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Barriers to Diabetes Care in a Developing Country: Exploratory Evidence from Diabetes Healthcare Providers

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Authors' contributions

All authors have made useful contributions to qualify for authorship as follows author EU conceptualized the study and contributed to study design, literature search and manuscript writing. Author SO contributed in data acquisition and analysis. Authors IE, MO and OA contributed in results interpretation and critical revision of the manuscript while author AU critically reviewed the manuscript for important intellectual content. All authors read and approved the final version of the paper.

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ABSTRACT

Aims: The morbidities and mortalities associated with diabetes are disproportionately high in low and middle income countries. This study aimed to explore important barriers and facilitators to diabetes care in Nigeria from the perspectives of diabetes healthcare providers (DHPs).
Study Design: A nationwide descriptive survey.

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Place and Duration: Onsite (Calabar, Nigeria) and online surveys conducted between September 2016 and March 2017.
Methodology: A validated self-administered questionnaire was used to assess barriers to diabetes care and strategies to improve care among DHPs in Nigeria.
Results: A total of 129 subjects with mean ± SD age and mean ± SD duration of practice of 42.4 ± 7.6 years and 8.5 ± 5.4 years respectively were surveyed. About 84.5% of the respondents perceived diabetes care in Nigeria as being remarkably challenging. The most common barriers identified include: poverty, low diabetes awareness, shortage of trained diabetes care specialists, poor diabetes care knowledge among primary care doctors, and poor knowledge of diabetes self care among patients and other institutional, cultural and religious barriers.
To improve care, respondents recommended, among other strategies, increasing healthcare funding, expansion of national health insurance coverage, introduction of government subsidy on diabetes medications, encouraging local production of diabetes medicines and supplies, increasing public diabetes awareness, periodic training of general practitioners and strict regulation of alternative medicine practitioners and faith healing centers.
Conclusion: This survey identified several barriers to diabetes care in Nigeria and proffered some useful and implementable strategies to improve care. In order to reduce the burden of diabetes in Nigeria and perhaps other countries in SSA, these expert opinions should form the basis for a blue print by major diabetes stakeholders and health policy makers.

Keywords: Barriers; challenges; diabetes care; developing country; Nigeria; sub-Saharan Africa.

ABBREVIATIONS

AADE : American Association of Diabetes Educators
ADA : American Diabetes Association
AMP : Alternative medicine practitioners
CDE : Certified diabetes educators
DFU : Diabetic foot ulcerations
DHP : Diabetes Healthcare Provider
DM : Diabetes mellitus
DSME : Diabetes self management education
EMSON: Endocrinology and Metabolism Society of Nigeria
GP : General Practitioner
HbA1c : Glycated hemoglobin
IDF : International Diabetes Federation
PHC : Primary Healthcare
SPSS : Statistical Package for Social Sciences
SSA : Sub-Saharan Africa

1. INTRODUCTION

Diabetes mellitus (DM) is a serious public health issue, currently affecting about 425 million adults globally [1]. As a result of demographic transition, increasing urbanization and adoption of unhealthy lifestyles, the prevalence of diabetes in sub-Saharan Africa (SSA) is increasing at an alarming rate. For instance, within two-and-a-half decades, the number of adults diagnosed with type 2 DM in Nigeria nearly tripled, from about 874,000 (2%) in 1990 to about 4.7 million (5.7%) in 2015 [2]. According to the International Diabetes Federation (IDF), Nigeria has the largest burden of diabetes in sub-Saharan Africa, accounting for at least one-fifth of the diabetes burden in this region [1]. This figure probably represents a tip of the iceberg as it is estimated that at least two-third of cases of DM in Nigeria are yet undiagnosed [1].

In spite of significant advances in diabetes care globally, the morbidities and mortalities associated with diabetes in SSA have remained unacceptably high compared to those of developed nations. For instance, the prevalence of DM-related lower extremity amputation in Nigeria and other SSA countries is over 30% compared to about 0.25% in Netherlands and 0.4% in the United States [3-5]. Diabetes has increasingly become one of the leading causes of stroke, blindness, heart attack and end stage kidney disease in SSA [6-8]. Diabetes related mortality in Nigeria is among the highest globally with mortality rate as high as 30.2 per 100,000 [2]. Moreover, over 50% of diabetes related deaths in SSA occur in those below 60 years of age, the productive segments of the population [1]. Therefore, diabetes is taking a huge toll on a people still grappling with high burden of infectious diseases.

