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Promoting Diabetes Self Management Education [DSME] through Community Based Care in Nigeria

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Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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Review Article

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ABSTRACT

Nigeria has the largest number of people living with diabetes mellitus in Africa and through a period of ten years, there was an over 50% increase in morbidity rates. There is also a twin burden of communicable and non-communicable diseases in Nigeria which influences the poor life expectancy rate of 54 years. Diabetes mellitus is a chronic disease and with the help of the chronic care model, functional and clinical outcomes are highly dependent on an informed, activated patient. In Nigeria, the organization of health care for diabetes has improved to the state of having country specific clinical management guidelines but our outcomes are still far below standards. At present, the care arrangement that is operational is the traditional hospital-based management as well as alternative/unorthodox health care practices. Self-management among people living with diabetes is still very poor and non-adherence to clinical regimen is rampant and greatly influenced by cultural beliefs. The chronic care model is fully functional in developed countries and underway in developing ones. However, there is a dearth of research into effective forms of care outside the clinical settings in Nigeria. In fact, diabetes self-management and education [DSME] in Nigeria, revolves around the secondary care level with few referrals in some states back to the primary health care level. Community based care for diabetes mellitus remains an untapped resource which can go a long way in promoting self-care behaviours especially when it is culturally sensitive and supportive. This review paper aims at exploring barriers and facilitators of community based care

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for DSME in Nigeria with the goal of producing informed, activated patients who can serves as peer models and can promote disease prevention habits among members of families and communities.

Keywords: Diabetes mellitus; self-management; community-based; education; complications; prevention; support; team-based approach.

1. INTRODUCTION

In 2005, the World Health Organization estimated that deaths from diabetes will increase by 52% over the next 10 years [1]. Global estimate of type two diabetes mellitus [DM] in 2011 was 336 million people, up from 171 million people in 2000; and a projected increase to 552 million by 2030 [2]. The estimate inadvertently shows at least a 50% increase over a decade as predicted. The chronic nature of the disease and the debilitating complications affects the individual in myriad ways including disruptions to lifestyle, challenging psychosocial adjustment, and substantial health care expenses [3]. There is a 2 - 4 fold increased risk for developing cardiovascular disease in persons with diabetes. Diabetes mellitus [DM] is the leading cause of blindness, non-traumatic amputations and end-stage renal disease [4].

Diabetes mellitus is fast becoming a global epidemic and health systems seem poorly prepared to meet the rising challenges of the disease. Factors that have being identified to predispose the prevalence of the disease include genetic susceptibility and environmental / lifestyle factors such as overweight / obesity, physical inactivity, and a high-fat / low-fibber diet [4]. Population growth, ageing populations, increasing urbanization, dietary changes, obesity, reduced physical activity and changes in other lifestyle patterns are broadly responsible for the diabetic pandemic [5].

People living with chronic illnesses, such as diabetes, provide close to 95% of their own care [6]. This fact has birthed the concept of self-management support which has been defined, by the Institute of Medicine, “as the systematic provision of education and supportive interventions by health care staff to increase patients’ skills and confidence in managing their health problems, including regular assessment of progress and problems, goal setting, and problem-solving support” [6]. The question we are therefore faced with is; is the self-management support offered in Nigeria sufficient and effective to meet the culturally diverse needs of people living with diabetes? And have all evidenced based forms of diabetes self-management support been activated to promote the quality of life and encourage preventative practices at all levels of care? These are issues to be tackled in this review paper.

In a study conducted in a Nigeria Teaching Hospital on the quality of life of patients with diabetes mellitus, poor quality of life [QOL] was associated with low occupational status, low monthly income, low education, non-insulin-dependent diabetes and physical complications such as hypertension, gangrene, cataract, obesity, weight loss, and sexual function impairment [7]. Young adults and patients with complex co-morbidities, financial or other social hardships, and those who have limited English proficiency may also present certain challenges to goal-based care. These challenges stir up the need to translate research into action in order to improve clinical outcomes as well as quality of life of people living with diabetes across the life span. A recurring theme in recent studies across the world is well captured in the Chronic Care Model [CCM] whose components, broadly classified into two involves community resources and policies and an organized health system in order to produce an informed activated patient interacting with a prepared proactive practice team.

This review discusses the burden of diabetes mellitus in Nigeria and the impact it has on the populace. It also hopes to investigate the Nigerian concept of diabetes self-management, its limitations and the unexplored resources inherent in the community. The barriers of community based care will be discussed and factors that can promote the integration of community resources into diabetes self-management and education would be highlighted. With a view to advocacy for a more improved diabetes care beginning at the primary level, it is the intention of the author to stimulate the policy makers to initiate policies that would improve the quality of life of this vulnerable population.

2. MATERIALS AND METHODS

This review was conducted using several literatures and studies from Nigeria and other countries. Inclusion criterion was based on studies that were conducted on people living with diabetes as well as diabetes health care providers. Literatures included reviewed diabetes self-management and education as well as integrated forms of care with emphasis on the primary care level. The Chronic Care Model approach was used as a guideline in the selection of articles for review. 35 studies and literatures were reviewed in this paper. They were sourced via internet publications and text books. A publication from WHO was utilized, fourteen articles and studies from Nigeria, and twenty articles from developing and developed countries within and without Africa.

2.1 The Burden of Diabetes Mellitus [DM] in Nigeria

According to the International Diabetes Federation (IDF) Atlas (2012); Nigeria has the largest number of people with diabetes (3.0 million) in Africa, followed by South Africa (1.9 million), Ethiopia (1.4million) and Kenya (769, 000). The estimated prevalence of diabetes in Nigeria is 4.04% compared to South Africa (6.46%), Cameroun (5.18%), Niger (4.36%), Ghana (4.09%), Benin (1.71%) and Reunion (16.78%; highest in Africa) [4]. The country has a twin burden of non-communicable diseases (NCD) and communicable diseases hence a poor life expectancy rate of 54 years at birth [8].

