

## **Patient Perspectives on Barriers to Diabetes Management and the Affordability of Care in Ilorin, Kwara State, Nigeria**

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### **Abstract**

Diabetes Mellitus (DM) continues to pose a growing public health concern, with the increasing prevalence worsened by socio-economic and healthcare system constraints in Nigeria. Among the key barriers to effective DM care, affordability is a major challenge. This study aimed to assess patients' perspectives on the affordability of DM care and identify barriers and sociodemographic factors influencing access to effective care in a tertiary healthcare facility. A descriptive cross-sectional study was conducted from June to August 2024 at the University of Ilorin Teaching Hospital among 165 adult DM patients using systematic random sampling. Data were collected through structured interviewer-administered questionnaires, and analysed using SPSS version 22.0, with statistical significance set at  $p < 0.05$ . Nearly half, (49.1%) of the respondents were between 46–60 years old, with a female predominance (57.6%). The majority (88.5%) had Type 2 DM. Notably, over two-thirds (68.5%) of respondents indicated that DM care was unaffordable. The major barriers identified included treatment costs (53.3%) and transportation burdens (35.2%). Affordability was significantly associated with age, marital status, education, and employment status ( $p < 0.05$ ), while gender and having health insurance were not. Furthermore, high treatment costs, transportation expenses, and delayed salary payments were significantly linked to reduced hospital visits. In conclusion, the study revealed that affordability is a major barrier to effective DM care in Nigeria. Hence, there is a need to enhance access to affordable care by expanding health insurance coverage, strengthening healthcare infrastructure, improving quality, and subsidizing DM care.

**Keywords:** affordability, care, barriers, diabetes, management, patient perspectives

### **INTRODUCTION**

The International Diabetes Federation, reported that the prevalence of Diabetes Mellitus (DM) among adults aged (20-79) was over 537 million worldwide as of 2021, with a projection that this will increase to 643 million by 2030, and 783 million by 2045; this highlights the growing burden of the disease globally [1&2]. Also, the estimated number of people living with diabetes in Africa as at 2021 was 24 million, and this was predicted to increase to 55 million by 2025, an increase of 129%, which is the highest amongst the continents [2&3]. The alarming increase in DM prevalence in Africa can be attributed numerous factors which include; demographic transition, expanding urbanization and adoption of unhealthy lifestyles particularly relating to diet, physical activity and exercise [2]. This challenging situation is compounded by low awareness level, late diagnoses, inadequate health infrastructure and limited access to healthcare services.

DM is a chronic, progressive metabolic disorder characterized by persistent hyperglycaemia resulting from defects in insulin secretion, action, or both [4-7]. DM has become a disease of public health importance affecting a considerable proportion of the global population, causing various complications and contributing to high morbidity and mortality rates.

In Nigeria, there has been an increase in the prevalence of DM, with the highest prevalence (9.8%) in the South-South geopolitical zone, the lowest (3.0%) in the North-West, and an overall pooled prevalence of 5.77% across the nation [8]. There is also a rising burden from the complications of the disease [9-13], leading to higher rates of conditions such as cardiovascular disease, cerebrovascular disease, diabetic retinopathy, diabetic nephropathy, diabetic neuropathy, diabetic foot ulcer and other complications that can have significant negative impact on the quality of life and life expectancy.

The rising prevalence of DM shows that the preventive and treatment measures being taken seem inadequate and may be a pointer to the fact that there are barriers, which hinder individuals from seeking for quality healthcare and effectively managing their conditions [14-18]. These barriers can be broken down into structural barriers: e.g. poor or limited access to healthcare facilities and services; healthcare system barriers: e.g. long waiting times and healthcare staff attitudes; financial barriers: e.g. unaffordable or high cost of healthcare services and lack of health insurance or inadequate coverage; educational/knowledge barriers: e.g. poor awareness and knowledge about DM; sociocultural barriers: such as lack of family support, cultural beliefs and practices, myths and stigma; and psychological barriers: e.g. fear of healthcare settings and illness-related emotional challenges [15-18].

Among these barriers, affordability of care is a critical concern, especially in low-and-middle income countries like Nigeria. Patients often point toward cost and affordability as the main factors when asked about their reasons for missing clinic appointments and failing to adhere to prescribed medications. The high cost of healthcare services and medications, in addition to intangible costs such as transportation often force people to delay, forgo or compromise necessary treatments leading to negative health consequences and poorer health outcomes.