Nearly all complications of diabetes are associated with poor long term control of the disease. Conversely, good diabetes control significantly reduces complications [9,10]. Therefore the high burden of DM-related complications and deaths in SSA countries is a reflection of the poor quality of diabetes care in this sub-region. This notion is supported by

evidences indicating that majority of patients with diabetes in Nigeria fail to attain recommended treatment targets [11]. Diabetes is a costly disease, and the presence of complications significantly increases the costs. The poverty rate in SSA is alarming as the sub-continent harboring 27 out of 28 poorest nations of the world [12]. Furthermore, social security measures including health insurance are grossly lacking [13]. Thus SSA countries lack sufficient capacity to deal with the huge burden of diabetes related complications, making their prevention through optimal diabetes care a compelling option.

In order to address these gaps in care, there is a need to identify the barriers to effective diabetes care in SSA and formulate evidence-based framework to tackle them. Diabetes healthcare providers (DHPs) represent vital resource persons in this regard due to their experiences and good understanding of the dynamics of diabetes care. Elsewhere, efforts have been made to identify barriers to diabetes care through diabetes care providers' engagements [14-16]. This work represents an attempt to identify important barriers to diabetes care in Nigeria by tapping into the collective perceptions of DHPs.

2. METHODS

This survey was conducted among DHPs in Nigeria between September 2016 and March 2017. The survey took place in two phases. First, onsite questionnaires were administered to all attendees to the scientific conference of the Endocrinology and Metabolism Society of Nigeria (EMSON) which held at Transcorp Hotels, Calabar Nigeria. The EMSON is a professional body comprising of all endocrinology specialists and trainees in Nigeria as well as other healthcare professionals allied to endocrinology practice including diabetes nurse educators, podiatrists, dieticians and pharmacists. It is the largest of such professional bodies in SSA with about 150 certified and practicing endocrinologists/diabetologists.

In the second phase of the survey, the questionnaires were mailed online to DHPs through the EMSON electronic mailing platform where those who did not participate in the on-site survey were invited to participate. Respondents in this second phase downloaded the questionnaire and returned a scanned completed copy to the study investigators.

The Research and Ethics Committee of Enugu State University Teaching Hospital approved the protocol while informed consent was obtained from the participants.

2.1 Data Instrument

A validated self-administered questionnaire was used to assess the perceived barriers to diabetes care among the respondents. The questionnaire which was developed by the researchers was tested for reliability by a split-half test method in a pilot study involving 10 multi-disciplinary specialists. It demonstrated good internal consistency of responses (Cronbach's alpha coefficient 0.772 and 0.814 respectively for each spilt group) and a correlation between groups of 0.802, indicating a very strong reliability.

The questionnaire was in three parts. The first part contained socio-demographic information of the respondents including age, gender, professional cadre, and location and duration of practice in the field of diabetology. In the second part, respondents were asked to rate their perception about the challenges of diabetes care in Nigeria. The responses were presented in a Likert scale from 1 – 5 representing the degrees of diabetes care challenges, from "none" to "extremely challenging". This was followed by a list of potential barriers to diabetes care to which respondents rated each one as a major barrier, minor barrier or constituted no barrier to diabetes care. The list was developed from the investigators' experiences in diabetes care as well as from findings from published studies on the same topic [14-16]. Respondents were further required to state any other perceived barriers to care that were not contained in the list. This part also explored availability of specific diabetes care support staff including nutritionists, diabetes educators and podiatrists in the respondents' healthcare facilities. Lastly, section three of the questionnaire provided a list of options on improving diabetes care in Nigeria and the respondents rated each of these options on a 5-point Likert scale from 1 to 5 indicating the degree of agreement from "strongly disagree" to "strongly agree".

