Wydawnictwo UR 2024
ISSN 2544-1361 (online)
doi: 10.15584/ejcem.2024.3.24

http://www.ejcem.ur.edu.pl
European Journal of Clinical and Experimental Medicine
Eur J Clin Exp Med 2024; 22 (3): 653–667

REVIEW PAPER

Improving diabetes mellitus care in Nigeria – health promotion and education perspectives

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ABSTRACT

Introduction and aim. In this review, we suggest ways to improve diabetes mellitus (DM) care in Nigeria from a Health Promotion and Education (HPE) perspective by addressing the gap in DM care through the adoption of strategies from the Ottawa Charter and National Health Promotion Policy (NHPP) guidelines.

Material and methods. This review conducted a comprehensive literature search on Africa Journal Online, PubMed, Google Scholar, and Science Direct, from 1986 to 2023, using relevant keywords.

Analysis of the literature. The adoption of the Ottawa charter and NHPP remains a key strategy in addressing the gap in DM care in Nigeria. This could be achieved by the adoption of population-focused multi-sectoral interventions encompassing legislation, regulation, and fiscal measures, creating sustaining and expanding health-promoting environments to reduce modifiable risk factors, and reorienting the primary health care services to aid the diagnosis, treatment and rehabilitation of DM patients.

Conclusion. This review concluded that the government and other critical stakeholders should adopt the HPE strategies that covers increased financing, strict legislation on DM modifiable risk factors, reorientation of the primary healthcare system, and capacity building for HPE practitioners into DM care in Nigeria as a strategy to improving DM care and prevention in Nigeria.

Keywords. community participation, diabetes mellitus care, HPE, Nigeria, primary health care

Introduction

Nigeria, which has a total surface area of about 923,768 square kilometers and an estimated population of over 200 million, is the most populous country in Africa. Thirty-six states make up the country's six geopolitical zones, with the federal capital territory acting as the administrative capital.[1] Nigeria with his large population size and land mass, coupled with migration, industrialization, and globalization have resulted in disease burden of both communicable and non-communicable diseases. Communicable diseases prevalent in Nigeria are the HIV/AIDS epidemic, Lassa fever, cholera etc. Non-communicable diseases (NCDs), which include chronic renal disease, diabetes mellitus (DM), cancer, and cardiovascular diseases, have become more common in recent times. The average life expectancy has decreased due to the weight of the disease burden, with males surviving an average of 53.7 years and women living an average of 55.4 years.[2] Figure 1 illustrates the death rates associated with non-communicable diseases,

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Received: 15.12.2023 / Revised: 7.04.2024 / Accepted: 2.05.2024 / Published: 30.09.2024

Agofure O, Abiodun OO, Oyewole OE. Improving diabetes mellitus care in Nigeria – health promotion and education perspectives. *Eur J Clin Exp Med.* 2024;22(3):653–667. doi: 10.15584/ejcem.2024.3.24.

which comprise of chronic respiratory disorders 2%, diabetes 1%, malignancies 4%, and cardiovascular diseases 11%.[3] However, the review focuses on DM because of its prevalence among all strata of the population and it imposes a degree of morbidity when poorly managed which affects almost all organs of the body.

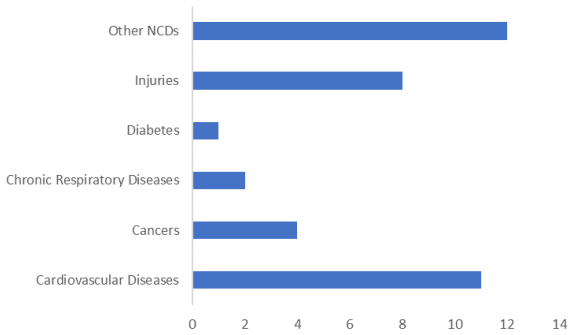

Fig. 1. Mortality due to NCDs diseases in Nigeria[3]

Diabetes mellitus (DM) is a long-term metabolic illness characterized by high blood glucose levels which when poorly managed could lead to serious damage to the heart, blood vessels, eyes, kidneys and nerves.[4] The three major types of DM include type 1 DM, type 2 DM and gestational DM. Of the three types, type 2 DM, which is adult onset, is the most common and it occurs when the body becomes resistant to insulin or doesn't make enough insulin.[4,5] Type 1 DM is a long-term disease in which the pancreas generates little or no insulin on its own; while gestational DM is associated with pregnant women.[4,5]

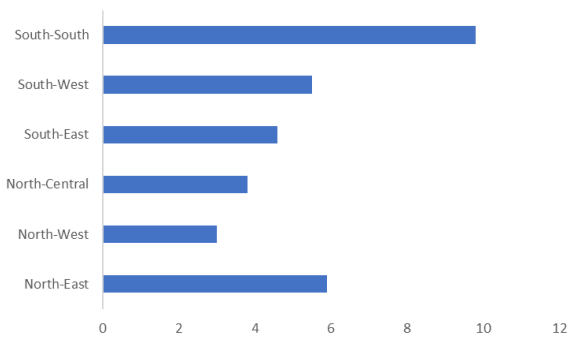

Fig. 2. Pooled prevalence of DM in Nigeria[7]

