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Short Communication

A qualitative study to understand the barriers and enablers of access to diabetic screening services in Nigeria

Nnenna Ozioko[1]*, Sureshkumar Kamalakannan[2]

[1]Department of Ophthalmology Enugu State University of Science and Technology Teaching Hospital, Parklane.
[2]Department of Social Work Education and Community Wellbeing, Northumbria University, Newcastle upon Tyne, United Kingdom

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***Correspondence:**
Dr. Nnenna Ozioko,
E-mail: nneozioko@outlook.com

ABSTRACT

Nigeria in working to redefine its health care system's approach to diabetic retinopathy (DR) screening services needs to reduce obstacles and highlight the enablers to services provision. Due to the increased prevalence of diabetes, this has become increasingly necessary. A qualitative study examining the perceptions, practices, and experiences of Nigerian DR healthcare practitioners (HCPs) in relation to the facilitators and barriers of access to DR screening services. Mode of participant recruitment was on-line through e-mails by using snowballing method. In-depth interviews were used to acquire information from 6 DR HCPs (all ophthalmologists) at three eye centers in the three geo-political areas of Nigeria and at international center for eye health (ICEH) in London via on-line Microsoft teams. Thematic analysis was used for data analysis and all the steps applied to the data analysis process. Non-systematic screening, poverty, poor transport systems, insecurity, and poor motivation are key barriers to DR screening access in Nigeria while enablers include government participation through subsidized costs and remuneration of workers. Screening in communities, and using low-cost techniques are key to enable access. Other enablers include collaboration and integration between endocrinology and ocular units in terms of referrals, information sharing, use of intermediary carers, technology, man-power and health resource provision including low- cost services. A dearth of personnel, screening technologies, and resources, have an impact on the effectiveness of the DR screening services in Nigeria as well as social and individual factors, such as the cost of the services and national insecurity.

Keywords: DR, Healthcare system, Screening services, Barriers, Enablers

INTRODUCTION

Diabetic retinopathy (DR) is a complication of uncontrolled diabetes mellitus (DM), a chronic metabolic illness caused by absolute or relative insulin insufficiency.[1] Diabetes affects more than 415 million adults worldwide, making it one of the most prevalent non-communicable diseases and a substantial cause of morbidity.[2] The global prevalence of diabetes was 10.5% as of 2021.[3] According to projections by Sun et al the number of adults aged 20-79 years worldwide with diabetes could rise from 536.6 million in 2021 to 783.2 million by 2045.[3] Diabetes in persons aged 15-30 years (juvenile onset) is uncommon.[1]

The diabetes population is growing at the same rate in Sub-Saharan African nations with a prevalence of 23.6 million in 2021, which has been projected to rise to 54.9 by 2045.[4] In 2021, an estimate of 300,000 deaths were attributable to diabetes.[4] In Nigeria, the total adult prevalence of diabetes is around 3.7% according to information released by the international diabetes federation, released information (IDF).[5] Regarding the major clinical classifications, type 1 diabetes (juvenile onset) was reported to be less common

in Nigeria than type 2 diabetes (adult onset), with prevalence estimates ranging from 0.1 to 3.1 per 1000.[6] Up to 90 to 95 percent of cases seen in endocrine clinics are type 2.[7] Also, approximately 80% of diabetes patients, according to studies, reside in low- and middle-income nations.[8] A growing trend in diabetes prevalence has been brought on by the effects of expedient urbanisation, industrialization, and lifestyle modifications.[9] Diabetic complications including retinopathy contribute significantly to the disease burden in those countries.

Diabetic eye disease is one of the causes of painless, slowly progressive loss of vision encountered in ophthalmology practice which can present as DR or diabetic macular edema.[10] Much of its burden is borne by low- and medium-income countries, particularly in sub-Saharan Africa.[4] Estimates from 2010 indicate that a third of diabetics exhibit retinopathy symptoms, which if untreated, can result in blindness.[11] Rates of progression to sight-threatening DR have fallen in developed countries. For instance, according to recent reviews, DR is no longer the leading cause of blindness in the working age group in the United Kingdom as opposed to developing nations.[12,13] In contrast to the UK situation, approximately 42% of diabetic hospital patients in south-western Nigeria was reported to have associated retinopathy.[14] Also, in the working age range (20-64 years), DR is the most frequent cause of legal blindness.[15] Length of retinopathy, poor management, cardiovascular disease, and nephropathy have been identified as risk factors for development of DR. On the other hand, being a microvascular complication of diabetes, DR is linked to a higher risk of fatal systemic vascular consequences such as stroke, coronary heart disease, and heart failure.[15]