2.2 Data Analysis

The questionnaires were collated and data extracted into a computer database, and thereafter analyzed descriptively with the statistical package for social sciences software version 23. Frequencies and percentages were computed for categorical variables while

continuous variables were presented as means and standard deviations. Open ended responses were grouped into similar themes as appropriate.

3. RESULTS

3.1 Socio-demographic Characteristics

Nigeria had a total of 146 registered endocrinologists who were all targeted for the study. However, only 129 respondents returned completely filled questionnaires, giving a response rate of 88.4%. They were made up of 76 certified diabetes specialists and 53 trainees. There were more males than females (62% vs. 38% respectively). The mean age of the participants was 42.4 ± 7.6 years while the mean duration of practice was 8.5 ± 5.4 years. Majority of the respondents (86.8%) practiced in tertiary health institutions. The demographic characteristics of the respondents are shown in Table 1.

Table 1. Socio-demographic characteristics of the respondents

Variable	Mean ± SD	Frequency	Percentage
Age (years)	42.4 ± 7.6		
<45		84	65.1
≥ 45		45	34.9
Gender			
Males		80	62
Females		49	38
Professional cadre			
Diabetes Specialists		59	45.7
Endocrinology Trainees		48	37.2
Other healthcare professionals		22	17.1
Setting of practice			
Teaching Hospital		99	76.7
Federal Medical Center		27	20.9
General Hospital		3	2.3
Duration of practice	8.5 ± 5.4		
≤ 10 years		92	71.3
11-20 years		32	24.8
> 20 years		5	3.9

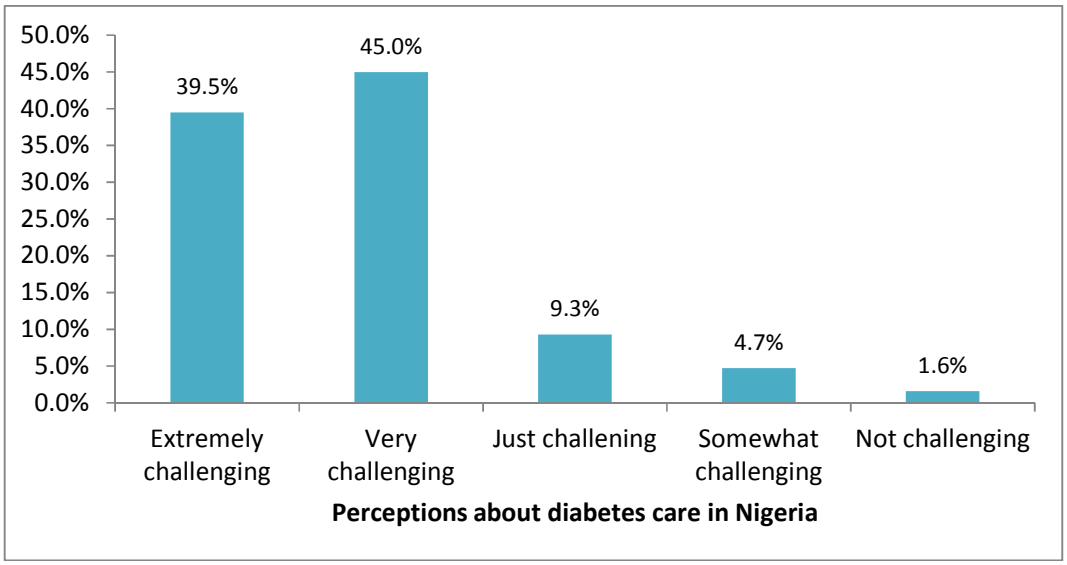

Fig. 1. Diabetes healthcare providers' perceptions about challenges of diabetes care in Nigeria

3.2 Challenges of Diabetes Care in Nigeria

Fig. 1 shows the perceptions of the respondents regarding the challenges of diabetes care in Nigeria. Of the 129 subjects, 84.5% reported diabetes care in Nigeria as either extremely challenging (39.5%) or very challenging (45%).