In Nigeria, the last time a national study estimating the prevalence of DM was carried out was over 30 years ago. The 1992 Nigerian National NCD survey, estimated the prevalence of DM to be 2.2%.[6] According to the International Diabetes Federation atlas, the number of people aged 20-79 years living with DM is 3.6 million.[5] Owing to paucity of data there is currently no national prevalence of DM in the 36 states of the nation, except pooled prevalence of DM (Fig. 2) and other prevalence studies published in various local and international journals.[8-15]

The rising prevalence of DM has been associated with the increase of cardiovascular diseases, end-stage kidney disease, erectile dysfunction, stroke and lower extremity amputation.[14,16-19] In addition, DM constitute a third of all hospital admissions in Nigeria non-surgical wards and patients with DM has the longest hospital stay and highest medical bills.[20-23]

In terms of health care organization, in Nigeria there is poor screening activities taking place at the community level as most cases of DM are either diagnosed with classic symptoms or complications or during routine public health screening, pre-medical screening programs, pre-employment medical checks and for investigations such as stroke, hypertension, infertility, HIV/AIDS and tuberculosis.[16,20] In addition, most DM care takes place at the secondary level of care and fewer more complicated cases at the tertiary level of care with little or no form of care at the primary care level in most states of the federation.[20,24]

Furthermore, DM care in Nigeria has been suboptimal in all ramifications. This was buttressed by the former Nigeria Minister of State for Health Mr. Ekumankama Joseph Nkama on 14th November, 2022 during the commemoration of the World Diabetes Day who stated "the risk of having DM has been rising because the vast majority of Nigerians with the condition are unaware of it or only have a basic understanding of it." He bemoaned the lack of understanding about DM prevention, testing, and treatment that has contributed to the disease's rising prevalence. Furthermore, Mr. Nkama said the management of the disease in the nation has been impacted by the lack of sufficient education for Type 2 diabetes prevention, education for those living with all types of diabetes, and access to cost-effective medication, particularly insulin. Additionally, he emphasized that while diabetes can be effectively prevented or controlled by encouraging healthy lifestyle choices, educating medical professionals, and improving the quality of care's capacity for diagnosis, treatment, and support, the disease is still a major public health concern" (WHO, 2023).[25]

Similarly, a World Health Organization report also documented the prevalence of DM to be 4.3% (males 4.4% and females 4.3%).[27] The report brought to light the deficiencies in the national response to DM in terms of policy guidelines and monitoring. These included the operational policy plan aimed at reducing overweight and obesity, the diabetes registry, and the national risk factor survey, which measured blood glucose levels in relation to the accessibility of medications, fundamental technologies, and public health procedures. The study demonstrated the overall lack of insulin availability in primary healthcare institutions, as well as the absence

of treatments including retinal photocoagulation, renal replacement therapy through dialysis, and renal replacement therapy through transplantation. Furthermore, primary health care facilities lack fundamental technology such as the Doppler foot vascular status, dilated fundus examination, HbA1c test, and foot vibration sensing by turning fork.[27]

Consequently, due to the reported constraints in the management, prevention and control of DM in Nigeria which include lack of political will to implement adopted national healthcare policies, poor levels of coordination and integration within the multi-sectoral health care and related agencies, poor and inadequate funding and cultural inhibitions and attachments among others.[28] It has been recommended that Nigeria should adopt a holistic approach in curtailing the DM scourge. The adopted approach should align with the Nigerian Multi-Sectoral Action Plan 2019–2025, Ottawa Charter and the Nigerian Health Promotion Policy (NHPP). The inclusion of the Ottawa Charter and the NHPP is important because it provides a Health Promotion and Education (HPE) road map for addressing the burden of both communicable and non-communicable diseases in Nigeria.

The process of empowering people to take more responsibility over their health and its determinants in order to improve their health is known as HPE.[29] On November 21, 1986, the first worldwide conference on HPE took place in Ottawa, Canada. The main reasons for this meeting were the increasing global expectations for a new public health movement and the significance of HPE in accomplishing the movement's goals. The charter centered on three basic prerequisites of advocate, enable and mediate. The conference also outlined HPE actions to include build healthy public policy, create supportive environments, strengthen community actions, develop personal skills and reorient health services (Fig. 3). The Ottawa Charter made it necessary to create a national health promotion policy for Nigeria that is tailored to the country's unique needs while taking into account its social, cultural, and economic structures. The Nigerian Health Promotion Policy (NHPP) was first developed in year 2006. The need for NHPP became necessary because of the prevailing communicable diseases and demographic and epidemiological transition, rapid urbanization and changing lifestyles which have been correlated with the advent of NCDs. The NHPP contains guidelines to assist in creating affirmative outcomes through enablement for positive health action and enhanced community involvement. The NHPP had to be revised, though, due to a number of issues that were found to be preventing its implementation, including systemic issues, inadequate infrastructure at all three levels of government, the appropriation of health promotion responsibilities by other sectors and programs, and a lack of political will on the part of leaders to give health promotion a higher priority. The revised NHPP was drafted to deliver health care that is preventive, promotive, protective, restorative and rehabilitative to every citizen of the country. The review will highlight the importance of the Ottawa Charter and NHPP in providing advocacy efforts in addressing the establishment of policy, providing enabling environment for DM care which include provision of integrated DM care at the primary care level in Nigeria, increase in community participation in DM care, awareness about DM, strengthening of the health system, mobilization of increased political will and the need for the national DM survey.[30]

The NHPP consists of guiding principles and values with major stakeholders in the implementation of NHPP. Also, the NHPP consists of a broad goal and four specific objectives with action points (Fig. 3).

