



Challenges Faced in Accessing Diabetes Drugs in Low and Middle Income Settings in Aba North, Southeast Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author NJC is the leading author who played a vital role for the successful completion of the work, initiating the research topic and making sure every author contributed. Author EAO ensured that the statistical analysis was successfully done and completed. Authors NOIS, OEC, CNR and ANA contributed immensely in data collection and the writer up while authors ODC and DJI gave financial support and review the literature. We highly appreciate each other's contribution to this work. All authors read and approved the final manuscript.

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ABSTRACT

Diabetes is a costly disease, placing a high financial burden on the patient and the healthcare system in every nation. If poorly managed, it can cause a lot of damage to body parts such as blindness, loss of kidney function. The aim of this study is to determine the challenges faced in

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accessing drugs for diabetes mellitus management in south-eastern Nigeria. The study was conducted between January and December, 2014 in Aba North which is one of the Local Government Areas in Abia State. The study design was a descriptive cross-sectional survey involving face-to-face interview with patients based on a structured questionnaire format. Stratified random sampling technique was used to obtain the required sample size of 200 from the sampling frame on only those who met the inclusion criteria. The instrument used for data collection was questionnaire. The generated data were presented into table/charts, and also analyzed using descriptive statistics and chi-square statistics. The level of association was accepted at 0.05 significant differences. The results of this study showed that age of the respondents, from 51 years and above were highest 71(35%) compared with other age ranges. The educational level of the respondents was majorly on secondary level of education (46.5%). Access to diabetes drugs, 136(68%) of the respondents said they have access to diabetes drugs. Socioeconomic status influences the access of diabetes drugs (55%) and availability of diabetes drugs (80%). Also cost of diabetes drugs have high influence of (82.5%) on accessing diabetes drugs. Based on the findings of this study, it was concluded that majority of the patients with diabetes have access and knowledge of diabetes drugs but still some are yet to meet up with it due to some factors. Therefore, there is need to strengthen diabetes care centres with special focus on improving drugs availability and integration of health services for diabetes at the community level.

Keywords: Diabetes; drugs; Income and socioeconomic status.

1. INTRODUCTION

Diabetes mellitus belong to the group of common metabolic disorder that shares the phenotype of hyperglycaemia. Diabetes could be defined as a health condition in which there is an increase in levels of blood glucose (blood sugar) above normal in human body and leads to insufficient production of insulin by the body. It is a chronic disorder that affects the metabolism of carbohydrates, fats, proteins and electrolytes in the body, leading to severe complications which are classified into acute, sub-acute and chronic [1].

It is also the most common endocrine-metabolic disorder characterized by chronic hyperglycaemia giving rise to the risk of microvascular complications (retinopathy, nephropathy, and neuropathy) and macrovascular complications (ischaemic heart disease (IHD), stroke and peripheral vascular disease) damage with associated reduced life expectancy and diminished quality of life [2].

The burden of diabetes was not only on the quality of life of affected individuals and their families, but also on the country's socioeconomic structure because of low and middle-income settings. In the same vein, 29% of diabetes deaths occur among people under the age of 50, compared to 13% in high-income countries [3], which are the active work forces. Considering the two major type of diabetes as type 1 diabetes and type 2 in terms of insulin resistance, the important comparisons and contrasts between

type 1 diabetes and type 2 diabetes are highlighted in terms of hepatic fat, fat partitioning and lipid profile, and how these may differ between type 1 diabetic patient with and without double diabetes. A patient with type 1 diabetes that is placed on an intensive insulin regimen is clearly gaining a significant amount of weight; early consideration should be given to regimen in the context of diet and lifestyle in order to limit weight gain. It may be necessary to ascertain information on family history of type 2 diabetes in such patients too.