Factors that were reported as major barriers to diabetes care in Nigeria are shown in Fig. 2. Poverty ranked first among the major barriers as reported by 89.1% of the respondents, followed by low diabetes awareness which was reported by 82.9% of the participants. Poor access to healthcare facilities and poor health workers' remunerations were the least identified major barriers, being reported by 21.3% and 17.1% of the respondents respectively.

Access to three important diabetes care support staff namely – dieticians, podiatrists and diabetes educators as reported by the participants is presented in Fig. 3. Only 8.5% and 19.4% of the respondents reportedly have access to podiatrists and trained diabetes educators respectively. Majority of the respondents (60.5%) reported that less than 30% of persons living with diabetes in their practice met the IDF recommended glycemic target of HbA1c < 7% (Fig. 4).

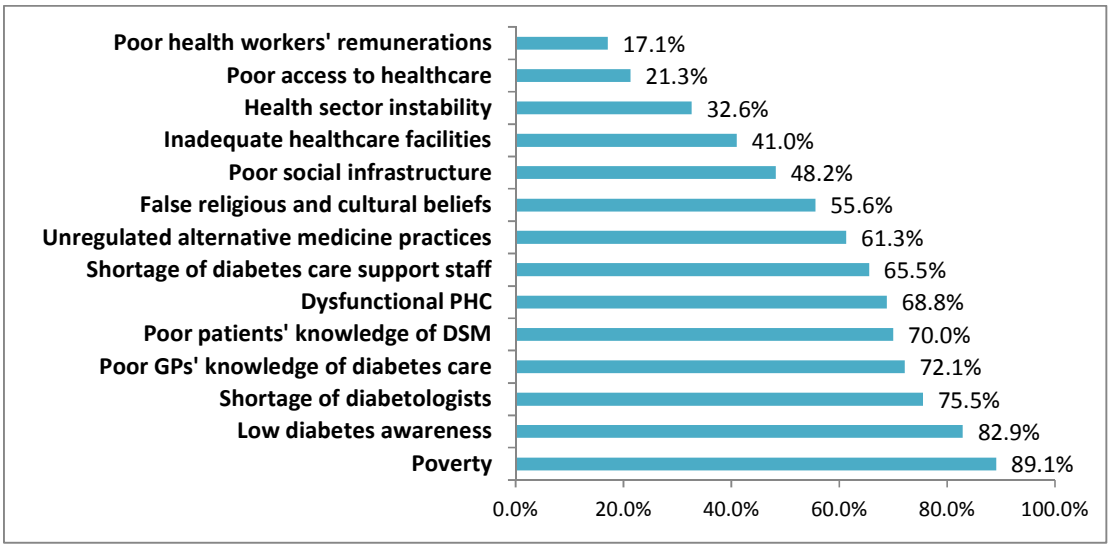

Fig. 2. Major barriers to diabetes care in Nigeria

DSM = diabetes self management, GPs = general practitioners, PHC = primary healthcare