Aim

The aim of the review was to suggest ways to improve DM care in Nigeria from HPE perspective by addressing the gap in DM care through the adoption of strategies from the Ottawa Charter and NHPP guidelines.

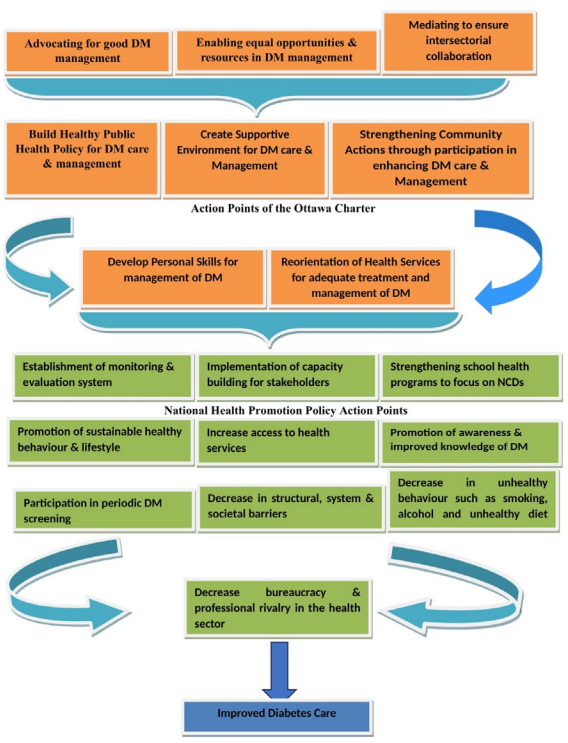

Fig. 3. Highlights of the constructs from the Ottawa Charter and NHPP to improve diabetes care in Nigeria

Material and methods

A collation of published articles on DM care as it relates to the domains or action points of the Ottawa charter and NHPP over the period of establishment of the charter to 2023 was retrieved between April and September,

2023 to develop an all-inclusive distribution of articles in the review. The authors searched online bibliographic archives such as google scholar, African Journal Online, PubMed and Science Direct. Using MesH headings, the terms "diabetes mellitus", "diabetes care in Nigeria", "Ottawa Charter", "NHPP", "HPE" activities as well as variations thereof were searched for. The results of the literature search were screened for their compliance to the eligibility criteria, which include original studies, reviews, reports and intervention studies reporting findings on DM care related to the domains or action points of the Ottawa charter and NHPP. Data extraction from the eligible articles were carried out independently by two authors (AG and OOA) in line with the objective of the study which include DM care in Nigeria, Ottawa Charter, NHPP and ways of investing and improving HPE activities as it relates to DM care in Nigeria.

Analysis of the literature

Domains of the Ottawa Charter

Build healthy public policy

In order to effectively manage and prevent NCDs, the United Nations High-Level Meeting on NCDs highlighted the necessity of population-focused, multisectoral interventions encompassing legislation, regulation, and fiscal measures.[31,32] By enacting public policies that prioritize the identification and elimination of health barriers, this action point seeks to make the "healthier choice the easy choice." These regulations give people and the community a way to choose the healthier choice, lowering their chance of contracting diseases like DM.

The responsibility of addressing the social determinants of DM and health lies mainly with the non-health sector and so it will require collaborative efforts with policy makers in other sectors such as finance, judiciary, political, agriculture, and environment etc. to be able to address the issue of DM and its consequences.[32,33] In order to promote better DM care in Nigeria, it emphasized the necessity for coordinated effort that incorporates a variety of strategies, including legislation, fiscal measures, taxation, and organizational transformation. The Ottawa charter recommended the need for adoption of a multisectoral approach in formulating healthy public policy including identification of barriers to its implementation and how to circumvent them in promoting the management and prevention of non-communicable diseases. Therefore, DM care organizations, community and faith-based organizations and researchers involved in DM care will need to collaborate with people in the best position to develop laws and policies that encourage wholesome environments and communities that support the best possible treatment and prevention of DM. One of such obstacles that may affect the implementation of policies promoting DM care is the lack of provision of evidence-based information to policy makers from researchers. By using networks and intermediary bodies, it would be possible to improve direct interaction and communication between academics and decision-makers in order to get beyond these obstacles. Local, fact-based data on the dangers of DM must be provided to policymakers and the best available local option to minimize the threats. Providing policymakers with choice and flexibility that is, a range of options with varying costs and benefits instead of a single solution is more likely to inspire action. It is imperative that the available options accurately reflect the political, social, cultural, and economic landscape in which a given policy will be implemented.[32,34] For instance, a study by Ajisegiri et al.[35], to understand the implementation of NCD policies in Nigeria, found that the focus of NCD national policies is "top down," with little consideration given to decentralization to sub-national and frontline care delivery levels of the health system; NCD program coordination mechanisms are flawed, with weak regional organizational structures serving as their foundation; NCD financing is administratively onerous and dispersed; and frontline NCD service delivery for NCDs is not effectively integrated with other crucial PHC services.