All forms of diabetes increase the risk of acute and chronic complications, which affect virtually every system of the body. The complications include foot problem, renal disease, eye problem, cardiovascular disease etc. In the western world, diabetes mellitus (DM) is the leading cause of blindness, non-traumatic amputation and chronic renal failure, which are on very much increase. Globally, there is serious challenge of having access to drug use for diabetes treatment where 15.1 million in 2000 with diabetes do not really have access to drugs; and the number of people with diabetes worldwide is projected to increase to 366 million by 2030 and all need drugs for control measure [4]. The situation in the developing world, particularly in Africa, is even worse due to late diagnosis and poor access to diabetic care [5]. One of the biggest challenges for health care providers today is addressing the continued needs and demands of individuals with chronic illnesses like diabetes [6]. Due to low access of diabetes drugs in most local setting, this research focuses on the challenges faced by

rural and urban people of Aba North on diabetes drugs management. The needs of diabetic patients are not only limited to adequate drugs (glycemic) control but also correspond with preventing complications; disability limitation and rehabilitation. The primary aim of this study is to determine the challenges faced in accessing drugs for diabetes mellitus management.

In addition, the common knowledge and better understanding of the risk factors limiting access to diabetes drugs as revealed by the study will help to educate the prospective/target victims on how they could control the situation with the use of prescribed diabetes drugs when it has already developed. This study will help as a resource material in creating the necessary awareness of the availability existence and nature of the risk factors of diabetes mellitus which if handled very effectively will ultimately help in reducing the rate of diabetes and mortality associated with it.

2. MATERIALS AND METHODS

The study was conducted in Aba North South-Eastern Nigeria, on people with diabetes from January to December, 2014. Aba North is a Local Government Area of Abia State, Nigeria. Its headquarters are in the town of Eziama Urata, 05°20'N 07°19'E / 5.333°N 7.317°E / 5.333; 7.317 with an estimated population in of 6,446 in 2009. The age group was between 20-60 years who have trading as their major occupation. The study method was a descriptive cross-sectional survey involving face-to-face interview with patients based on a structured questionnaire format. The descriptive approach was based on the in-depth interview with the people in the study area to ascertain the challenges faced in accessing diabetes drugs in low and middle-income setting. Stratified random sampling technique was used to obtain the required number of respondents from the sampling frame. A sample of 50 respondents was selected from four-health centres in Aba North LGA giving a total of 200. Those who did not meet the inclusion criteria were excluded from the study. The study population includes all adults aged 20 years and above diagnosed with diabetes both type 1 and 2 attending and not attending health care centre that consented to be part of the study. The study involved both outpatient and in-patients. The outpatients in this research were identified, and approached with a designed questionnaire. The criteria for inclusion in the study include:

(a) The patient must have been properly diagnosed as diabetic, that is having a grossly elevated random blood glucose above a specified range (whole blood glucose > 6.7 mmol/L or plasma glucose 7.8 mmol/L) for a long period of time; or after a formal 75 g OGTT has been performed, having a venous plasma glucose level 2 hrs after loading as > 11.1 mmol/L.

(b) Patients must have been on drug treatment for upwards of 6 months. Patients who were newly diagnosed were excluded from this study. Patients on dietary modifications and/ or exercise alone were not included.

The instrument used for data collection was questionnaire, which also served as interview guide for illiterate subjects. It consisted of 25 close-ended questions arranged in three sections as follows: The first section "A" contained 5 questions used to collect the socio-demographic data such as Age, Sex, Religion, Educational status and Occupation. The second section "B" consisted of 15 questions to elicit information on the factors/challenges of accessing diabetes drugs and section "C" comprise of 5 questions on management/control techniques by the diabetic patients (self-care) management. The literate subjects completed the questionnaires independently, while the questions were read-out and interpreted for the illiterate respondents and their responses were recorded. The questionnaire was adopted from a survey on the factors or challenges faced in accessing diabetes drugs. The administration of the questionnaire is preceded by the observance of the necessary culture norms of the people, explanation of the study objective, filling of the consent form and the interview. The instrument was validated by Diabetes Care professionals from diabetic care centers in which the questionnaire was reviewed to ensure relevance and clarity of the items. The experts/professionals (diabetic's educators, nurses and physicians) were clarified appropriate use of terminology such as duration of diabetes and factors affecting the use of drugs. The reliability of the instrument was satisfied by the diabetic experts through assessment of the important variables such as challenges of drugs use, treatment measures and management in terms of prevention. The completed questionnaires were sorted out and put in tables, frequency and percentages. The generated data were plotted into charts, and also analyzed using descriptive statistics and chi-square statistics.

