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

Nwaokoro Joakin Chidozie¹, Ede Alison Okorie¹, N. O. Ibe Sally¹, O. Emerole Chima¹, C. Nwufo Regina¹, A. Nwaokoro Amaka¹, Onwuliri Daniel Chinemerem² and Dozie Judith Ijeoma³

¹Department of Public Health Technology, School of Health Technology, Federal University of Technology Owerri, Imo State, PMB 1526, Nigeria.
²Department of Community Medicine, University of Nigeria Teaching Hospital, Enugu, Old Site, Enugu State, Nigeria.
³Department of Family Medicine, Lagos University Teaching Hospital (LUTH), Idi – Araba, Lagos, Nigeria.

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.

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
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/challenges in 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/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           |
| ₦11,000-20,000                   | 34                | 17.0           |
| ₦21,000-30,000                   | 44                | 22.0           |
| ₦31,000-40,000                   | 11                | 5.5            |
| ₦41,000-50,000                   | 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          |

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%).
200 respondents interviewed, 151(75.5%) of them said ‘no’ to co-morbidity to diabetes while 49(24.5%) said yes. Responses to diabetes comorbidities from the respondents recorded as follows; those who said hypertension were 150(75%), Obesity had 22(11%), Ischemic heart disease 16(8%), Dyslipidaemia disease 10(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 12(6%), Diuretic had 8(4%), calcium antagonist was 6(3%), @-blocker 5(2.5%) while alpha methyldopa had 4(2%). Other drugs used for hypertension were recorded as follows; Daonil 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. 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.

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                      |                   |                |
| <1 year                                   | 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           |
| 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
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 methyldopa                 | 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  | 45(22.5%)    | 142(71%)      | 13(6.5%)    |
| behavioural pattern)                          |              |               |             |
| 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 enhances 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   |

\[ X^2 = 25.92; DF = 1; P = 0.05; \text{Critical value (Cv) of } 3.841 \text{ at } 0.05 \text{ level of significance} \]

Table 6. Shows respondents’ knowledge on time commitment

| Variable          | Yes | No | Don’t know | Total |
|-------------------|-----|----|------------|-------|
| Time commitment  | 141 | 53 | 6          | 200   |

\[ X^2 = 140.89; DF = 2; P = 0.05; \text{Critical value (Cv) of } 5.99 \text{ at } 0.05 \text{ level of significance} \]

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    |

\[ X^2 = 107.3; DF = 6; P = 0.05; \text{Critical value (Cv) of } 12.592 \text{ at } 0.05 \text{ level of significance} \]

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
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.

REFERENCES

1. Kumar P, Clark M. Textbook of clinical medicine. Saunders; London, Fifth Edition. 2002:1099-1121.
2. Center for Disease Control and Prevention (CDC); 2007. Available:http://cdc.gov/diabetes
3. National Diabetes facts sheet, United States; 2005.
4. Eysenbach E. The law of attrition. J. Med Internet Res; 2005.
5. American Diabetes Association. Standard of medical care in diabetes. 2008;31(1):43.
6. Wagner AD, Juliana PE, Blagoev, Clark J, Russell AP. Recovering meaning: Left prefrontal cortex guides controlled semantic retrieval. Neuron. 2001;31:329–338.
7. Buck D, Jacoby A, Baker G. A factors influencing compliance with antiepileptic drug regimes. Seizure. 1997;6:87–93.
8. Krousel-Wood MA, Thomas S, Muntner P. Medication adherence: A key factor in achieving blood pressure control and good clinical outcomes in hypertensive patients. Curr Opin Cardiol. 2004;19:357–62.
9. Lacasse Y, Archibald H, Ernst P. Patterns and determinants of compliance with inhaled steroids in adults with asthma. Can Respir J. 2005;12:211–7.
10. Cooper C, Carpenter I, Katona C, et al. The AdHOC study of older adults’
adherence to medication in 11 countries. Am J Geriatr Psychiatry. 2005;13:1067–76.
11. Ghods AJ, Nasrollahzadeh D. Noncompliance with immunnosuppressive medications after renal transplantation. Exp Clin Transplant. 2003;1:39–47.
12. Kaona FA, Tuba M, Siziya S. An assessment of factors contributing to treatment adherence and knowledge of TB transmission among patients on TB treatment. BMC Public Health. 2004;29:68.
13. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: Estimates for the year 2000 and projections for 2030. Diabetes Care. 2004;27(5):1047-1053.
14. Chuah SY. Factors associated with poor patient compliance with antituberculosis therapy in Northwest Perak, Malaysia. Tubercle. 1991;72:261–4.
15. Dagenais GR, Gerstein HC, Holman R. Effects of ramipril and rosiglitazone on cardiovascular and renal outcomes in people with impaired glucose tolerance or impaired fasting glucose: Results of the Diabetes Reduction Assessment with ramipril and rosiglitazone Medication (DREAM) trial. Diabetes Care. 2008;31(5):1007–1014.
16. Lawson VL, Lyne PA, Harvey JN. Understanding why people with type 1 diabetes do not attend for specialist advice: A qualitative analysis of the views of people with insulin-dependent diabetes who do not attend diabetes clinic. J Health Psychol. 2005;10:409–23.
17. Gonzalez J, Williams JW, JR, Noel PH. Adherence to mental health treatment in a primary care clinic. J Am Board Fam Pract. 2005;18:87–96.
18. Siegal B, Greenstein SJ. Compliance and noncompliance in kidney transplant patients: Cues for transplant coordinators. Transpl Coord. 1999;9:104–8.
19. Ellis JJ, Erickson SR, Stevenson JG. Suboptimal statin adherence and discontinuation in primary and secondary prevention populations. J Gen Intern Med. 2004;19:638–45.
20. Choi-Kwon S, Kwon SU, Kim JS. Compliance with risk factor modification: Early-onset versus late-onset stroke patients. Eur Neurol. 2005;54:204–11.
21. Berghofer G, Schmidl F, Rudas S. Predictors of treatment discontinuity in outpatient mental health care. Soc Psychiatry Psychiatr Epidemiol. 2002;37:276–82.
22. Congressional Budget Office. Prescription drug coverage and Medicare's fiscal challenges; 2003. Available: http://www.cbo.gov/ (Accessed on 10 October, 2014)
23. Kaplan RC, Bhalodkar NC, Brown EJ. Race, ethnicity, and sociocultural characteristics predict noncompliance with lipid-lowering medications. Prev Med. 2004;39:1249–55.
24. Carney RM, Freedland KE, Eisen SA. Major depression and medication adherence in elderly patients with coronary artery disease. Health Psychol. 1995;14:88–90.
25. Bender BG, Bender SE. Patient-identified barriers to asthma treatment adherence: Responses to interviews, focus groups, and questionnaires. Immunol Allergy Clin N Am. 2005;25:107–30.
26. Kyngas HA. Compliance of adolescents with asthma. Nurs Health Sci. 1999;1:195–202.

© 2016 Nwaokoro et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
http://sciencedomain.org/review-history/12867