Though several previous studies have explored clinical and systemic factors related to diabetes care, there still exist a gap on the patient-reported barriers and their perspectives on the affordability of care in Nigeria. This is very crucial, especially due to the socio-economic disparities and limitations that exist within the healthcare system, which can significantly affect patient experience. This study aimed to assess patients' perspectives on the affordability of DM care and identify barriers and sociodemographic factors influencing access to effective care. The research seeks to stimulate policy interventions and healthcare strategies that will promote diabetes care delivery and improve patient outcomes.

## **METHODOLOGY**

This cross-sectional descriptive hospital-based study was conducted at the Diabetes Clinic of the University of Ilorin Teaching Hospital (UITH), located in Ilorin, Kwara State. UITH is a tertiary healthcare facility that provides a wide range of specialties and medical services across various fields of medicine. It is also an accredited healthcare provider under the National Health Insurance Authority (NHIA). Patients with DM are treated and followed up at the specialist diabetes clinic, which holds at the Medical Outpatient Department. Most of the patients attending the diabetes clinic are referred from the General Outpatient Clinic, Accident and Emergency department, inpatients (after discharge), and various hospitals within and around the state.

The study was carried out between June 2024 and August, 2024, among consenting adult patients aged 18 years and above, who have accessed DM care in the hospital not less

than two times. Adolescent patients, as well as patients who were too ill to respond or could not stand the stress of an interview were however excluded from the study. The minimum sample size for this study was determined using the Cochran's formula [19] for sample size estimation in cross-sectional studies ( $N = z^2 pq/d^2$ ). Assuming a 95% confidence interval, 5% degree of accuracy, 10% non-response, and an 89% prevalence of patients who reported affordability of care as the major barrier DM care from a previous study [20], a sample size of 165 was calculated.

Patients were selected by systematic random sampling. Data collection was conducted using a pretested interviewer-administered structured questionnaire, designed by the researchers, drawing on insights from previous related studies and patients' complaints [13,14,17,18]. The questionnaire included socio-demographic information, clinical characteristics, perception of care affordability, frequency of hospital visits and barriers to care.

Data analysis was done using Statistical Package for Social Sciences (SPSS version 22), and frequency tables and cross tabulations were generated. Chi-square test was used to determine statistical significance of observed differences in cross-tabulated variables. Multiple regression was used to examine the influence of the barriers to DM care on DM care access. The Level of significance was set at a p-value of  $< 0.05$ .

Ethical approval for the study was obtained from the Ethics and Research Committee of University of Ilorin Teaching Hospital, Ilorin, Kwara State. Participation was fully voluntary, confidentiality and anonymity assured, and written informed consent obtained from the participants.

### **Conflict of Interest**

The authors have declared that no competing interests exist.

### **Sources of funding**

The authors received no specific funding for this work.

**RESULTS****Table 1: Socio-demographic Characteristics of Respondents**

| <b>Variables</b>               | <b>Frequency (n=165)</b> | <b>Percent (%)</b> |
|--------------------------------|--------------------------|--------------------|
| <b>Age group (years)</b>       |                          |                    |
| ≤ 30                           | 4                        | 2.4                |
| 31-45                          | 39                       | 23.6               |
| 46-60                          | 81                       | 49.1               |
| ≥ 61                           | 41                       | 24.8               |
| <b>Sex</b>                     |                          |                    |
| Male                           | 70                       | 42.4               |
| Female                         | 95                       | 57.6               |
| <b>Marital Status</b>          |                          |                    |
| Single                         | 16                       | 9.7                |
| Married                        | 115                      | 69.7               |
| Divorced                       | 9                        | 5.5                |
| Widowed                        | 25                       | 15.2               |
| <b>Highest Education</b>       |                          |                    |
| No formal Education            | 16                       | 9.7                |
| Primary                        | 41                       | 24.8               |
| Secondary                      | 43                       | 26.1               |
| Tertiary                       | 65                       | 39.4               |
| <b>Employment Status</b>       |                          |                    |
| Unemployed                     | 17                       | 10.3               |
| Self- employed                 | 56                       | 33.9               |
| Employed                       | 65                       | 39.4               |
| Retired                        | 27                       | 16.4               |
| <b>Health Insurance Status</b> |                          |                    |
| Insured (NHIA)                 | 48                       | 29.1               |
| Not insured                    | 117                      | 70.9               |

The largest age group was 46-60 years (81, 49.1%), representing nearly half of the participants, followed by age group 31-45 years (39, 23.6%), age 61 and above (41, 24.8%), with a small proportion (4, 2.4%) being under 30 years. There were more females (95, 57.6%) than males (70, 42.4%). Majority of the respondents (115, 69.7%) were married. Most of the participants (65, 39.4%) had completed tertiary education degree. A considerable number of the participants (65, 39.4%) were employed or self-employed (56, 33.9%), while a smaller proportion were retired (27, 16.4%) and unemployed (17, 10.3%). Lastly, a vast majority (117, 70.9%) of the respondents were not insured, while 48 (29.1%) were insured under the NHIA.