3. RESULTS

The results of the data collected were gathered and interpreted as shown Table 1, it revealed the socio-demographic characteristics of the respondents assessed on the challenges faced in accessing diabetes drugs in low and middle-income settings in Aba North, Abia State.

Table 1. Shows the socio-demographic characteristics of the respondents

Variables	Frequency (N=200)	Percentage (%)
Age of the respondents		
<20 yrs	10	5.0
21-30 yrs	24	12.0
31-40 yrs	41	20.5
41-50 yrs	54	27.0
51 yrs above	71	35.5
Total	200	100.0
Religion of the respondents		
Christianity	194	97.0
Muslim	6	3.0
Total	200	100.0
Marital status of the respondents		
Married	130	65.0
Single	53	26.5
Divorced	17	8.5
Total	200	100.0
Sex of the respondents		
Male	123	61.5
Female	77	38.5
Total	200	100.0
Monthly income of the respondents		
< ₦1000	1	.5
₦1000-10,000	33	16.5
₦11-20,000	34	17.0
₦21-30,000	44	22.0
₦31-40,000	11	5.5
₦41-5,0000	11	5.5
> ₦50,000	66	33.0
Total	200	100.0
Place of residence		
Urban	131	65.5
Rural	69	34.5
Total	200	100.0

Source: Fieldwork, 2014

With regards to the age of the respondents, those with age of 51 years and above were highest 71(35%) compared with other age ranges as follows; 41-50 years had 54(27%), 31-40 years 41(20%), 21-30 years 24(12%) and less than 20 years had 10(5%) respectively.

Religion preference, 194(97%) of the respondents were Christian while Muslim was 6(3%). Marital status of the respondents; 130(65%) were married, 53(26.5%) were single and divorced recorded 17(8.5%). Concerning the sex of the respondents, 123(61.5%) were male while 77(38%) were female. The result also revealed the monthly income of the respondents in accessing diabetes drugs in low and middle-income settings. Those that earned less than one thousand naira had 1(0.5%), respondents that earned ₦41,000-₦50,000 and ₦31,000- ₦40,000 had no difference of 11(5.5%), 33(16.5%) of the respondents earned ₦1,000- ₦10,000, 34(17%) of them earned ₦11,000-₦20,000, those earned ₦21,000-₦30,000 had 44(22%) while 66(33%) of the respondents earned greater than ₦50,000 as their monthly income. Place of residence; 131(65.5%) were lived in urban area while 69(34.5%) lived in rural area. Educational level of the respondents assessed on the challenges faced in accessing diabetes drugs in low and middle-income settings as Fig. 1 indicated, secondary level of education had (46.5%), tertiary level had (26.5%), primary level (16.5%) while no formal education (10.5%) respectively. Occupational status of the respondents was shown in Fig. 2, (27.5%) where civil servants, unemployed had (27.5%), students (16.5%), trader/artisan had (12%), public servant had (11%) while 11(5.5%) were farmer respectively.

Table 2 showed the measures of the knowledge of diabetes on easy access to drugs among respondents. About the type of diabetes the respondents diagnosed of, 106(53%) had type 2 diabetes while 94(47%) had type 1 diabetes. Family history of diabetes mellitus, 173(86.5%) of the respondents agreed they had it in their family while 27(13.5%) said no to that. Results in the same Table 2 also revealed the duration of diabetes among respondents, 1- 4 years duration had 78(39%) which was the highest followed by 5-9 years period 55(27.5%), those who said less than 1 year had 34(17%), 10-14 years duration had 23(11.5%) while 10(5%) of the respondents said greater than 15 years period. Type of treatment employed on diabetic patients as stated by the respondents, both insulin and tablets users had 91(45.5%), those that used tablets were 66(33%) while use of insulin only had 43(21.5%). Classification of body mass index among respondents, underweight had 112(56%), those who have normal weight were 77(38.5%) while overweight had 11(5.5%). Out of