Create supportive environment

This priority area focuses on people's surroundings because it can influence how they approach their health. This component of the Ottawa charter gives the community the opportunity to collaborate in creating a wholesome atmosphere that supports, encourages, and gives resources to those who have the ability to improve their health. The WHO buttressed this point in his report on the Global Action Plan for Prevention and Control of NCDs. The report highlighted the importance of creating, sustaining and expanding health-promoting environments to reduce modifiable risk factors such as alcohol consumption, smoking of cigarette and other harmful substances injurious to the body, harmful dietary habits and physical inactivity.[32,36]

With the current epidemiological transition in Nigeria which has led to rapid urbanization and industrialization that is contributing to the increasing prevalence of type-2 DM. There is therefore need to create a supportive environment that increases peoples' access to resources in management of DM (glucometer, insulin and other hypoglycemic drugs), increasing opportunities for adoption of healthy lifestyles (reducing alcohol and cigarette use, healthy dietary and physical activity), reducing threats to DM complications and improving individuals ability to properly manage DM at the intrapersonal level.[37,38] Additionally, fostering a supportive environment is employed to locate organizations that could help in comprehending the characteristics of dif-

ferent approaches and practices required to get beyond typical obstacles to illness prevention.[39,40]

In Nigeria, the national guidelines on the prevention, control and management of DM (FMOH), encouraged the promotion of creative supportive environments in the management of DM.[41] It recommended whole-of-community health promotion activities in accordance with the Ottawa Charter, which includes targeted community-based activities (school-based physical activity programs and community physical activity programs like marathons, swimming, dancing, etc.) and workplace interventions (discounted vouchers for sports/gym facilities, active spaces or gyms in the workplace and periodic workplace recreation). Healthful feeding and eating programs (healthy infant and young children feeding programs, school-based feeding programs and removal of vending machines from schools and communities). The recommendations were in line with the WHO Global NCD Action Plan 2013–2020 and the Nigerian multi-sectoral action plan for NCD prevention and control.[42,43]

Strengthen community actions

Strengthening community actions enables people to collaborate with one another and the community to guarantee that strategies and priorities are carried out in a way that promotes improved health. It strengthens community support and encouragement to take part in making sure that all services are available to everyone. Every information is accessible, and every opportunity for learning is fair. More pertinent results are obtained by communities that effectively combat DM through public involvement in prevention and control than communities who do not actively participate in prevention and control activities.[32]

To guarantee that results are in line with communities' needs and resources, local expertise and skills must be given equal weight during the planning and decision-making process when bolstering community actions.[44,45] This is because poor knowledge of causes, risk factors, complications of DM is common in most communities in Nigeria.[46-50] Increased community access to diabetes health care and community control over the socioeconomic factors of DM should be the main goals of any diabetes community action projects.[32] Furthermore, community action for diabetes mellitus is to be broadened to encompass DM screening and early detection, patient support for self-management, rehabilitation services, and community-led multisectoral diabetes prevention initiatives.[32]

The World Diabetes Foundation carried out a project with the aim of strengthening DM care in Lagos State Nigeria through the establishment of 35 DM clinics across the state. The project implemented the following strategies: it developed and reviewed guidelines for training and referrals for healthcare professionals managing diabetes; it strengthened access to diabetes care at 35 Primary Health Clinics by providing DM and DM foot screening equipment; it improved the referral process for cases involving complications; and it trained physicians, nurses, and community health workers in diabetes screening, prevention, and care.[51]

Additionally, research has demonstrated that community health workers' participation in diabetes treatments enhances patients' diabetes care and self-management practices. To enhance diabetes testing and monitoring, medication adherence, nutrition, physical activity, or weight control, interventions can involve coaching, teaching, or social support.[45,52]

Develop personal skills

This is the only one of the Ottawa Charter's five priority areas for action that is at the intrapersonal level. Action at this level is necessary to help people, especially those who have chronic diseases, succeed in improving their health status and managing their illness.[32,53] This area of action alters a person's behavior to help them realize what adjustments they can do to lower their chances of contracting DM and its consequences. Concerning DM management, it equips the patients with the most useful knowledge and abilities that are necessary to improve certain aspects of their health. This is because patient empowerment for DM self-management is necessary to maximize outcomes. The daily decisions and considerations that a patient with type 2 DM must make are part of diabetes self-management. Patients must be able to manage their resources, values, and preferences while adhering to a therapy regimen that calls for consistent exercise, a healthy diet, blood sugar self-monitoring, and medication compliance.[32,54,55]

As a result, patients' need to be equipped with information and abilities in accordance with the Federal Ministry of Health's National Guidelines on the prevention, control, and treatment of diabetes. This is because the national guidelines align with the cultural context of Nigeria and addresses more problematic areas.[56,57] This is pertinent in DM self-care and management because studies have shown that DM educational intervention aligning with the socio-cultural context has better management outcomes.[58-60]

Reorient health services

Health care professionals are not the only ones who have to share responsibility for health promotion in the healthcare system; governments, community organizations, individuals, and healthcare institutions all have a part to play. To develop a healthcare system that advances the objective of health, they must work together. This means that in order to promote health, the focus of health care must be shifted from being individual and

treatment-centered to being community-centered and focusing on the promotion of a healthy community.[32] Such health care services should focus on prevention, promotion and cure.