**Table 2: Respondents' Clinical characteristics**

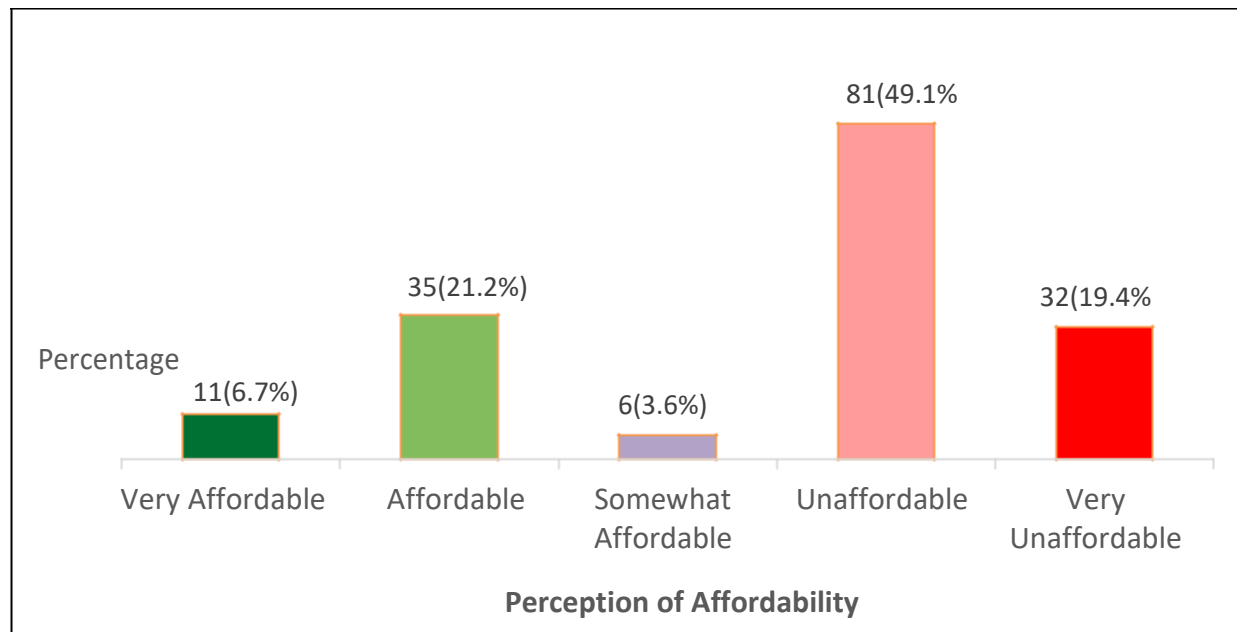
| <b>Variables</b>                           | <b>Frequency (n=165)</b> | <b>Percentage %</b> |
|--------------------------------------------|--------------------------|---------------------|
| <b>Types of DM</b>                         |                          |                     |
| Gestational                                | 4                        | 2.4                 |
| Type 1                                     | 15                       | 9.1                 |
| Type 2                                     | 146                      | 88.5                |
| <b>Duration of DM diagnosis</b>            |                          |                     |
| <1                                         | 58                       | 35.2                |
| 1-5                                        | 32                       | 19.5                |
| 6-10                                       | 15                       | 9.1                 |
| >10                                        | 60                       | 36.1                |
| <b>Number of DM medications being used</b> |                          |                     |
| One                                        | 52                       | 31.5                |
| Two                                        | 103                      | 62.5                |
| Three                                      | 10                       | 6.1                 |
| <b>Type/s of medications being used</b>    |                          |                     |
| Insulin Only                               | 22                       | 13.3                |
| Insulin + Oral Antidiabetic drug/s         | 36                       | 21.8                |
| Oral Antidiabetic drug/s only              | 107                      | 64.8                |

Majority of the respondents (146, 88.5%) had Type 2 DM, while smaller proportions had Type 1 DM (15, 9.1%) or gestational DM (4, 2.4%). A little above a third (58, 35.2%) were diagnosed within the last one year. Other respondents had been diagnosed for 1-5 years (32, 19.5%), 6-10 years (15, 9.1%) or more than 10 years (60, 36.1%) respectively. Regarding medication use, majority (103, 62.5%) were on two medications, while about a third (52, 31.5%) and 10 (6.1%) were taking one and three medications respectively. Furthermore, most of the participants (107, 64.8%) were using oral antidiabetic drugs only, while 36 (21.8%) were on insulin along with oral antidiabetics, and 22 (13.3%) insulin alone.

