Awareness Assessment of Treatment Target Goals for Persons Living with Type 2 Diabetes Mellitus Accessing Care in a Tertiary Health Facility, Southeast Nigeria

M. O. Nkpozi[1]*, I. F. Ogbonna[2], C. M. Ezeude[3], G. C. Nwala[2]

ABSTRACT

Background: Diabetes clinic visits by persons living with type 2 diabetes mellitus (PLWDM) afford the healthcare professionals (HCPs) opportunities to assess their achievements of the recommended treatment targets for glycated hemoglobin (HbA1C), lipid profile, blood pressure (BP), and body mass index (BMI). Meeting these targets significantly affect treatment outcome in diabetes mellitus (DM). Awareness of the treatment targets by PLWDM attending the diabetes clinic of Abia State University Teaching Hospital (ABSUTH), Aba, Southeast Nigeria, is not known. This study, therefore, set out to bridge this gap in knowledge. **Methodology**: This was a cross-sectional study in which consenting PLWDM attending the diabetes clinic of ABSUTH, Aba, were consecutively recruited. Interviewer-administered questionnaire was filled for each subject to assess their knowledge and awareness of the treatment target goals for HbA1C, BP, lipid profile, and BMI. Data obtained were analyzed using Statistical Package for Social Sciences version 23.0 software. **Results**: A total of 165 persons living with DM, 60 (36.4%) males and 105 (63.6%) females, participated in the study. Majority of them (89.1%) were ignorant of HbA1C and its implications while awareness of their treatment target goals for HbA1C, BP, lipid profile, and BMI was very low at 1.8%, 16.4%, 1.8%, and 0%, respectively, despite their formal educational levels. **Conclusion/Recommendation**: Awareness of treatment target goals for HBA1C, BP, lipid profile, and BMI was very low among PLWDM in Aba, southeast Nigeria. It is strongly recommended that the HCPs step up their games in diabetes education programs.

Keywords: Awareness, Blood pressure, Body mass index, Glycemic control, Lipid profile, Southeast Nigeria, Treatment target goals, Type 2 diabetes mellitus

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INTRODUCTION

There is an increasing prevalence of diabetes mellitus (DM) globally,[1] more so, in sub-Saharan Africans[2] due to aging of the population, improving survival of people living with diabetes, obesity, increased urbanization, and westernization, dietary changes, and physical inactivity. It is projected by the WHO that 552 million people worldwide would have DM by 2030, but it currently affects 371 million people in the world with about 5 million affected Nigerians.[3]

The goals of treatment of type 2 DM include to avoid acute decompensation, prevent or delay chronic complications, decrease mortality, and maintain a good quality of life.[4] The treatment targets[5,6] for type 2 DM (T2DM) patients include a fasting capillary blood glucose (FBG) of 80–120 mg/dl, post-prandial blood glucose (PPG) of 80–140 mg/dl, glycated hemoglobin (HbA1C) <7%, low-density lipoprotein cholesterol (LDL-C) <100 mg/dl, blood pressure (BP) <130/85 mmHg, and body mass index (BMI) 18.5–24.9 kg/m². Good glycemic control reduces the incidence of microvascular complications[7,8] of DM (retinopathy, nephropathy and neuropathy) but not so important in the prevention of DM macrovascular complications which include ischemic heart disease (IHD), stroke, and peripheral vascular disease.[8] The macrovascular complications of DM, especially IHD are the main causes of death in diabetic patients.[9,10] It is, also, known that the cardiovascular risk of diabetic patients is similar to that of persons without diabetes who, already, have ischemic heart disease.[11]

According to the Clinical Practice Guidelines for Diabetes management in Nigeria,[12] persons living with diabetes should have their fasting lipid profiles measured annually and their BP measured at each clinic visit. Those with low-risk lipid values (LDL-C <100 mg/dl, high-density lipoprotein cholesterol (HDL-C) >50 mg/dl

[1]Department of Internal Medicine, Abia State University Teaching Hospital (ABSUTH), Aba, Nigeria.