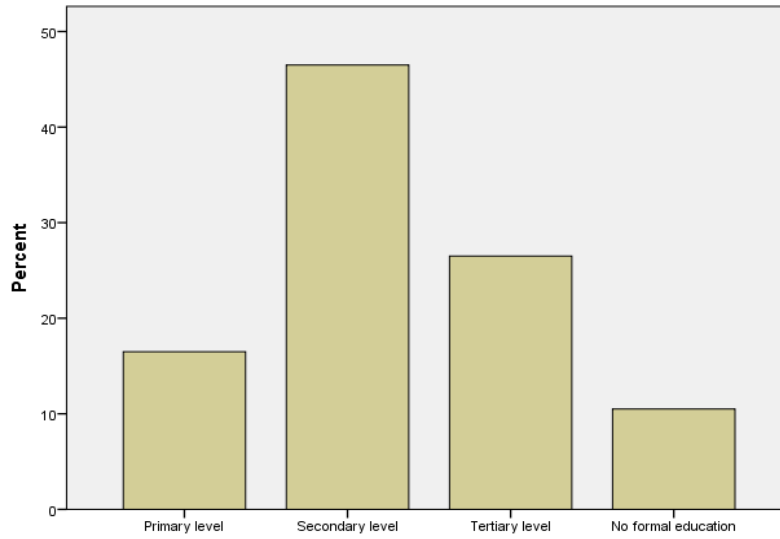


Fig. 1. Shows educational level of the respondents

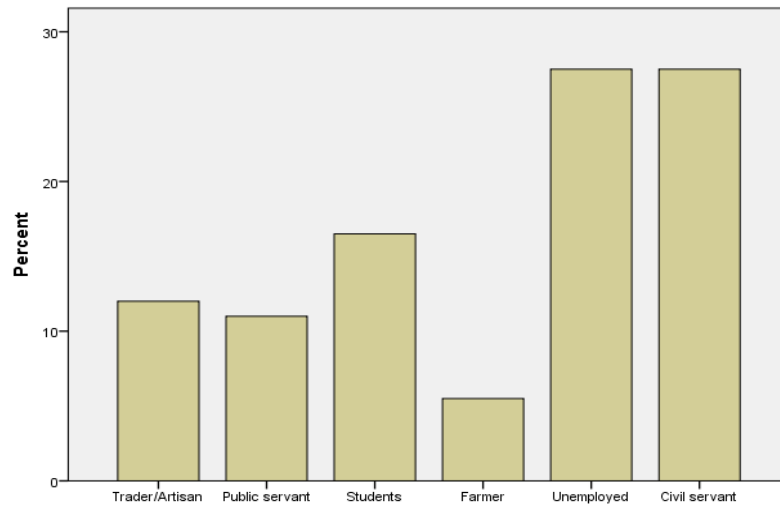


Fig. 2. Shows occupation level of the respondents

200 respondents interviewed, 151(75.5%) of them said 'no' to co-morbidity to diabetes while 49(24.5%) said yes. Responses to diabetes co-morbidities from the respondents recorded as follows; those who said hypertension were 150(75%), Obesity had 22(11%), Ischemic heart disease had 12(6%), Diuretic had 8(4%), calcium antagonist was 6(3%), @-blocker 5(2.5%) while chronic renal failure had 2(1%) respectively.

Table 3 depicted the various prescribed drugs used for diabetes management, 136(68%) of the respondents said they have access to diabetes drugs while 64(32%) of them said no.

Classification of drugs used for diabetes management; Anti-diabetes agents, Insulin had the highest thirty five percent (35%), Metformin was 32(16%) and Sulphonylureas recorded 10(5%). For anti-hypertensive agents: Lisinopril had 50(25%), Rosiglitazone was 2(5%), and ant-plate had 1 (1%).

Table 4 presented various challenges the respondents faced in accessing diabetes drugs.