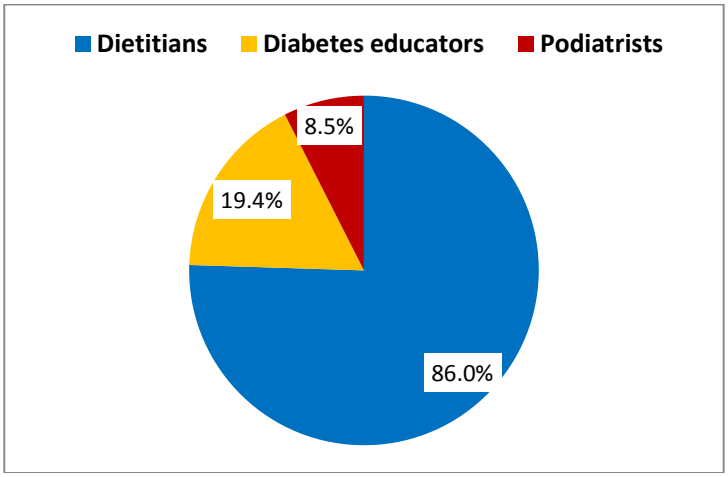

Fig. 3. Availability of diabetes care support staff in Nigeria

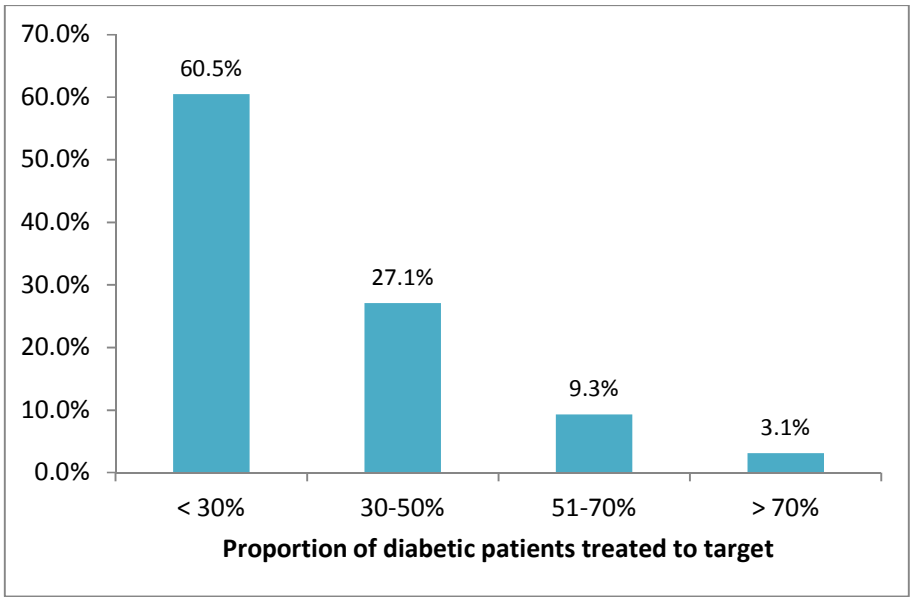

Fig. 4. Estimated proportion of diabetic patients who meet treatment targets in Nigeria

Table 2. Diabetes experts' opinions on improving diabetes care in Nigeria

Strategy	Strongly agree	Agree	Disagree	Strongly disagree	Not sure
Increase health insurance coverage	83.7	6.2	2.3	0.8	7.0
Increase Healthcare Funding	81.4	13.9	1.6	0	3.1
Increase diabetes awareness	80.6	17.8	0	0	1.6
Incorporate diabetes screening in routine clinical care	79.1	14.7	2.3	1.6	2.3
Subsidize diabetes medications	75.2	16.3	3.1	1.6	3.9
Encourage private sector collaboration	72.1	17.8	3.9	3.9	2.3
Train general practitioners	70.5	23.3	3.1	0.8	2.3
Ban media advertisement by alternative medicine practitioners	62.8	24.8	7.0	1.6	3.9
Support local research in diabetes treatment	54.3	29.5	10.1	3.1	3.1
Ban media advertisement by faith healing centers	36.4	29.5	12.4	10.1	11.6
Declare diabetes a national emergency	31.8	25.6	20.2	7.8	14.7
Train native doctors on diabetes care	1.6	6.2	23.2	56.6	12.4

Data are presented in percentage (%)

3.3 Improving Diabetes Care in Nigeria

Table 2 shows the views of the participants on suggested steps to improve diabetes care in Nigeria. Majority (83.7%) of the respondents strongly agreed on the need to increase health insurance coverage; 80.6% strongly recommended improving diabetes awareness while 75.2% of the respondents strongly recommended subsidy on diabetes medications. Majority (56.6%) however strongly disagreed on training of native doctors as a way of improving diabetes care, while the issue of banning media advertisements by faith healing centers yielded the most controversial responses with only 36.4% strongly agreeing.

4. DISCUSSION

Previous authors have highlighted the sore state of diabetes care in some SSA countries [17-19]. However, all were based on reviews of existing literature rather than direct interviews of diabetes patients or their care givers. To our knowledge,

this survey represents the first attempt to identify the challenges confronting diabetes care in Nigeria from the broader perspectives of a large pool of DHPs whose practical field experiences were deployed in shaping their perceptions on several issues bordering on diabetes care. Their views are therefore likely to reflect the realities on ground and thus serve as an important framework in formulating action plans to improve diabetes care in Nigeria and possibly other countries in SSA. For convenience, we would categorize these findings into four major barrier themes namely, patient--centered barriers, physician barriers, health systems barriers and socio-cultural barriers.