[2]Department of Paediatrics, Federal Medical Centre, Umuahia, Nigeria.

[3]Department of Internal Medicine, Nnamdi Azikiwe University Awka, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria.

Corresponding Author: Dr. M. O. Nkpozi, Department of Internal Medicine, Abia State University Teaching Hospital (ABSUTH), Aba, Nigeria. E-mail: marcelnkpozi@gmail.com

and TG <150 mg/dl) should have their fasting lipid profiles assessed every 2 years. The guidelines also stated that for diabetic patients with overt cardiovascular disease (CVD), a lower LDL-C goal of <70 mg/dl should be used while a target BP goal of <130/80 mmHg is set for persons living with T2DM (PLWDM).[12]

Persons living with T2DM visit diabetes clinics from time to time to access diabetes care services. The frequency of such visits varies depending on healthcare systems of the country and the chronic complications afflicting the patients. At such clinic visits, persons living with diabetes are assessed, among other things, for their achievement of the treatment targets for glycemic control, lipid profile, BP, and BMI. Patients can only strive to reach treatment targets if they know what their treatment targets should be. The extent of this knowledge and awareness is dependent on the

patients, HCPs, existing healthcare system, and diabetes education programs.

Awareness of the treatment targets by persons living with DM attending the diabetes clinic of ABSUTH, Aba, Southeast Nigeria, is not known. Published literature on awareness of these anthropometric and metabolic parameters in Nigeria, to the best of our search and knowledge, is nonexistent. This study, therefore, set out to determine the awareness and knowledge of the glycemic, BP, BMI and fasting lipid profile goal targets for persons living with T2DM in Aba, southeast Nigeria Findings from this study will highlight the shortcomings of the current health education practices and, therefore, will influence endocrine practice especially diabetes education programs in the sub-region.

SUBJECTS AND METHODS

Study Design and Setting

This was a cross-sectional study conducted at the diabetes clinic of ABSUTH, Aba. Aba is a commercial city in the southeast region of Nigeria noted for the craftwork and trading activities of her residents. Operating once a week, on every Wednesday, the diabetes clinic provides diabetes care services to persons living with diabetes in Aba and the neighboring communities and states. The diabetes clinic is headed by a consultant in the Endocrinology, Diabetes, and Metabolism (EDM) unit of the Department of Internal Medicine of ABSUTH, Aba, and assisted by medical residents and interns. The diabetes clinic has other support staff units such as the nursing unit, medical records, pharmacy section, and the cleaners. Diabetic patients accessing diabetes care services in the clinic have their vital signs, including BP assessed by the Nursing unit before being attended to by the EDM unit.

Each consenting study subject was consecutively recruited when they sought diabetes care services at the diabetes clinic of the hospital. By the time of being recruited, each subject had had his/her BP measured by the nursing unit. An interviewer-administered questionnaire was completed for each subject.

Inclusion Criteria

All consenting persons living with T2DM for at least 1 year and presenting at the diabetes clinic were included in the study. Patients with repeat visits within the study period participated once.

Exclusion Criteria

Persons living with T2DM for <1 year and attending the diabetes clinic within the study period were excluded from the study. T1DM patients were excluded because some of them are minors and dependent on their parents/guardians for their health/diabetes education while BP and BMI do not usually pose problems for them. Again, patients who declined consent or presented with end-stage renal disease, heart failure, foot ulcer disease, or acute diabetic complications (such as diabetic ketoacidosis) were excluded from the study.

Recruitment and Data Collection

Using the consecutive type of non-probability sampling technique,[13] 165 consenting subjects that met the inclusion criteria for the study were recruited between September 2 and October 31, 2019. For each of the study subjects, the following data were collected: socio-demographic characteristics, weight, height, duration of DM, current HbA1C result, knowledge of the index BP just measured by the nursing unit, and awareness of treatment target goals for BP, HbA1C, lipid profile, and BMI. The Nursing unit was instructed not to tell any of the subjects their BP readings unless the subject requested to know. These aforementioned data were captured in the interviewer-administered questionnaire as the study subjects presented to the EDM unit. The BMI was calculated for each patient using the formula, weight in kilograms/height in meters squared. For each subject, soon after capturing their data, he/she was educated on the treatment target goals for BP, HbA1C, lipid profile, and BMI. Ethical approval was obtained from the Institution's Health Research Ethics Committee before commencing the study, and patients' written consent was obtained too.