The challenges of socioeconomic status; 110(55%) of the respondents agreed that socioeconomic status such as good job, high income etc plays an important role in accessing diabetes drugs, 84(42%) of them disagreed while only 6(3%) said they don't know. Availability of diabetes drugs, 160(80%) of the respondents said diabetes drugs are always available, 38(19%) said no while 2(1%) said they don't know. Cost of drugs; 165(82.5%) of the respondents admitted that cost of drugs contributed against access to diabetes drugs, 30(15%) disagreed while 5(2.5%) of them said they don't know. Time commitment; 141(70.5%) respondents agreed time was one of the challenges faced in accessing diabetes drugs, 53(26.5%) of them said no while only 6(3%) said they don't know. 132(66%) of the respondents said lack of trained diabetes educator is a challenge in accessing diabetes drugs, 56(28%) said no while 12(6%) said they don't know. Respondents were interviewed on the drugs (Insulin) shortage affects access to diabetes management, 132(66%) of them agreed, 58(29%) disagreed while 10(5%) of the respondents were they don't know. Social support factor in accessing diabetes, 77(38.5%) accepted that there was a social support, 111(55.5%) did not accept while 12(6%) said no idea. Psychological factors (mental, emotional and behavioural pattern) as challenges of accessing diabetes drugs, 45(22.5%) of the respondents agreed, 142(71%) disagreed and 13(6.5%) stated no idea. Patient's belief (Religion, culture etc) on accessing diabetes drugs; only few of the respondents said yes, majority of them said no while 13(6.5%) were on the opinion that they don't know. Some of the respondents were interviewed on the influence of patient's motivation in accessing diabetes drugs; 27(13.5%) of them said yes, 167(83.5%) said no while don't know had 6(3%). In the same vein, 151(75.5%) of the respondents welcome the idea that negative attitude toward therapy affects the accessing of getting the drugs, 41(20.5%) of them refused and 8(4%) said no idea. Lastly, 154(77%) of the interviewed respondents agreed that healthcare system factors affects the access of getting diabetes drugs, 34(17%) disagreed while 12(6%) clearly stated they don't know.

The difference is significant, the calculated χ^2 value is 25.92 is greater than the critical value. Therefore, knowledge of respondents on access to diabetes drugs uphold as a challenges to diabetes management as seen in Table 5.

The difference is significant, the calculated χ^2 value is 140.89 is greater than the critical value 5.99. Therefore, knowledge of respondents on time toward the search of diabetes drugs is a challenge to diabetes management as seen in Table 6.

Table 2. Shows the measures and knowledge of diabetes for easy access to drugs

Variables	Frequency (N=200)	Percentage (%)
Type of diabetes diagnosed of		
Type 1	94	47.0
Type 2	106	53.0
Total	200	100.0
Family history of diabetes mellitus		
Yes	173	86.5
No	27	13.5
Total	200	100.0
Duration of diabetes		
<1year	34	17.0
1-4 years	78	39.0
5-9 years	55	27.5
10-14 years	23	11.5
> 15 years	10	5.0
Total	200	100.0
Type of treatment employed		
Use of insulin	43	21.5
Use of tablets	66	33.0
Both insulin and tablets	91	45.5
Total	200	100.0
Classification of body mass index (BMI)		
Under weight	112	56.0
Normal weight	77	38.5
Over weight	11	5.5
Total	200	100.0
Have diabetes co-morbidity		
Yes	49	24.5
No	151	75.5
Total	200	100.0
Diabetes co-morbidities are as follows		
Hypertension	150	75.0
Obesity	22	11.0
Chronic renal failure	2	1.0
Ischemic heart disease	16	8.0
Dyslipidaemia	10	5.0
Total	200	100.0

Source: Fieldwork, 2014

The difference is significant, the calculated χ^2 value is 107.3 is greater than the critical value 12.592. This implies that the respondents' financial status influence access to diabetes drugs as seen in Table 7.