**Table 3: Care Access and Barriers of DM care among Respondents**

| <b>Variable</b>                                      | <b>Frequency</b> | <b>Percentage %</b> |
|------------------------------------------------------|------------------|---------------------|
| <b>N =211</b>                                        |                  |                     |
| <b>Frequency of Hospital visit (Care Access)</b>     |                  |                     |
| Fortnightly                                          | 7                | 4.2                 |
| Monthly                                              | 50               | 30.3                |
| Quarterly                                            | 64               | 38.8                |
| >Quarterly                                           | 44               | 26.7                |
| <b>Barriers to DM care (Multiple response)</b>       |                  |                     |
| Cost of treatment                                    | 88               | 53.3                |
| Distance /Transport costs                            | 58               | 35.2                |
| Unavailability of medications around local residence | 11               | 6.7                 |
| Cumbersome Registration & payment processes          | 6                | 3.6                 |
| Late salaries                                        | 3                | 1.8                 |
| Long waiting time for consultations                  | 5                | 3.0                 |
| NHIA procedural delays                               | 4                | 2.4                 |
| None                                                 | 7                | 4.2                 |

Minority (7, 4.2%) of the respondents reported visiting the hospital fortnightly, while 50 (30.3%) attended monthly. Quarterly visits were the most common, with close to two-fifths (64, 38.8%) reporting this, while about a quarter (44, 26.7%) accessed care less frequently than quarterly. The most common barrier reported was cost of treatment (88, 53.3%), while distance/transportation costs were cited by 58 (35.2%) of the participants. Other barriers were unavailability of medications around respondents' local residences (11, 6.7%), cumbersome registration and payment processes (6, 3.6%), long waiting time (5, 3.0%), NHIA procedural delays (4, 2.4%) and late salary payments (4, 2.4%). Interestingly, 7 (4.2%) of the respondents reported that they faced no barriers.



**Fig. 1. Respondents' perception about affordability of DM care**

Figure 1 displayed respondents' perception about affordability of DM care. Only a little more than a quarter (46, 27.9%) of the respondents reported that DM care costs were affordable, while a significant portion (113, 68.5%) indicated that DM care costs were unaffordable. This highlights the financial burden that DM care exerts on patients.

**Table 4: Associations between Socio-demographic Characteristics and Respondents' perception about affordability of DM care**

| Variable<br>N=165              | Categories    | Very<br>Affordable | Afford-<br>able | Somewhat<br>Affordable | Unafford-<br>able | Very<br>Unaffordable | Total | P-value |
|--------------------------------|---------------|--------------------|-----------------|------------------------|-------------------|----------------------|-------|---------|
| <b>Age</b>                     | ≤ 30          | 0                  | 1               | 0                      | 1                 | 2                    | 4     | <0.001* |
|                                | 31-45         | 3                  | 16              | 0                      | 17                | 3                    | 39    |         |
|                                | 46-60         | 5                  | 17              | 3                      | 48                | 8                    | 81    |         |
|                                | ≥61           | 3                  | 1               | 3                      | 15                | 19                   | 41    |         |
|                                | Total         | 11                 | 35              | 6                      | 81                | 32                   | 165   |         |
| <b>Gender</b>                  | Male          | 3                  | 16              | 3                      | 38                | 10                   | 70    | 0.458   |
|                                | Female        | 8                  | 19              | 3                      | 43                | 22                   | 95    |         |
|                                | Total         | 11                 | 35              | 6                      | 81                | 32                   | 165   |         |
| <b>Marital Status</b>          | Single        | 0                  | 7               | 0                      | 6                 | 3                    | 16    | 0.002*  |
|                                | Married       | 8                  | 23              | 6                      | 60                | 18                   | 115   |         |
|                                | Divorced      | 0                  | 5               | 0                      | 4                 | 0                    | 9     |         |
|                                | Widowed       | 3                  | 0               | 0                      | 11                | 11                   | 25    |         |
|                                | Total         | 11                 | 35              | 6                      | 81                | 32                   | 165   |         |
| <b>Formal Education</b>        | None          | 0                  | 0               | 0                      | 13                | 3                    | 16    | 0.001*  |
|                                | Primary       | 0                  | 8               | 3                      | 19                | 11                   | 41    |         |
|                                | Secondary     | 0                  | 12              | 3                      | 18                | 10                   | 43    |         |
|                                | Tertiary      | 11                 | 15              | 0                      | 31                | 8                    | 65    |         |
|                                | Total         | 11                 | 35              | 6                      | 81                | 32                   | 165   |         |
| <b>Employment Status</b>       | Unemployed    | 0                  | 3               | 0                      | 8                 | 6                    | 17    | <0.001* |
|                                | Employed      | 5                  | 14              | 0                      | 35                | 11                   | 65    |         |
|                                | Self-employed | 0                  | 18              | 6                      | 28                | 4                    | 56    |         |
|                                | Retired       | 6                  | 0               | 0                      | 10                | 11                   | 27    |         |
|                                | Total         | 11                 | 35              | 6                      | 81                | 32                   | 165   |         |
| <b>Health Insurance Status</b> | Insured       | 2                  | 15              | 3                      | 23                | 5                    | 48    | 0.093   |
|                                | Not insured   | 9                  | 20              | 3                      | 58                | 27                   | 117   |         |
|                                | Total         | 11                 | 25              | 6                      | 81                | 32                   | 165   |         |