Statistical Analysis

The Statistical Package for Social Sciences (SPSS Inc. Chicago IL. USA) version 23.0 statistical software was used for data analysis. For continuous variables such as the ages of the study subjects, BMI and duration of living with DM, mean values and standard deviations (SD) were calculated and the relevant means compared using two samples independent t-test. Categorical variables such as gender and awareness of treatment target goals for HbA1C, BP, lipid profile, and BMI were summarized using proportions expressed in percentages. The relevant categorical variables were compared using the non-parametric test, Chi-square test. The level of statistical significance was set at $P < 0.05$.

RESULTS

A total of 165 subjects participated in the study and their socio-demographic characteristics and mean duration of living with DM are shown in Table 1. The subjects' age range was 32–80 years with a mean age of 59.76 ± 10.46; males 59.00 ± 9.13, females 60.20 ± 11.26. The difference in the mean ages of the male and female patients was not statistically significant ($t = 0.406$, $P = 0.686$). Among the participants, 147 (89.1%) did not know anything about HbA1C at the time of being recruited, only 18 of the subjects (10.9%) had any HbA1C test results at recruitment, while only 3

Table 1: Sociodemographic characteristics of the study subjects and their duration of living with diabetes mellitus

Indices	Frequency (n=165), n (%)
Mean age in years (±SD)	59.76±10.46
Gender	
Male	60 (36.4)
Female	105 (63.6)
Occupation	
Self-employed	75 (45.5)
Civil servant	33 (20)
Retired	57 (34.5)
Highest level of education	
No formal education	12 (7.3)
Primary education	72 (43.6)
Secondary education	36 (21.8)
University education	45 (27.3)
Mean duration of DM in years (±SD)	7.91±7.77

SD: Standard deviation, DM: Diabetes mellitus

persons (1.8%) were aware of their HbA1C target. Treatment target awareness levels for BP 27 (16.4%), lipid profile 3 (1.8%) and BMI 0 (0%) were very low.

Even with a mean duration of living with DM at 7.91 ± 7.77 years, 51 (31%) did not care asking the Nursing unit and knowing what their BP reading was on the day of their recruitment. The subjects' level of education did not have a significant relationship with their ability to know their BP readings on the day of their recruitment ($X^2 = 6.495$, df = 3, $P = 0.09$). The BMI range of the subjects was from 16.2 to 46.1 kg/m^2 with a mean BMI of 27.64 ± 5.82 kg/m^2. More females than males were overweight and obese as shown in Table 2, but this difference between the gender was not statistically significant ($X^2 = 3.413$, $P = 0.64$). Finally, 147 (89%) of the study subjects have not done their fasting lipid profiles in the prior 1 year while only 18 (10.9%) have a recent fasting lipid test results at recruitment.

DISCUSSION

The main findings of this study were that majority of persons living with T2DM accessing care at ABSUTH diabetes clinic were not aware of their treatment target goals for HbA1C, BP, lipid profile and BMI regardless of the educational levels they attained and most of them did not know what HbA1C was for.

Glycated hemoglobin (HbA1C) is a measure of glycemic control in the prior two to three months, and it correlates very well with the degree of microvascular complications (retinopathy. nephropathy, and neuropathy) someone living with DM will experience in future years.[8,14] In other words, HbA1C has a strong predictive value for diabetes complications. In the index study, the majority of the study subjects (89%) did not know what HbA1C was and its implications. This is a worrisome situation as such ignorance is not in tandem with the Clinical practice guidelines for Diabetes management in Nigeria which recommended that HbA1C should be checked at least, 2 times in a year or quarterly in patients whose therapy has changed or who are not meeting glycemic goals.[12] Explanation for this ignorance of the study participants is not obvious from the study but is probably as a result of shoddy or poorly executed diabetes education programs. International Diabetes Federation's optimal target[3] for glycemic control is FBG of 72–120 mg/dl, 2 h PPG 72–140 mg/dl, and HbA1C of ≤6.5%. As majority of the study subjects did not know what HbA1C meant, one is not surprised that their awareness of the treatment target goal for HbA1C is very low.