Currently, in Nigeria DM treatment and care is only operational at the tertiary and secondary level of care, with little or non-existent care at the primary level.[61,62] This is a drawback of the Nigerian health care system because primary health care is the only setting where integrated risk reduction and prevention, treatment, and long-term management of diabetes mellitus can be successfully accomplished due to accessibility to care. The reorientation of health services in Nigeria concerning care and management of DM should focus on primary health care because primary health care is the domain where health promotion and education activities could be carried out effectively. Primary healthcare demands that all people have access to health services regardless of their location, social status, economic status, or cultural background; that the community be involved in the planning, implementation, and assessment of health services; that health and other sectors be integrated; that multidisciplinary teams be recognized as equal partners in promoting the community's health; and that a range of services, chosen by the community, be provided.[32] In Nigeria studies have shown the reorientation of primary health care through interventions to improve services, drive change and overall output among health care workers.[35,63,64]

Domains of the National Health Promotion Policy

Participation in periodic screening programs

Undiagnosed Diabetes Mellitus (UDM) remains a challenge globally, but is more common in low-and middle-income countries. According to the IDF, in 2021 almost one-in-two (44.7%) representing 239.7 million of the total adults living with diabetes (20–79 years old) were found to be unaware of their status.[5] In low and middle income countries the prevalence of undiagnosed DM is even higher with a proportion of 50.5% representing about 9.5 million people.[5] In the African sub-region the proportion of adults (20–79 years) with undiagnosed DM is estimated to be 53.6% representing 12.7 million people.[5] The African sub-region does not have a standard data for UDM due to poor documentation in the health system. However, few available studies on the prevalence of UDM in Africa shows North Africa (4.2% in Egypt), South Africa (18.1%), East Africa (7.2%, 11.5%, 5%, 2.3%, 3.8%, 2.13% in Ethiopia), (9% in Tanzania), and West Africa (3.19% in Guinea), (6.3% in Cameroon), (4.64% in Senegal), (7% and 4.6% in Nigeria).[65-78] Early diagnosis of people with DM is essential to prevent or delay micro and macro vascular complications; improve quality of life and avoid premature death.[62] This is because late diagnosis of DM most likely would have resulted in complications leading to more use of health care services; thereby placing additional burden on the health care system already struggling with known communicable diseases and other non-communicable diseases.[62] Screening for DM remains one of the surest ways to reduce the high burden of UDM in Nigeria. The NHPP proposes participation in periodic maximum pressure campaigns activities which involve screening programs for DM to address the burden of DM in the country. Such screening programs should be organized by all levels of government (Local, State and Federal) and other non-governmental organizations regularly and should incorporate all the levels of the health care system in Nigeria (Primary, Secondary and Tertiary) to facilitate referral activities when the need arises.

Promotion of awareness and improving knowledge of DM

Creating awareness and adequate knowledge of DM remains a vital way of reducing risk of complications among diagnosed patients.[79] While previous research has documented high awareness of DM among various subgroups of the populations; the level of knowledge has been suboptimal.[46,47,62,80-83] The NHPP proposes supporting health promotion interventions that promote awareness creation and enhancing the knowledge of DM and its prevention. This would empower the population in identifying risk factors and detecting signs and symptoms early enough to prevent DM complications and late diagnosis. In addition, the high awareness of DM among the population could be leveraged upon to increase their knowledge, attitude and practice towards DM. Both governmental and non-governmental organizations should focus on regular and continuous sensitization campaigns on the causes, signs and symptoms, risk factors, complications, management and prevention of DM in the communities, schools, religious gatherings, market places and other social gatherings in the community. This is to ensure knowledge enhancement and sustenance in health seeking behavior among the population.[81]

Increase access to health services by significant reduction of structural, system and societal barriers especially for the vulnerable groups

The most vulnerable groups in terms of access to DM health care services are the poor in the society who cannot afford the high cost of insulin and other hypoglycemic drugs. This is because in Nigeria there are high out-of-pocket expenses for health care services and low insurance policy especially among patients in the rural areas.[60,75] Furthermore, weak structural and systemic factors within the health care services are hindering adequate access to health care among DM patients. For instance, in Nigeria adequate and specialized care for DM

can only be obtained from secondary and tertiary facilities as DM care is in most cases non-existent in primary care centres.[62] Also, poor referral activities among the three tiers of health care systems and derisory implementation of health policies have compounded the problem of care among DM patients.[84,85] Furthermore, inter-cadre rivalry among health care professionals has hindered patients from having the best possible care.[62] Poor awareness and knowledge of DM, stigmatization and myth about DM are societal barriers that hinder access to health services.[62,86]