Table 3. Shows access of patients to various prescribed drugs use for diabetes management

Variables	Frequency (N=200)	Percentage (%)
Have access to diabetes drugs		
Yes	136	68.0
No	64	32.0
Total	200	100.0
Classification of drugs:		
Anti-diabetes agents		
Metformin (Biguanides)	32	16.0
Sulphonylureas	10	5.0
Insulin	70	35.0
Anti-hypertensive		
ACEI/ARBs(Lisinopril)	12	6.0
Calcium antagonist	6	3.0
Alpha methyl dopa	4	2.0
Diuretic	8	4.0
@-blocker	5	2.5
Other drugs use for hypertension		
Anti-plate	2	1.0
Rosiglitazone	1	.5
Daonil	50	25.0

Source: Fieldwork, 2014

Table 4. Shows challenges faced in accessing diabetes drugs

Variables	Yes	No	Don't know
Socioeconomic status(income, job etc)	110(55%)	84(42%)	6(3%)
Availability of diabetes drugs	160(80%)	38(19%)	2(1%)
Cost of drugs	165(82.5%)	30(15%)	5(2.5%)
Time commitment	141(70.5%)	53(26.5%)	6(3.0%)
Treatment complexity	50(25%)	130(65%)	20(10%)
Lack of trained diabetes educator	132(66%)	56(28%)	12(6%)
Drugs shortage problem (Insulin)	132(66%)	58(29%)	10(5%)
Social support factor	77(38.5%)	111(55.5%)	12(6%)
Psychological factors(mental, emotional and behavioural pattern)	45(22.5%)	142(71%)	13(6.5%)
Patients belief (Religion, culture etc)	9(4.5%)	178(89%)	13(6.5%)
Patient's motivation	27(13.5%)	167(83.5%)	6(3%)
Negative attitude toward therapy	151(75.5%)	41(20.5%)	8(4%)
Healthcare system factors	154(77%)	34(17%)	12(6%)

Source: Fieldwork, 2014

4. DISCUSSION

The study assessed the respondents on the challenges faced in accessing diabetes drugs in low and middle-income settings in Aba North, South-eastern Nigeria. The age distribution of the respondents showed that majority of them fall between 51 years and above. It could be because of the fact that diabetes associated with increase in age, as one goes down with age, it enhance the chances of developing diabetes and directly promote the challenges faced in accessing diabetes drugs. In a study carried out in the UK, patients over 60 years old were more

likely to have access to diabetes drugs than patients below the age [7]. These results are consistent with the findings in this study and other published reviews focusing on younger people (age group 46–50 year) indicated the same trend that compliance increased with the increasing age [8,9].

Marital status might influence patients' access and compliance with medication positively [10]. The help and support from a spouse could be the reason why married patients were more compliant to medication than single patients could. However, marital status was not found to

be related to patients' access and compliance in three recent studies [11-13]. This disparity might be because the recent studies investigated the effect of marital status in disease conditions, which were different from those evaluated in the older studies, with the impact being masked by the disease factor. Therefore, majority of the respondents were married compared to single and divorced ones. The highest percentage of the respondents was Christians, which was not surprising because the study area was largely dominated by Christians.

Statistical analysis on access to diabetes drugs among respondents

Table 5. Shows respondents' knowledge on access to diabetes drugs

Variable	Yes	No	Total
Have access to diabetes drugs	136	64	200

$\chi^2 = 25.92$; $DF = 1$; $P = 0.05$; Critical value (Cv) of 3.841 at 0.05 level of significance

Table 6. Shows respondents' knowledge on time commitment

Variable	Yes	No	Don't know	Total
Time commitment	141	53	6	200

$\chi^2 = 140.89$; $DF = 2$; $P = 0.05$; Critical value (Cv) of 5.99 at 0.05 level of significance

Table 7. Shows respondents' knowledge on financial status monthly income of the respondents

Variables	Earned amount	Not earned	Total
Less than ₦1,000	1	0	1
₦1,000-10,000	30	3	33
₦11-20,000	29	5	34
₦21-30,000	40	4	44
₦31-40,000	10	1	11
₦41-50,000	10	1	11
Greater than ₦50,000	60	6	66
			200

$\chi^2 = 107.3$; $DF = 6$; $P = 0.05$; Critical value (Cv) of 12.592 at 0.05 level of significance

The findings showed greater percentage in male than female on the knowledge of challenges faced in accessing diabetes drugs in low and middle-income settings in Aba North, despite the observational study conducted by Chuah, [14] in Malaysia where some women with diabetes co-

morbidity like tuberculosis were more engager to look for drugs and complied with it.

