of well-being/healing	1	0.00	5.347	3.453-8.280
Forgetfulness	1	0.00	5.487	3.630-8.296
Skipping doses of prescribed medicine	1	0.00	7.450	4.680-11.858
Preference for medicines from local pharmacy store to the prescription by the physician	1	0.00	9.991	6.125-16.289
Taking other medicines prescribed by friends and relations	1	0.00	10.934	6.782-17.628
Taking incomplete doses of prescribed medicine	1	0.00	11.201	6.927-18.112

df: Degrees of freedom, OR: Odds ratio, CI: Confidence interval

Table 3: Determinants of nonadherence to dietary treatment

Variables	df	P - value	OR	95% CI
Eating food in large quantity that should be taken in little quantity	1	0.00	6.286	3.919-10.083
Faith healing preventing one from adhering to recommended diet	1	0.00	9.904	6.244-15.710
Eating foods that one should stop taking because of the disease	1	0.00	12.010	7.422-19.435

df: Degrees of freedom, OR: Odds ratio, CI: confidence interval

Table 4: Respondent's view on ways of improving medication and dietary treatment

Variable	Frequency (n = 700)**	Percent (%)
Patients should seek more information about the disease	140	40.0
Health care should be easily accessible	139	39.7
Stick to doctors instructions	139	39.7
Patients should exhibit self-discipline	164	46.7
Patients should attend hospital regularly	49	14.0
Regular workshop on diabetic education should be organized	67	19.1
Government should help in subsidizing the drugs	54	15.4
Pray to God for help	55	15.7
Find the cure for the disease	31	8.9
Free treatment	47	13.4
Availability of drugs	46	13.1
Taking drugs regularly	34	9.7
Creation of awareness	22	6.3
Regular counseling	18	5.1
Government should equip hospitals	8	2.3

**Multiple responses

Table 5: Major challenges confronting diabetes patients

Variable	Frequency (n = 700)**	Percent (%)
Lack of awareness about the disease	149	42.6
Age of patients and what they feel and go through	126	36.0
Stigma in mixing with friends and relations	73	20.9
Restriction in drinking and eating	118	33.7
Financial constraint	76	21.7
Nonchalancy and carelessness on the part of patients	92	26.3
Individual differences/belief	121	34.6
Ignorance on the importance of adhering to treatment	132	37.7
Burden of ingesting and injecting drugs	89	25.4
Counterfeit drugs in the system often discourage diabetes patients	7	2.0
Food stuff is expensive	4	1.1

**Multiple responses

Table 6: Respondent's view of overcoming challenges confronting diabetes patients

Variable	Frequency (n = 700)**	Percent (%)
Creation of more awareness about the disease	137	39.1
Conditions of diabetic patients should be improved	97	27.7
Patients should be realistic and show strong will to adhere	77	22.0
Praying to God for help	69	19.7
Financial support from the government and relations	57	16.3
Diabetic patients should prepare adequately before leaving home to avoid temptation	40	11.4
Following recommended guidelines	229	65.4
Empower diabetic patients with knowledge on management of the disease	91	26.0
Attending clinic regularly	49	14.0
Counseling on the need to adhere to treatment	79	22.6
Proper management of finance when it is available	19	5.4
Doctors should prescribe drugs adequately	32	9.1

**Multiple responses

study focuses on type 2 diabetes mellitus, which is usually adult onset. Also, most of the respondents were females and traders which is consistent with the study location were majority of traders are females.

Linda[10] reported that sociodemographic variables such as age, gender, and race appear to influence the degree of adherence to medication and dietary treatment. However, age and educational status had a significant association with both adherence to medication and dietary treatment; while sex, marital status, and occupation had no association with both adherence to medication and dietary treatment. This is similar to previous findings where age and educational status had a significant association with adherence to treatment,[7] while contrary to the same findings by Okolie et al.,[7] were sex, marital status, and occupation had a significant association with adherence to treatment.

The level of adherence from the study showed above average for strict and partial adherence to medication treatment which is consistent with previous studies.[10,12] Also, taking alternative traditional medicines (herbs) for the treatment of the disease was the major determinant variable contributing to nonadherence to medication treatment. This use of alternative traditional medicine might be due to the perceived inefficacy of orthodox medicine and the easy access to traditional herbs which are usually obtained from traditional healers and local herb dealers.

Similarly, the level of adherence from the study showed above average for strict and below average for partial adherence to dietary treatment which is consistent with previous studies.[10-12] In addition, eating food in large quantity that should be taken in little quantity was the major determinant variable contributing to nonadherence to dietary treatment. This finding might be due to respondents from the study location having difficulty in adjusting to little or moderate carbohydrate intake, which is the main staple food of the people. This finding is similar to previous findings where respondents had difficulty in adjusting to dietary treatment.[8,12]

Respondent's view of improving adherence to medication and dietary treatment is self-discipline by diabetic patients which shows the role of self-management in managing the disease and preventing complications associated with diabetes.[7]

Furthermore, lack of awareness about the disease was the major challenge confronting diabetic patients indicating the importance of improving access to

information about the disease which is vital in its successful management.[8] This was corroborated by majority of the respondents who suggested following recommended guidelines and creation of more awareness about the disease as ways of overcoming challenges confronting diabetic patients.

CONCLUSION

In most part of Nigeria, use of herbs for treatment of diseases and eating of food composed mainly of carbohydrate as staple meal is common. Thus, respondents in the study had a challenge of use of alternative medicine (herbs) and eating food above recommended quantity. Therefore, health education on diabetic care with emphasis on adherence to medication and dietary treatment regimen, among other strategies, should be organized regularly for diabetic patients.

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