Promoting sustainable healthy behavior and lifestyle

Modifiable risk factors such as smoking, alcohol consumption, and physical inactivity are major risk factors of DM.[87] Thus, sustaining healthy behavior and lifestyle is important in minimizing the risk of contracting DM. As at 2012 there were about 13 million smokers in Nigeria, with above 16,000 mortality attributable to cigarette smoking.[88,89] As at 2020 the smoking rate was 3.70% which was a decline of 0.2% from 2015 (4.70%).[90] According to the Nigerian Demographic Health Survey (NDHS), about 6% of men smoke any type of tobacco while 94% are non-smokers and less than 1% of women smoke cigarette.[91] Also, among men who smoke cigarettes daily, about 38% smoked less than 5 cigarettes each day, while 33% smoked 5–9 cigarettes and 8% of daily cigarette smokers smoked between 15 and 24 cigarettes each day. Similarly, worldwide research has demonstrated that consuming low to moderate amounts of alcohol reduces the risk of developing type-2 DM because it increases insulin sensitivity.[92,93] On the other hand, chronic and heavy use of alcohol, however, has been shown to interfere with glucose homeostasis and cause the development of insulin resistance, which increases the chance of developing diabetes mellitus.[94,95] Nigeria is one of the countries in the world with the highest per capita alcohol consumption.[96,97] In Nigeria, alcohol abuse is still the most common substance. Adolescents and young adults are more likely to engage in excessive, episodic drinking, and in certain situations, alcohol beginning occurs as early as 11 years old.[98,99] Reasons posited for increased alcohol consumption is unrestricted access to alcohol products, continued promotion and popularity of alcohol products, absence of alcohol policies and lack of implementation of a minimum drinking age by both the government and the brewers. Others are socio-cultural practices, rapidly changing lifestyles and increasing purchasing power.[100] Alcohol consumption is a contributing factor to most non-communicable diseases such as diabetes, cancer, liver cirrhosis, road traffic accidents among others.[101] In Nigeria, according to reports, there are significant rates of physical inactivity (between 25% and 57%), which have been related to greater incidence of obesity, type 2 diabetes, and cancer.[102,103] Nigeria has national policies to regulate the consumption of tobacco and alcohol. For instance, the National Tobacco Regulations 2019 Act was passed into law in the year 2019. Moreover, the Federal Road Safety Act, the Non-communicable Diseases Prevention and Control Policy, and the Strategic Plan of Action all contain policy measures to combat dangerous alcohol consumption. However, despite the existence of these policies in Nigeria, more still need to be done to ensure a tobacco and alcohol-free society in Nigeria. Various ways of ensuring the sustaining of these policies is to adopt a multi-sectoral approach, adoption of the framework for global monitoring to measure progress on major NCDs, their main risk factors, and their prevention and control on a global scale, decrease in the youth and young adults consumption of alcohol and tobacco, public health advocacy, partnership, technical support and capacity building.[101,104-106] The proportion of men and women who smoke various tobacco products in Nigeria according to age and geopolitical zones is as shown in Figure 4.

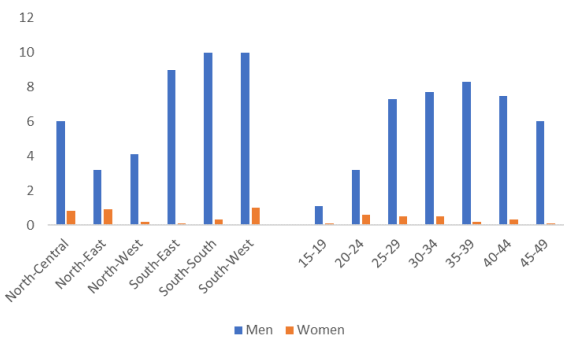

Fig. 4. Proportion of men and women who smoke various tobacco products according to age and geopolitical zone in Nigeria[101]

Strengthening school health programs to focus on the prevention of non-communicable diseases

The implementation of the guidelines on the National School Health Program was developed in the year 2006. The purpose of this school health policy was to advance students' health in order to fulfill the objectives of 'Education for All'. The need to strengthen the implementation of the National School Health Program has become more pertinent because of the increasing prevalence and burden of DM in school environment.[107-110] In school health programming, the NHPP suggests promoting and protecting health behaviors for children, parents, staff, and the community at large. Therefore, in line with the proposal the areas of the policy that the implementation needs to be strengthened include school feeding services, health education and school health services. In school feeding services, foods served to the pupils and students should contain high fiber diet such as fruits and vegetables which have been shown to in-

crease insulin sensitivity thereby decreasing the chances of developing type-2 diabetes.[111,112] Also, health education on the prevention of DM and other non-communicable diseases should regularly be organized for primary school pupils, secondary school and University students and staffs. As previous studies have shown the improvement of knowledge of DM among students through health education intervention.[113-115] Furthermore, the annual World Diabetes Day every 14th November could be leveraged to embark on DM awareness across primary, secondary schools and Universities in the country. Additionally, the school curriculum especially the secondary school curriculum should be revised to contain more information on the pathophysiology of DM, signs and symptoms of DM, risk factors of DM, complications, management and prevention of DM. This is important because teachers in secondary schools have affirmed the inadequacy of prevention of DM in the current secondary school curriculum.[116] School health services centers should have glucometer, and hypoglycemic drugs, referral, follow-up services and effective counseling services. Lastly, the school health records should be made to be comprehensive for proper referral and follow-up especially of pupils or students with DM.