Establishing or revising relevant policies linked to lowering diabetes, interacting with stakeholders, organizing the health care system, and increasing physician efforts at all points of care are required to give the optimum diabetic screening service. Meanwhile, the onus lies on diabetologists, and other health personnel involved in the management of diabetes to refer appropriately and monitor patients closely through periodic eye examinations. The GPs, medical professionals, and ophthalmologists need collaboration to ensure care pathways that would not miss diagnosis of the onset of retinopathy in diabetic patients.[16] Early referral is therefore important in patients with presence of retinopathy for prompt institution of appropriate management. The available data showing a rise in the population at risk has given the diabetic and eye specialists the task of ensuring efficient screening platforms and complying with recommended guidelines for the prevention of vision loss due to diabetes.[17] Therefore, the need for DR screening systems is sharply rising as the prevalence of DM.[18] There are currently systems in place in developed countries for widespread DR screening. Platforms for nationwide DR screening commissioned a long time ago are now running on established guidelines in developed countries but yet to reach low-income countries.[19] However, these platforms have developed over time from in-person assessments provided by ophthalmologists through grassroots community organizations to cutting-edge telemedicine platforms with the ability to save and retrieve databases for online reading and assessment.[18]

DR screening has advanced further in developed nations that have not rested on their oars to seek better versions of the current functional screening set-up. Lately, talks about improving existing systems by incorporating AI technology are also ongoing.[19] Formerly in manual DR assessment, the retina is assessed by fundus photography, which then relies on competent readers to interpret it accurately.[17] However, this requires a lot of work and often produces inconsistent results. As a result, diabetic screening has advanced to the use of automated software for analyzing retinal images and recently has become more and more common, with the potential to reduce this burden in an efficient manner.[17]

Aim

The major aim of this research is to explore the barriers and enablers for access to DR services in Nigeria.

Primary objective

Primary objective was to assess the barriers that prevent healthcare providers/professionals in Nigeria from offering DR screening services to diabetics.

Secondary objectives

Secondary objectives were to identify the facilitators that promote effective DR screening programme for diabetics in Nigeria and to identify ways of improving DR screening services in the Nigerian context.

METHODS

Study design

A qualitative study to gather qualitative data to better understand ophthalmology service providers' opinions and experiences regarding eye care and diabetic screening services in Nigeria through in-depth interviews which started on the 16th of August 2023 and ended on the 30th of August 2023.

Study location

Nigeria in the context of current DR screening service provisions.

Study participants

The participants for this study were health care professionals providing DR screening services in Nigeria. The participants were any DR service provider with

experience of working in the Nigerian healthcare setting and who can be accessed online for interview and who was willing to participate in the study. The participants were recruited via snowballing method by emailing heads of eye centers in the three political regions of Nigeria and utilizing all the professional network of the principal researcher.

Inclusion criteria

DR service providers and healthcare providers with experience of working in a Nigerian healthcare setting. DR service providers in this context refer to anyone who has direct contact with diabetic patients in a long-term healthcare facility and/or clinical decision makers or other stakeholders involved in decision-making related to DRS services.[18]

DR service providers with internet facility for on-line interview, workers in DR service provision in Nigerian-based establishments DR health care service provider in hospital setting and any cadre.

Exclusion criteria

Those who do not have DR screening experience and those who do not have access to internet.

Method of interview data collection

A qualitative study approach was chosen to better understand the barriers and enablers of DR screening services in the Nigerian context by interviewing DR healthcare providers who have relevant working experience within the Nigerian hospital setting. This method involved the healthcare providers answering open and closed-ended questions through in-depth interview. This process provided an in-depth insight into their perceptions and work experiences concerning the barriers and or enablers to DR screening service during their period of practice in a Nigerian based hospital or care setting. It also captured an overview of their practice relative to specific issues such as available resources, quality of DR services delivery, performance level and level of utilization by DR patients and the factors that promote and deter utilization. Online one-on- one interview via Microsoft teams has been chosen. Informed consent was obtained from all participants by providing a detailed information sheet and consent form when the participants indicated interest in participating. A debrief sheet was also sent at the end of all the interview process. The participants were informed of their freedom to discontinue at any point of the interview process if they are no longer willing to continue. Before the interview began the participants were given another opportunity to revalidate their consent orally.