Furthermore, the findings showed respondents earned fifty thousand naira and above as the highest amount that enable them to have much access to diabetes drugs if other family issues are not challenging. Place of residence, majority of the respondents lived in urban and it could enhance the chances for easy access to diabetes drugs compared to those in rural area which most of them depend on chemist stores. The effect of educational level on access and non-compliance was equivocal after reviewing thirteen articles which focused on the impact of educational level as they used different criteria for "higher" and "lower" education. Several studies found that patients with higher educational level might have higher access and compliance to diabetes drugs [11], while some studies found no association [12]. Intuitively, it may be expected that patients with higher educational level should have better knowledge about the disease and therapy and therefore be more engage to search for the drugs and comply with prescription. However, educational level of the respondents assessed on the challenges faced in accessing diabetes drugs in low and middle-income settings in Aba North, indicated higher percentage between secondary level of education and less of no formal education. In reference to the American Diabetes Association (ADA) that set a standard for diabetes self-management education and found that there was a four-fold increase in diabetic complications for those individuals with diabetes who had not received formal education concerning self-care practices [15].

The results showed a greater number of respondents that have access to diabetes drugs and the classification of drugs they have access to buy.

However, most patients may not be able to take time off work for treatment; as a result, their rate in accessing and complying with the prescribed drugs could be threatened [16]. Therefore, a shorter travelling time between residence and healthcare facilities could enhance patient's access to drugs [17]. A study suggested that busy patients have poor access because they have other priorities [18].

Cost is a crucial issue in patient's access and compliance especially for patients with chronic disease as the treatment period could be life-long

[19]. Healthcare expenditure could be a large portion of living expenses for patients suffering from chronic disease. Cost and income are two interrelated factors. Healthcare cost should not be a big burden if the patient has a relatively high income or health insurance. A number of studies found that patients who had no insurance cover [20], or who had low income were more likely not to have access to drugs and also not comply to drugs [21]. However, even for patients with health insurance, health expenses could still be a problem in accessing drug use. More than one in ten seniors in the USA reported using less of their required medications because of cost [22].

Many studies showed an association between patients' negative attitude towards therapy (eg, depression, anxiety, fears or anger about the illness) and their compliance [23].

In one study conducted in patients older than 65 years with coronary artery disease, depression affected compliance markedly because of no easy access to the required drugs [24]. There were other studies reporting that for children or adolescents, treatment may make them feel stigmatized [25], or feel pressure because they are not as normal as their friends or classmates [26]. Therefore, negative attitude towards therapy should be viewed as a strong predictor of poor search of drugs and compliance.

Despite the diabetes drugs challenges, individuals with diabetes must manage and treat their condition on a daily basis with the guidance of physicians and other medical professionals in order to stave off complications. People with diabetes usually do frequent check on their blood glucose levels but many patients do not have adequate access to drugs and blood glucose test strips and other instrument required to effectively management of their condition on a daily basis.

5. CONCLUSION

Based on the findings of this study, it was concluded that majority of the patients with diabetes have access and knowledge of diabetes drugs. However, diabetes patients in poorer urban areas face several constraints in accessing diabetes drugs from the study area. These constraints included financial barriers, time, social support and negative attitudes etc.

6. RECOMMENDATIONS

In view of the findings of this study, the following recommendations were made:

- There is need to strengthen diabetes care centres with special focus on improving drugs availability and integration of health services for diabetes at the community level.
- Promoting patient-centred care, and improving continuity in delivery of diabetes care.
- The government and non-governmental agency should help in providing diabetes drugs to the patients for free or at highly subsidized rate.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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