Establishment of effective media strategies

Effective media strategies comprising both the social and new media for DM prevention should be established by the health promotion divisions at the federal, state and local government levels. The aim of such media engagement should be to ensure:

1. Strengthening the capacity of media professionals: This could be achieved by ensuring that the capacity of media practitioners is strengthened on the reportage of issues concerning non-communicable diseases including DM and the role of social determinants of health on the onset of DM.
2. Information, enlightenment and empowerment of communities: The mass media has a wide reach therefore it could be engaged by health promotion divisions at all levels to ensure periodic and regular up-to-date information on the government activities in the organization, management and prevention of DM across communities in Nigeria. This would help in driving information to the grassroots level thereby empowering communities in adopting positive lifestyles and health seeking behavior.
3. Generation of evidence on the contribution of health promotion and education in improving diabetes care in Nigeria: Evidence based data from publications, conferences, workshops etc. on the contribution of health promotion in improving the organization, care and management of DM should be supplied to designated media practitioners periodically. This would help media practitioners with their reportage duties in informing the public on the contribution of health promotion in improving the health of the people.
4. The media should be in cooperated as part of the team for the development of health promotion and education interventions at all levels. This would ensure adequate monitoring and coverage of health promotion programs especially as it concerns the organization, care and management of DM in Nigeria. This would help the media through the social and new media to perform its function of continuously updating the public on progress of government investment in health promotion and education activities on the organization, management and prevention of DM.

Implementation of capacity building for the delivery of health promotion and education interventions as it relates to DM care and prevention

Building organizational contexts, partnerships, and infrastructure to conduct health promotion programs, as well as developing problem-solving skills, are all elements of capacity building for health promotion.[117] The NHPP proposes as it pertains to DM care and prevention a clear framework for transferring and scaling up staff capacity strengthening. This could be achieved by ensuring the regular organization of capacity building workshops for all categories of health professionals involved in DM care by governments at all levels. The endocrinologists, physicians, nurses and other professional bodies involved in DM care should be trained on best practices in DM care at the tertiary level. This is even more important because care at this level is constrained owing to the few diabetologists and endocrinologists providing care for DM patients.[62] At the secondary level of care general practitioners, nurses, dieticians, pharmacists and other professional bodies involved in DM care should be targeted for such capacity building workshops, as this would help them upgrade their skills and knowledge regularly in order to manage DM more effectively and efficiently. The primary care level in Nigeria is not equipped to manage non-communicable diseases such as DM. Most primary health care in Nigeria focuses on maternal and child health care and management of communicable diseases and minor ailments.[62,118] Previous reviews have highlighted the importance of capacity building in the management of DM in Sri Lanka and India.[119,120] Capacity building workshops and training should be certified in form of fellowships, diplomas and certificate programs which should be institutionalized by securing buy-in of the policy with National Universities Commission (NUC) and other strategically relevant agencies for short and long term adoption. In addition, such programs should adopt a bottom-top approach where various communities and families of those affect-

ed with DM would be incorporated in the development of a National Diabetes Educational Guidelines for the management of DM.

Establishment of systems to monitor and evaluate DM care activities in Nigeria

A DM care monitoring and evaluation center should be created in the department of public health or health promotion at the national, state and local governments' levels. Such center would be saddled with the responsibility of generating evidence-based data for DM in Nigeria by establishing a national DM register consisting of all DM patients in Nigeria for easy tracking and follow-up. This will aid the generation of reliable data on prevalence of DM, morbidity and mortality, as currently such data are generated from cross sectional studies,[11,14,33,121,122] and systematic reviews.[7,122] Furthermore, the establishment of such center would help in tracking DM researches including interventions among various set of the population in Nigeria which will aid evidence-based data gathering. Researchers will be mandated to get approval and documentation from such offices nationwide before commencing their studies. The established DM monitoring and evaluation center will be able to work with the support of the government through the ministry of health to organize quarterly or annual national review meetings and conferences were recent researches in the management of DM will be presented and discussions on how to strengthen the system will be carried out. In addition, all health facilities in collaboration with the DM monitoring and evaluation centers would be mandated to write a monthly report of their DM activities and they will be collated and sent to the national center for documentation.