The main interview questions were asked from the topic guide and included questions like the following: Having experienced the Nigerian diabetic services provision what do you consider the barriers to service provision from a healthcare provider point of view? What are the enablers? What do you consider is lacking? do you think there are gaps in it? What can be done better? The investigator interviewed each participant for 30-45 minutes using the questions as set out above to guide the discussion and make sure the discussant does not go off target. After every interview, the topic guide was slightly adjusted so that same questions were asked differently to emphasize perspectives that are noticed to come up in the previous interviews. The interview recordings were transcribed for analysis. Transcription helped the investigator to immerse herself in the interview to gain a more in-depth understanding during analysis.

Data analysis

The raw data from participants in the form of interview transcripts was organized in one folder in Microsoft teams. All interview transcripts were reviewed several times to obtain greater comprehension for manual coding to be done. After reading through thoroughly the first set of codes were applied. Thematic analysis was used to extract themes from the texts by analysing the words and sentence structures in the interview transcripts. [20] Each key word and phrase were systematically examined for patterns and meaning, and the codes examined for frequency. An organizational structure for all the codes was created. This was done by arranging a set of codes into categories that the researcher created. This helped manage and organize the data throughout analysis. Frequency counts on codes was used to identify key themes. With this, the researcher was able to rearrange the data in a way that helped to summarize it and help to answer the research questions. Different interviewees' opinions or experiences in relation to the subject was compared.

Ethics approval

Ethics approval from the university of Northumbria ethics committee was obtained via online application portal.

RESULTS

Profile of respondents

This result is based on the qualitative data which was collected using in-depth interview with DR HCPs from 3 eye care organisations representing the three zones in Nigeria which covers North, West and East as well as 3 Nigerian eye care practitioners at the international centre for eye health (ICEH), London. A total of 6 participants i.e. (1 from Eastern Nigeria, 1 from Western Nigeria, 1 from the Northern Nigeria and 3 from London eye centre) were interviewed using Microsoft teams. Consent was orally given by all the participants prior to the interviews. The profile of participants shows that most of them are well experienced with over 10 years ophthalmology practice including residency training which makes them very suitable for the research. Three out of the six

ophthalmologists interviewed were male Ophthalmologists while the others were females. All six participants had urban practices. Although two centres had retinal cameras, all participants had access to direct ophthalmoscopes and slit lamps for DR screening. One out of the 6 centers had OCT machine and two centers had functional laser machines. Nobody in the study admitted to using DR screening protocol. The in-depth interviews started on the 16th of August 2023 and ended on the 30th of August 2023. To protect the confidentiality of participants, codes were given to the participants. D1 to D6 were used for the individual participants.

Table 1 showed the diverse and interconnected challenges faced by DR HCPs and patients in accessing and providing DR screening service according to region.

Table 2 describes the challenges faced by HCPs and patients in accessing and providing DR screening services.

Table 3 provides a summary of the primary enablers of DR screening, as perceived by the respondents.

Table 4 summarizes the ways to improve access to DR screening based on insights from D2, D5, and other DR practitioners.

Table 1: Barriers to DR screening services in Nigeria according to region (Research question 1).

Sources	Key barriers
Participants feedback	Opportunistic screening, cost, paucity of DR screening personnel, lack of information, Attitude of healthcare providers, poverty, long distance travel to screening centers, poor transport network for rural dwellers
ICEH London	Funding for DR Services, out of pocket payment for services
Northern Region (D3 and D6)	Road insecurity due to bandit activities, high transport costs for rural dwellers, burden on poor populations prioritizing survival over eye health
All respondents East, West, North, ICEH, London	Scarcity of fuel
D1-D5	Bad road networks

Table 2: Description of key barriers.