\*Statistically significant p-value

Table 4 showed the association between socio-demographic characteristics and perception of DM care affordability. The results signified that age, marital status, education, and employment status influence patient's perception of the affordability of DM care ( $p = <0.001$ , 0.002, 0.001 & 0.001), suggesting that elderly patients and married people are more likely to consider care unaffordable, while conversely, those with tertiary education and employed individuals are more likely to consider care affordable. Gender and health insurance status had no significant association with patient's perception of the affordability of DM care ( $p = 0.458$  & 0.093).

**Table 5: Multiple Regression Analysis of Barriers to DM care and Access**

| Variable                                             | Coefficients <sup>a</sup>   |            |                           | t      | Sig.  |
|------------------------------------------------------|-----------------------------|------------|---------------------------|--------|-------|
|                                                      | Unstandardized Coefficients |            | Standardized Coefficients |        |       |
|                                                      | B                           | Std. Error | Beta                      |        |       |
| (Constant)                                           | 3.937                       | .429       |                           | 9.175  | <.001 |
| Cost of Treatment                                    | -1.176                      | .438       | -.689                     | -2.686 | .008  |
| Distance/Transportation Costs                        | -.927                       | .404       | -.520                     | -2.295 | .023  |
| Unavailability of medications around local residence | -.321                       | .330       | -.094                     | -.974  | .332  |
| Long Waiting Time for Consultations                  | -.518                       | .387       | -.104                     | -1.339 | .182  |
| NHI Procedural delays                                | -.937                       | .592       | -.169                     | -1.585 | .115  |
| Cumbersome Registration & Payment processes          | .613                        | .407       | .135                      | 1.504  | .135  |
| Late salaries                                        | -1.212                      | .491       | -.190                     | -2.466 | .015  |

**a. Dependent Variable: Frequency of Hospital visit (Care Access)**

\*Statistically significant p-value

Table 5 summarised a multiple regression analysis, which examined how the various barriers to DM care influenced the frequency of hospital visits (care access). The results showed that Cost of treatment, distance/transportation costs and late salary payments were all significantly and negatively associated with DM care access ( $p= 0.008, 0.023$  &  $0.015$ ). On the other hand, unavailability of medications around local residence, long waiting time for consultations, and NHIA procedural delays were not found to have a statistically significant impact on DM care access ( $p$ -values  $> 0.05$ ).

## DISCUSSION

The socio-demographic characteristics of the participants in this study align with the findings of other researchers on the prevalence of DM, particularly regarding age group (46-60 years and above), marital status (being married), higher levels of education and having an employment [8, 21-26]. Increasing age is associated with physiological and metabolic changes, which can increase the risk of developing type 2 diabetes as individuals grow older; these include obesity, reduced insulin sensitivity, a decrease in insulin secretion caused by declining pancreatic beta-cell function, impaired response to incretin hormones (glucose-dependent insulintropic polypeptide [GIP] and glucagon-like peptide-1 [GLP-1]) and abnormalities in lipid metabolism [27-32].