Investing in health promotion and education to improve diabetes care

Health promotion and education remains a key strategy for promoting health and wellbeing especially as it concerns prevention of DM because it empowers people to improve their mental, social and physical health. For the government to achieve increased diagnosis, better management and prevention of DM, there must be a conscious and deliberate investment in health promotion through governmental and non-governmental agencies in Nigeria. The following are areas the government could invest in improving diabetes care through health promotion and education in Nigeria.[123]

Finance

Effective health promotion and education as it concerns DM care and prevention would need adequate financing for maximal delivery. This could be done by investment in health promotion activities through fiscal policy making and budgetary allocation to the department of health promotion through the ministry of health. Health financing for improving DM care would be channeled into subsidizing out-of-pocket payment for hypoglycemic drugs through credit allocation for indigent patients in the annual budget allocation to health care.[123] Also, the social insurance scheme such as the National Health Insurance Scheme and others could be funded and expanded to provide free basic insurance packages specifically for DM patients through the national and state hospital management boards as well as referral systems. Such insurance programs would be expected to cover the provision of social insurance, adequate health services and provision of drugs.[123]

Legislation

Legislation involves having the political will to create and push through legislation and policies that enhance as well as sustain healthcare delivery. Legislation involves formulating laws that would increase the budgetary allocation to health from its current 8% in 2023 to 15% of its total budgetary allocation which was signed by African Head of States in the Abuja declaration of 2001.[124] Laws that raise the risk of diabetes mellitus should be implemented as taxes on sugar-sweetened beverages, unhealthy meals, and services. Furthermore, laws should be passed to impose higher taxes on alcoholic beverages, tax every pack of cigarettes, pipe tobacco, and ready-to-use tobacco, tax cigarette retailers, and restrict the entry of tobacco products into Nigeria by foreign visitors by collecting taxes on them. Legislation could also ensure that a percentage from Value Added Tax becomes a health tax which would be channeled into the treatment and care of patients with chronic diseases such as DM.[123]

Health research

Investment should be made in health promotion and education research in Nigeria that promotes the prevention of non-communicable diseases such as DM.[125] Such funding should be focused on researches that are in line with the objectives of health promotion which includes prevention of DM in Nigeria, incidence and prevalence of DM, reduction of risk factors (modifiable) associated with DM, adherence and care of DM patients in preventing complications, interventions that focus on improved quality of life among DM patients. The government could also fund researches that focus on increasing individuals' knowledge of DM and skills for management of DM through information, education and communication, strengthening of community action by identifying and utilizing existing community structures, facilitating the creation of laws, regulations, and fiscal restraints that improve and support appropriate DM treatment and prevention in Nigeria. Monitor-

ing and evaluation of health promotion and education programs are also important.[124,125]

Health system

The Nigerian government should invest heavily in the health system from the tertiary to the primary level. This is pertinent for the provision of adequate care for DM patients and timely referral. Establishment of an appropriate feedback system among the various levels of healthcare is equally important. Although, DM cares at the primary level of care is non-existent considering even as it is the level of care closer to the populace and a place where DM patients are expected to present first, when in need of care.[126] This should be looked into and improved upon by the government especially the local government through the National Primary Health Care Development Agency, as these present the best opportunity for quick and timely diagnosis of DM across communities in Nigeria. If the populace is aware they can walk into any primary health center and receive adequate DM care without going to the secondary facility which might be some few kilometers away, it will go a long way to encourage residents of communities across Nigeria to seek care quickly and timely which is important to prevent DM complications.[126]

At the secondary and tertiary level of care where we have professionals handling DM care. The government must ensure that trained health promotion specialist is incorporated as part of care for DM patients and are saddled with the responsibility of promoting DM awareness in communities across Nigeria.[62]

Human resources

In line with the guidelines of the NHPP, all staffs appointed to carryout health promotion and education duties for the organization of the prevention of non-communicable diseases including DM at the federal, state and local government levels must meet the minimum requirement of a Masters' degree in public health or allied disciplines with specialization in health promotion and education at the national and state levels and a degree (BSc, HND or OND) in health promotion and education, a minimum of six months health promotion and education certification in addition to other basic professional qualification in health are required at the local government level.

Conclusion

This manuscript proposed the adoption of the Ottawa charter and the NHPP in the improvement of DM care services in Nigeria through the adoption of population-focused multi-sectoral interventions encompassing legislation, regulation, and fiscal measures which provides the populace and community options of adopting healthier choices, thereby lowering their chances of contracting DM. Furthermore, creating sustaining and expanding health-promoting environments to reduce modifiable risk factors; ensuring community participation in the decision-making process from the planning, implementation and evaluation of intervention programs in the community and reorienting the primary health care services to aid the diagnosis, treatment and rehabilitation of DM patients. Others include, promoting screening programs, increased access to DM care services and reorientation of the school health programs to include school feeding services, health education and school health policies. Policy recommendations include the formal adoption of the NHPP as part of the DM care process in health facilities in Nigeria, strengthening HPE trained human resources as part of the DM care team in health facilities, increase budgetary allocation for health financing and strengthening the social insurance schemes, adoption of strict legislation against modifiable risk factors such as tobacco and alcoholic beverages and increased allocation and access to funds for HPE research.

Declaration

Funding

This review article did not receive any specific grant from funding agencies.

Author contributions

Conceptualization, O.A., O.O.A. and O.E.O.; Methodology, O.A. and O.O.A.; Validation, O.A., O.O.A. and O.E.O.; Data Curation, O.A; Writing – Original Draft Preparation, O.A. and O.O.A.; Writing – Review & Editing, O.A., O.O.A. and O.E.O.

Conflicts of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors used publicly available data.

Ethics approval

Not applicable

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