4.1 Patient-centered Barriers

Poverty was the most frequently reported barrier to diabetes care in this study, suggesting that affordability of care constitutes a major challenge to optimum diabetes care in Nigeria. This notion is supported by reports on the poverty and unemployment indices in Nigeria. According to the National Bureau of Statistics, the poverty rate in Nigeria rose from 54.7% in 2004 to 67.1% in 2016 [20]. This sad reality would no doubt have adverse consequences on healthcare since a direct relationship between level of income and health has long been established [21,22]. In the Swedish Living Condition Surveys involving 7,201 adults aged 25-64 years, Fitzall et al. [21] clearly demonstrated that both earnings and disposable household income were strongly related to health in both gender. In the diabetic population, an association between socio-economic status and glycemic control was recently demonstrated [22]. In a cross-section of subjects with T2DM, Houle et al. [22] showed that low socio-economic status negatively affects HbA1c level and that this effect was mediated through avoidance of coping mechanisms leading to depression.

The negative impact of poverty on diabetes care could be mediated through several mechanisms including poor medication adherence, late presentation to hospital, patronage of unorthodox and/or unqualified health personnel and poor glycemic monitoring. For instance, significant association between level of income and adherence to anti diabetic medications has been demonstrated [23]. And poor medication adherence has been shown to negatively impact on glycemic control [24]. Furthermore, in a study of type 2 DM subjects in Eastern Nigeria, Ugwu et al. [25] identified financial constraint as the most common reason for infrequent self monitoring of blood glucose. Also, up to 75% of diabetic patients could not afford the cost of HbA1c as reported in another Nigerian study [26]. Poverty therefore has a profound negative impact on the quality of diabetes care in Nigeria. The problem of affordability of care appears to be a common denominator in most countries of SSA as has been reported in Guinea Bissau [27], Tanzania [28], Malawi [29], and Uganda [30]. It therefore sounds logical that over three-quarter of the respondents strongly agreed that anti diabetic medications need to be subsidized by the government, and 83.7% strongly recommended expansion of health insurance coverage, all aimed at improving affordability of care.

Low diabetes awareness and poor diabetes self care knowledge were among the major barriers reported in this study. This perception is supported by previous studies which demonstrated low level of diabetes awareness in Nigerian communities [31,32]. Among subjects who are living with diabetes, knowledge of diabetes and of self care practices have also been shown to be very low [33,34]. In one study, up to 78.1% of diabetic patients believed that their diabetes was caused by poisoning [33]. This raises serious concerns regarding acceptance and implementation of lifestyle modifications including diet and exercise as part of treatment strategies; and also on adherence to prescribed medications. Knowledge is a significant determinant of behavioral change, and the latter is a vital component of optimal diabetes prevention and care. Subjects who are knowledgeable about diabetes risk factors, symptoms and complications have been shown to have better attitude and practices towards its prevention and care including increased physical activities and healthy eating [31]. Similarly diabetes self management education (DSME) has been shown to confer several benefits including improving treatment adherence, reducing hospital admission rates and improvement in quality of life [33,35]. Importantly, randomized controlled trials and meta-analysis have provided strong evidences that DSME significantly improves HbA1c and therefore reduces the risk of micro and macro vascular complications [36,37]. These findings underscore the strategic importance of good diabetes self care knowledge among patients. In fact, the American Diabetes Association (ADA) adjudged DSME as a critical component of care for all people with diabetes and those at risk of

developing it, and recommends annual assessment of diabetes patients' knowledge and skills [38].