The IDF optimal target[3] for BMI (kg/m^2) for type 2 diabetic patients is <25, but the mean BMI of the study subjects in the index study was 27.64 ± 5.82 kg/m^2 with more females being overweight and obese than males. Overweight and obesity in DM patients increase their insulin resistance and anti-diabetic drugs requirement. Unfortunately, in the index study, none of the study subjects was aware of his/her BMI treatment target. Without knowing what the optimal target is, it is doubtful if the overweight and obese persons living with diabetes will have the discipline to adopt regular exercise programs and other lifestyle modifications needed to achieve weight loss.

In this study, a large percentage of the subjects (31%) did not care to know and remember their BP readings at the point of being recruited despite that it is known that hypertension is a risk factor for CVDs (such as IHD, stroke, and peripheral artery disease) in persons living with DM. Hypertension and dyslipidemia commonly coexist with DM, and all three of them (hypertension, dyslipidemia, and DM) are clear risk factors for CVD; the latter being the major cause of mortality in persons living with DM.[15,16] In the index study, only 16.4% were aware of their optimal BP goal. This is not good enough and may be in keeping with earlier studies which have shown that most people in the general population are not aware of their BP status.[17,18] The explanation why there is low awareness of BP treatment target is not obvious from this study but may have to do with the relative lack of symptoms attributable to raised BP and probable poor health-seeking behavior of the residents of Aba, southeast Nigeria.

Finally, only 18 (10.9%) of the study subjects had recent fasting lipid profile checks despite recommendations by the Nigerian Diabetes Management guidelines that FLP should be measured annually in all persons living with diabetes.[12] A low awareness of the need for and the optimal lipid goal for persons living with DM as noted in this study is worrisome because dyslipidemia is an independent risk factor for CVD in diabetic patients. Addressing multiple risk factors of CVDs goes a long way in improving diabetes outcome, and this starts with knowing the treatment target goals.

CONCLUSION/RECOMMENDATIONS

This study has shown a very low awareness of the treatment target goals for BMI, BP, glycemic control, and lipid profile by PLWDM accessing diabetes care services at ABSUTH, Aba. This low awareness has no relationship with their educational levels. It is, therefore, recommended that PLWDM, health policy planners, healthcare professionals, diabetes care teams, diabetes educators, and governments need to do more as regards training of health personnel, diabetes self-management education, and general health education to address the findings/shortcomings noted in this study. Effective health education is a strong weapon to check the awareness deficiencies/gaps of the PLWDM.

AUTHOR'S CONTRIBUTIONS

Dr Marcellinus O. Nkpozi - Conception and design of the research, collection of the data with drafting of the manuscript. He, also, takes overall responsibility for the study. Dr. Ikechukwu F. Ogbonna - Analysis and interpretation of the data. Dr. Chidiebele M Ezeude - Final approval of the manuscript. Dr. Gabriel C Nwala - Critical revision of the manuscript.

Table 2: Gender distribution of the study subjects according to their body mass index

BMI (kg/m^2)	Male (n=60), n (%)	Female (n=105), n (%)	Total (n=165), n (%)
Underweight (<18.5)	0	3 (2.9)	3 (1.8)
Normal weight (18.5–24.9)	15 (25)	33 (31.4)	48 (29.1)
Overweight (25–29.9)	33 (55)	39 (37.1)	72 (43.6)
Obesity: Grade 1 (30–34.9)	9 (15)	15 (14.3)	24 (14.5)
Obesity: Grade 2 (35–39.9)	0	9 (8.6)	9 (5.5)
Morbid obesity (≥40)	3 (5)	6 (5.7)	9 (5.5)

BMI: Body mass index

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