Key barriers to DR screening	Description
Opportunistic screening method:	Practitioners note that relying on hospital-based opportunistic screening rather than systematic outreach limits detection and treatment opportunities.
Cost and funding	High cost of screening and treatment services, coupled with insufficient funding and reliance on out-of-pocket payments, are significant barriers. This is compounded by poverty, where individuals prioritize basic needs over health services.
Lack of resources:	There is a noted paucity of trained DR screening personnel, which limits service availability. Additionally, there is a lack of information both among patients and healthcare providers regarding the importance and availability of DR screening.
Attitude of healthcare providers:	Negative or indifferent attitudes among healthcare providers towards DR screening can further discourage patient participation and adherence.
Infrastructure and accessibility:	Poor transport networks and bad road conditions, particularly in rural areas, make accessing screening centers difficult. This is exacerbated by the scarcity of fuel, affecting transportation availability and affordability.
Insecurity:	In the northern region, road insecurity due to bandit activities poses a significant barrier to access, discouraging travel for both patients and healthcare workers.
Rural challenges:	Rural dwellers face unique challenges due to long travel distances to screening centers, poor transport infrastructure, and higher transportation costs, making access to services more burdensome.

Table 3: The enablers of access to DR screening services in Nigeria, research question 2.

Enablers	Description
Collaboration and integration	Strengthening collaboration between endocrinology and eye care units to improve referral systems and information sharing
Referral systems	Establishing efficient referral pathways between healthcare providers to ensure patients are directed to appropriate DR screening services.
Information sharing	Enhancing communication and information dissemination between medical units and patients to raise awareness and understanding of DR screening importance

Continued.

Enablers	Description
Use of middle carers	Engaging trained middle carers, such as community health workers, to support and facilitate patient access to DR screening services
Technology utilization	Implementing technology solutions, such as telemedicine and electronic health records, to improve access and coordination of DR screening services.
Personal experience	Individuals with close relatives who have experienced DR are more likely to seek screening, suggesting the importance of personal stories and testimonies in encouraging participation

Table 4: Practical ways of improving DR screening services in Nigeria (Research question 3).

Improvement method	Description
Grants and foreign collaborations D2 and D5	Seeking international grants and establishing partnerships with foreign organizations to secure funding and resources for DR screening
Restructuring Screening services	Using additional funding to enhance infrastructure, streamline processes, and improve the efficiency of DR screening services.
Reducing reliance on Government	Diversifying funding sources to reduce dependency on government budgets, allowing for more flexibility and stability in service provision.
Massive advocacy campaigns	Implementing large-scale advocacy efforts to raise public awareness about DR and the importance of early screening.
Awareness creation	Educating the public and healthcare providers about the risks of DR and the availability of screening services through targeted outreach programs.

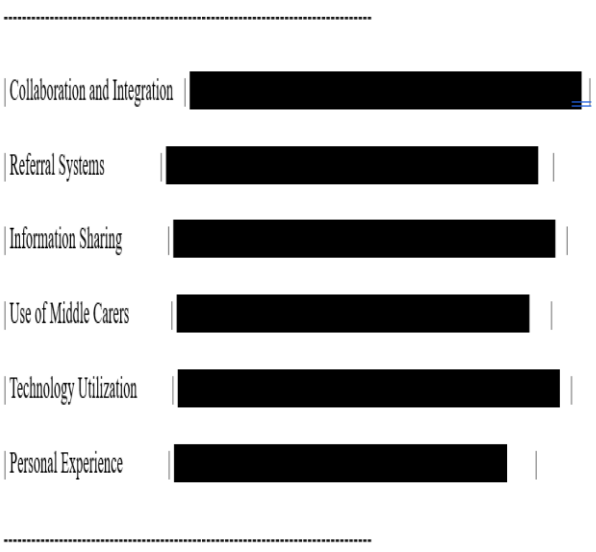

Figure 1: Enablers of DR screening.
= Represents the impact and significance of each enabler.

DISCUSSION

What are barriers to access for DR screening services in Nigeria (Theme 1).

Firstly, despite the participants' enthusiasm for implementing DR screening in their centres, the significant challenges revealed in this research that make it difficult to do so in Nigerian urban practices correlate with the subpar screening framework established within the eye care organisations and match the factors listed by Liu et al.[21] There is a corresponding report by the center for disease control and prevention by Lu et al.[22] A variety of obstacles have been presented in recent literature and has diverse interpretations in relation to the research locale.[18,23] Therefore, each DR screening setting has its own unique set of barriers.