The findings of the study showed that Type 2 DM was the most common type of diabetic among the study population, accounting for 88.5% of the participants; this is consistent with the prevalence patterns of diabetes across countries, continents and globally [2]. The key contributors to this include: urbanisation, an ageing population, decreasing levels of physical activity and increasing overweight and obesity prevalence [2]. Though the proportions of Type 1 DM (9.1%) and gestational DM (2.4%) in this study were low, which are comparable with global figures, they cannot be overlooked. Type 1 DM is a chronic disease characterized by the inability of the body to produce insulin due to the autoimmune destruction of the beta cells in the pancreas [33-35]. It typically manifests in childhood or early adulthood and requires insulin therapy, and some studies have reported a rising incidence of this condition [36,37]. Gestational Diabetes Mellitus (GDM) is any degree of glucose intolerance resulting in hyperglycaemia of variable severity with the first onset or diagnosis in pregnancy [38 -40]. It is a common pregnancy complication and a cause of maternal and perinatal morbidities. Hence, the need to address also all barriers to antenatal care, ensure regular screening among the antenatal care patients in all health facilities and

conduct more public enlightenment programs to improve the level of awareness.

The primary barrier patients with DM face in accessing care was treatment cost (53.3%). This challenge, particularly with regards to drug (insulin and other medications) and blood glucose monitoring, is prevalent not only in many African countries, including Nigeria, but generally in Low-and-Middle income countries [41,42]. This highlights the general concerns in low- and middle-income countries where diabetes care remains unaffordable for many, with high out-of-pocket expenses often leading to poor adherence to treatment regimens and suboptimal glycemic control, which contribute to increased complications and poor health outcomes.

The second leading barrier was distance/transportation costs (35.2%). This is usually due to poor and unavailable healthcare infrastructure in rural areas, often compounded by inadequate manpower, lack of equipment, lack of essential drugs and poor quality of healthcare services, which often force patients to travel long distances and incur huge transport costs to access health care in urban areas. From a holistic view, this challenge does not only impact the patients, but many tertiary healthcare facilities, leading to overcrowding, long patient waiting times, overstretching of hospital infrastructures, staff burnout, poor staff attitudes and ultimately poor services delivery [43]. Hence there is a need to strengthen and integrate DM care into the nation's primary healthcare (PHC) system, which will include routine screening, monitoring and access to essential drugs at the PHC level. This will not only enhance early detection and management but also reduce the service burden on tertiary facilities and out-of-pocket expenditures for patients.

The majority (68.5%) of the respondents reported that DM care was unaffordable. This highlights the significant financial burden associated with managing DM, and the associated negative impact it has on patients from regular consultations, follow-ups, medications and investigations. The unaffordability of DM care indicates not just the inability of persons to afford payments based on their employment and income levels, but reflects deeper systemic issues such as limited healthcare funding, lack of policy healthcare interventions, drug manufacturing and supply chain challenges etc.

There were significant associations between age, marital status, education, and employment and patients' perceptions of DM care affordability. Older and married individuals were more likely to find DM care unaffordable [44,45], probably due to higher healthcare needs or financial responsibilities, while those with tertiary education and employment found it more affordable, possibly due to higher health literacy and better economic stability. Gender, and interestingly health insurance status showed no significant impact on DM care affordability. These findings showed that the health insurance system does not significantly reduce the reliance on out-of-pocket expenditures, probably due to the complaints of out-of-stock drugs by many patients [46 – 50], and suggest the need for targeted interventions to enhance healthcare financing, improve health insurance programmes and access to quality care.

Cost of treatment, distance/transportation costs, and late salary payments were significantly and negatively associated with access to diabetes care, whereas unavailability of medications around patients' residences, long waiting times for consultations, and NHIA procedural delays were not. These findings underscore the importance of addressing economic barriers to improve access to diabetes care.

## **CONCLUSION**

The study highlights that affordability remains a critical barrier to effective DM care in Nigeria. This reflects systemic defects in the current healthcare financing and delivery structure.

Despite the existence of the National Health Insurance Authority (NHIA), coverage remains limited, and many patients continue to bear the burden of out-of-pocket expenditures. To address these challenges, there is an urgent need to improve healthcare infrastructure and subsidize essential diabetes medications to significantly reduce the financial burden on patients. In addition, there is a need to strengthen and integrate DM care into the nation's PHC system. Furthermore, it is crucial to expand and strengthen health insurance coverage to ensure access to quality care.

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