4.2 Healthcare Provider Barriers

About three-quarters of respondents in this study identified inadequate diabetes care knowledge among general practitioners (GPs) and shortage of diabetes care specialists as major barriers to diabetes care in Nigeria; and majority strongly recommended training of GPs on proper diabetes care as part of the solution process. With about 150 practicing endocrinologists in Nigeria serving an estimated population of 90 million adults, the population-to-endocrinologist ratio in Nigeria is about 600,000:1. This is a far cry from what obtains in developed countries, for instance in the United States where the ratio is 29,887:1 for adults aged 18-65 years and 6,194:1 for those aged 65 years and above [39]. Critical shortage of diabetes specialists is a major challenge generally in SSA [17-19,27,29]. Consequently, GPs are the main providers of diabetes care in this region especially in rural and semi-urban areas since the few available specialists often cluster in cities. This trend was also depicted in this study where 86.8% of our respondents practiced in tertiary care institutions in urban areas. Ironically, over half of the Nigerian population resides in the rural areas [40]. Furthermore, a diabetes care model which places the main burden of care on primary care physicians is now being advocated even in developed countries [41]. Therefore, empowering GPs with adequate knowledge and skills to provide optimal diabetes care is a matter of utmost priority. Studies on knowledge of and attitude to diabetes care among GPs in Nigeria are currently lacking. However, poor knowledge of diabetes care practices have been reported in other African countries [29,42]. In Cameroon for instance, over half of the GPs did not know the correct diagnostic criteria for DM beyond fasting plasma glucose, and only about 9.9% reportedly prescribed appropriate initial work-up for newly diagnosed cases [42].

Shortage of diabetes care support staff was identified as a major barrier to care in this survey. It revealed that less than a quarter of diabetologists in Nigeria had access to certified diabetes educators (CDE) while podiatrists were almost non-existent. This is the typical scenario in most SSA countries and contrasts with what obtains in the developed world. In the United States for instance, there were at least 20,000 registered CDEs by end of year 2016 [43]. The role of CDEs as indispensable players in integrated diabetes care is well established. They play significant roles at all levels of diabetes care including diabetes prevention and clinical care through provision of DSME which has been demonstrated to benefit several aspects of diabetes care [44,35-37]. A recent joint position statement of the ADA, American Association of Diabetes Educators (AADE) and Academy of Nutrition and Dietetics recommends that all healthcare providers and/or systems should provide measures that guarantee that all patients with type 2 DM receive adequate DSME services [45]. Similarly, podiatrists are important component of a comprehensive multidisciplinary diabetes foot care team which has been shown to significantly reduce foot complications and major amputation rates in diabetics by over 50% [46]. Chronic systemic complications of diabetes usually present in the foot before other organ manifestations [47]. Diabetic foot ulcerations (DFU) are common in Nigeria where it is only second to hyperglycemic emergency as a cause of diabetes-related hospitalization [2]. Diabetic foot outcomes in SSA are generally poor, with high amputation and mortality rates [3]. This very important cadre of DHPs is therefore highly needed in the SSA sub-region if the current unpleasant narrative is to be changed.

4.3 Health Systems Barriers

Over two-thirds of the respondents reported that dysfunctional primary healthcare system constitutes a major barrier to diabetes care. Other health systems related barriers identified include inadequate healthcare facilities, health sector instability, poor health workers' remunerations and harmful practices of alternative medicine practitioners (AMPs).

Following the National Health Policy of 1987, the Nigerian healthcare system was reorganized, with the establishment of Primary Healthcare (PHC) based on the Alma Ata Declaration of 1978 [48]. The goal of the PHC was to provide basic essential and accessible healthcare services for all. Regrettably, not only that this goal is yet to be actualized, but the PHC system is currently a complete shadow of itself with only about 20% of the 30,000 PHC centers functioning nationwide [49]. The rural and semi urban centers are the most underserved segment of the population. Yet, majority of Nigerians reside in these areas with limited access to healthcare services [41]. Furthermore,