The interviews reveal that DR screening in Nigeria is primarily opportunistic, which leads to significant access barriers. Unlike systematic screening with a nationwide protocol, opportunistic screening relies on healthcare providers or patients initiating the process.[9] This approach is mostly used in tertiary centers, which limits access for many individuals.[24] While population-based screenings occur during events like World Sight Day, the lack of a consistent screening approach reduces their effectiveness. Although various screening methods are mentioned in the literature, little has been documented about hospital-based DR screening that includes education or a multidisciplinary approach.[9] Participant D4 noted that existing screening protocols are not optimally accessible due to the non-systematic approach. Other study participants identified opportunistic screening as a barrier to effective DR screening, which aligns with the New Zealand government's guidelines that favor organized screening regimens.

Report from the international agency for blindness prevention (IABP) also agreed with the need for a national guideline, as screening protocols and treatments vary widely across Nigeria, resulting in inconsistent quality. DR practitioners in this study emphasized the importance of proper screening protocols, with a respondent from the Eastern zone stressing that primary health physicians should screen every diabetic patient and refer them appropriately.

Secondly, findings highlight the significant shortage of healthcare personnel for DR screening in Nigeria, emphasizing the lack of doctors is an identified barrier. All responses indicated that the inadequate number of screening personnel is a major issue, exacerbated by the recent wave of healthcare workers emigrating to other countries. This shortage severely impacts DR screening services. Similarly, according to a report from The Guardian, Nigeria, with a population of 218 million, has only 24,000 licensed doctors. The world health organization (WHO) has added Nigeria to its red list to discourage other countries from recruiting its medical professionals due to the already limited workforce. The Guardian, notes that Nigeria has a physician density of four doctors per 10,000 patients and 16.1 nurses and midwives per 10,000 patients, which is significantly below the WHO recommendation of one doctor per 600 patients and the critical threshold of 23 doctors, nurses, and midwives per 10,000 patients. This shortage underscores the challenges faced in providing adequate DR screening and healthcare in Nigeria.

Also, poverty and inequitable access significantly impact DR screening services in Nigeria. The responses from participants highlight that poverty and low socioeconomic status are major barriers to accessing DR screening, which is primarily available at tertiary hospitals where patients must pay for services and transportation. According to Ichoku et al there is a significant disparity in healthcare quality between the wealthy and the poor in Nigeria.[25] Participants noted that the cost of DR services and out-of-pocket payments deter people from participating in screenings, with low-income individuals having less access than those of higher socioeconomic status. Liu et al.[21] also pointed out that rural populations face even greater challenges due to factors like age, poverty, lack of insurance, and limited access to care. Additionally, Low et al emphasized that socioeconomic disadvantage is linked to a higher prevalence of DR among type 1 diabetes patients, highlighting the need for targeted efforts to address these disparities.[26] The worsening of poverty as a barrier to DR screening in Nigeria is attributed to two main factors: the post-COVID rise in living costs and poor leadership in the healthcare sector.[27,28]

The research identifies the poor referral system as a significant barrier to accessing DR screening services in Nigeria. This issue stems from the passive role of general practitioners, family physicians, and diabetic physicians, who are often the first point of contact for diabetic patients. Due to poor health system organization and policies, these healthcare providers frequently fail to identify DR and facilitate timely referrals to screening services.

Respondents highlighted other reasons for inadequate screening services, such as the difficulty healthcare providers face in leaving their primary duties to ensure diabetic patients receive eye checks. The Merton diabetic eye screening program provides a contrasting example, where general practitioners refer newly diagnosed diabetic patients to screening services as the first step in the care pathway. This program ensures annual screenings using digital retinal photography, with patients needing treatment being referred to secondary care. In contrast, Mohammed et al publication in the Nigerian medical journal noted that many diabetic patients in Nigeria self-refer to eye clinics only after experiencing significant vision loss, which is often too late for effective intervention.[29] Although primary diabetic caregivers are generally aware of potential eye complications, they often wait for patients to report visual problems before initiating screenings or involving eye care specialists.

The research showed the impact of insecurity and high living costs on accessing eye screening services in Nigeria. Four out of six study participants highlighted these issues, particularly emphasizing the challenges faced by rural populations. A participant from ICEH, London noted that high transportation costs, poor road conditions, and insecurity, such as banditry, are significant barriers to healthcare access. Ojo et al reported that bandit activities, including kidnappings and killings, are prevalent on roads in Northwest Nigeria, further exacerbating the situation.[30] Reports from Thisdaylive and Businessday underscore the dangers of road travel, with incidents of violence and kidnapping on federal roads.[31] The rising transport fares add to the burden, making it increasingly difficult for Nigerians to access healthcare services. This situation is particularly challenging for individuals from rural areas, as noted by D2, who mentioned that security concerns and transportation difficulties hinder access to healthcare.