even the few functioning PHC centers are bedeviled by numerous problems ranging from inadequate manpower to lack of equipment, poor funding, lack of essential drugs and poor quality of healthcare delivery [49]. The inability of PHC centers to provide essential healthcare services has put so much strain on both manpower and facilities in the few secondary and tertiary healthcare centers with resultant negative impact on the quality of care. For instance, a typical diabetes clinic in a Nigerian tertiary healthcare centre is characterized by such a high patient-to-specialist ratio that there is hardly time for effective communication and detailed examination. Furthermore, the collapse of the PHC system may have contributed to the proliferation of alternative medicine practitioners (AMPs) who attempt to fill these gaps in healthcare delivery with unlicensed, unwholesome and not-evidence-based practices that may not only be inefficacious, but may also cause harm. Unfortunately, these AMPs who often make bogus claims including a cure for diabetes and other diseases are poorly regulated by government and utilize every available media to woo the gullible populace. It is therefore not surprising that majority of the respondents in this study recommended a ban on open advertisement by the AMPs. Training and integrating the AMPs on diabetes care has been suggested but it remains a subject of controversy. Although most of our study respondents strongly opposed this idea, it is noteworthy that one Cameroonian study suggested that trained AMPs contribute useful complementary diabetes care workforce and impact positively on diabetes prevention and care [50,51]. However, more evidence is needed to evaluate the utility of such strategy in improving diabetes care in SSA.

4.4 Socio-cultural Barriers

Over half of the respondents identified negative cultural and religious beliefs as a major barrier to diabetes care. Culture has a significant influence on an individual's beliefs, attitudes and practices including health. For instance, the belief that sicknesses including diabetes are inflicted by the gods of the land in punishment for some sins, or are caused by witchcraft or diabolic poisoning is not uncommon in Africa [52]. Sufferers therefore tend to seek help first in unorthodox centers, only to present to hospitals much later with established complications. In addition, many patients continue to take concoctions along with prescribed orthodox therapy. In one Nigerian study, up to 65% of patients with diabetes used complimentary alternative medicines [53]. Religious beliefs that diseases are caused by demons are also rife in Africa and all sorts of religious preparations including "anointing" oils are often believed to cure diabetes and other diseases. It was recently reported that over half of patients hospitalized for diabetic foot ulcer in Nigeria had presented to either a herbalist or at faith healing center prior to presentation in hospital [3]. This trend is a common phenomenon in many countries in SSA and calls for intensification of public enlightenment and patient education so as to break these cultural and religious barriers to optimal diabetes care.

4.5 Strengths and Limitations of the Study

To our knowledge, this study represents the first attempt to explore the challenges of diabetes care in Nigeria by engaging the diabetes experts on a nationwide scale. Findings from this study are therefore likely to be a true reflection of the realities on the ground.

The study nevertheless has some limitations that the reader needs to be mindful of. Firstly, majority of the respondents in this survey practiced in tertiary hospitals located predominantly in urban areas. Therefore, their opinions may not accurately reflect the challenges of diabetes care in rural areas. Secondly, non inclusion of patients living with diabetes in this survey constitutes a study limitation. Although the DHPs' continual interactions with patients and health systems might have placed them in proper perspectives, it is not unlikely that further explorations from the patients' perspectives would yield additional insights which might have been missed in this survey.

In spite of these limitations, we believe that if the findings of this study are heeded to by major diabetes stakeholders and policy makers, it could significantly improve diabetes care in Nigeria.

5. CONCLUSION

Diabetes care in Nigeria and other sub-Saharan African countries have remained abysmally poor and not in tandem with progresses recorded in other parts of the world. We have relied on the experience-driven perceptions of a large proportion of diabetes healthcare specialists to identify some major challenges facing diabetes care in Nigeria as well as steps to address them. The study has uncovered several barriers to care at different levels including at the level of

patients, healthcare providers, health systems and the socio-cultural environment. These findings may provide useful evidence-based template for addressing the poor state of diabetes care in Nigeria and perhaps other countries in SSA which share similar socio-cultural and economic characteristics with Nigeria. We recommend that a Nigerian National Diabetes Care Plan be instituted by the federal government to harness the findings in this study with a view to improving the quality of diabetes care.

CONSENT AND ETHICAL APPROVAL

Approval for this study was obtained from the Enugu State University's Ethics and Research Committee. Informed consent was obtained from all individual participants included in the study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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