What are enablers to access for DR screening services in Nigeria (Theme 2)

The respondents in the research highlighted several enablers and barriers to accessing DR screening services in Nigeria. A key enabler identified is the need for collaboration among healthcare professionals who manage diabetic patients. Interviewees emphasized the importance of improving rural development, road access, and providing health subsidies for low-income earners to enhance access to DR screening.

Inequality in access to DR screening due to poverty is a significant issue, with respondents noting that district hospitals and primary healthcare centers, which serve low-income communities, lack DR screening services. As a result, patients must travel to cities for screenings, but poor road conditions, transportation costs, and security concerns, such as the risk of kidnapping, deter access. Respondents suggested that establishing community-based centers offering free DR screening and consistent availability of practitioners could improve access.

Furthermore, there is a need to incorporate primary eye care into primary healthcare. Training more DR practitioners and reducing the emigration of doctors are also seen as critical steps to increasing access. Improved infrastructure and resources would encourage people to

attend screenings, as they would no longer need to prioritize limited funds for travel to distant hospitals. Overall, better support and resources for DR screening could significantly enhance access and adherence to screening appointments.

What are the practical improvement strategies for DR screening services in Nigeria (Theme 3)

The research highlights the perspectives of DR HCPs in Nigeria, who strive to balance their work roles with the pressures of screening diabetics through a clinic-based approach. Practitioners are optimistic about the future of DR health education and screening, recognizing the potential for self-initiative within DR organizations and the need to attract international aid rather than relying solely on government support.

Respondents emphasized the importance of DR services' proximity in increasing healthcare-seeking behaviors, even among poorer populations. They noted the challenges posed by poor road infrastructure and transport systems, which hinder effective coordination of eye screening programs within local communities. Despite national health policies supporting eye care, less than 10% of primary healthcare facilities offer eye care services, leading to inadequate DR screening uptake in rural areas.[32]

A community-based strategy for diabetic eye screening is suggested to meet the needs of high clinic defaulters.[33] Respondents proposed incorporating primary eye care into primary healthcare centers as part of a DR screening program. Government incentives, such as improved working conditions and increased salaries for health workers, were also recommended to encourage greater engagement from healthcare professionals.

The need for active government involvement in promoting eye care in rural communities was highlighted. Respondents suggested developing a viable primary eye care service that includes screening and emphasized the importance of effective doctor-patient interactions to build patient confidence.[34] Long-term improvements may include adopting an integrated treatment approach with conversation maps, tele-screening techniques, patient support groups, and counselor-led education.

Cooperation among healthcare professionals in a multidisciplinary setting is seen as key to improving DR screening. A participant from the Western zone suggested training middle-care workers to screen diabetic patients using Fundus cameras, with images sent to ophthalmologists for review. This approach could enhance screening efficiency and expand access to DR care.

Limitations

Due to time restrictions, this study's scope is limited as it only examines DR screening from the viewpoint of health providers among online DR screening professionals with experience in the Nigerian setting. Six participants were able to participate in this study.

The perspectives of the policy makers or programme planners were as perceived by the DR HCPs, so this study lacks several aspects of stakeholder perspectives. The study concentrated on the perspectives of the DR HCPs alone, describing the barriers for themselves and for the patients.

Policy makers might not appreciate the interpretive viewpoint or grasp its importance, which would lead them overlook the significance of the research.

CONCLUSION

DR screening services in Nigeria is considerably hampered by poverty, low socioeconomic level and insecurity, and other factors which have a detrimental impact on diabetic eye screening. Personal factors or the barrier caused by poverty and low socioeconomic position was prominent in accounting for the low participation in DR eye screening in Nigeria, mainly conducted at tertiary hospitals which requires that patients make payment for the services as well as paying for their transportation costs.

In Nigeria, the DR screening services are impacted also by organisational factors that hinder efficiency. Organisational barriers to eye screening include few DR health care providers to make up the needed workforce, non-availability of support staff, qualified medical personnel, screening tools, and resources. Continuous efforts are being made for sustained uptake of diabetes in DR screening programmes. Therefore, target uptake of a DR screening programme is still low.

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