According to a Nigerian review paper type-2 diabetes accounts for 95% while the remaining 5% have type-1 diabetes [8]. There is also an uneven spread of people living with diabetes across urban and rural communities as well as across different levels of socioeconomic status. In Nigeria, there is a prevalence of 0 – 2% in rural areas while in urban areas it ranges from 5 – 10% which correlates with 0.65% in rural Mangu (a Northern region) to 11% in urban Lagos (a Southern region) [9,10]. It has also been surmised that 70-80% of people in Africa are undiagnosed or untreated [4,8]. This in turn results in high morbidity and mortality with degeneration to advanced stage of the disease and its debilitating complications at time of presentation to secondary and tertiary health institutions. The rising prevalence of diabetes in Nigeria has also led to increasing records of end-stage kidney disease, stroke, erectile dysfunction, heart failure, and lower extremity amputations which contribute to longer hospital stays, high medical bills and a great strain on the health budget of the country.

2.2 Impact

It has been estimated that about one in every five Nigerians are either diabetic or at risk of developing the disease and diabetes is gaining significance among population groups previously thought to be unaffected [11].

Diabetes as a chronic debilitating and costly disease is associated with severe complications, which poses severe risks to families, communities, member states, and the entire world as well as serious challenges to the achievement of internationally agreed developmental goals. In Nigeria, the prevalence of type 2 diabetes is increasing and adolescents are not left out. Also, gestational diabetes is on the rise. Type 1 diabetes is often misdiagnosed or undiagnosed resulting in coma and death [12]. The mean age of people living with diabetes as reported by several studies now range between 40 – 60 years [13,5].

According to WHO (2007), 400 million dollars in national income is the estimated loss from premature deaths in Nigeria due to heart disease, stroke and diabetes, and over the next 10 years, the country is expected to lose about 8 billion dollars. The cost of care for diabetics in Nigeria (age 20 – 70 years) is approximately double that of non-diabetics as reported by International Diabetic Federation [IDF] [14]. Annual diabetes-related expenditure per patient in Nigeria is US$137 [15]. The individual bears the full cost of diabetes care and with a poorly functional national health insurance scheme; “out of pocket” payment is the mode of financing [16]. This situation is also confirmed in a South-Eastern study where the most common means of financing, among patients from different socioeconomic groups, was household savings (99%) followed by support from family members (85.3%) and also, the mean monthly expenditure for the treatment of diabetes was $356 in this study [17].

Diabetes mellitus is one of the leading predisposing factors to operative obstetric delivery, premature births, and neonatal mortality [10]. It was also identified that about a quarter of all admissions in Nigerian medical wards are as a result of diabetes and its complications. In a

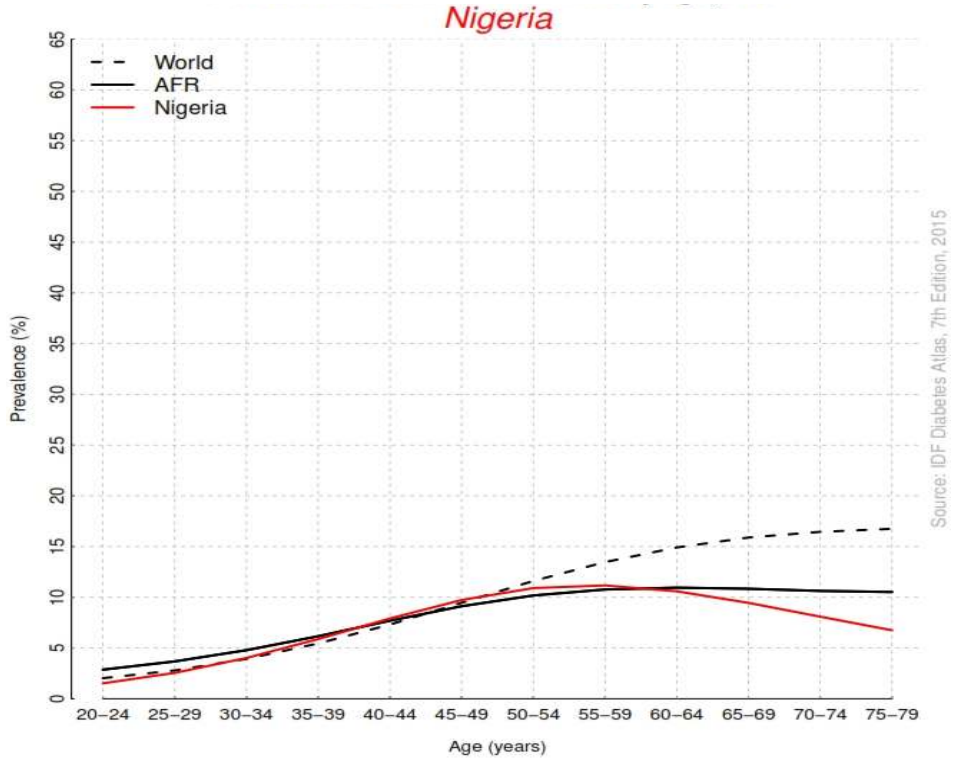

Fig. 1. Prevalence of diabetes in adults in Nigeria, Africa and Worldwide [15]

study conducted in Rivers state, Nigeria; out of 780 type 2 diabetics who presented for the first time, 56.3% had neuropathy, 36.3% had erectile dysfunction, 9.2% had nephropathy and 7.3% had retinopathy which implies the poor awareness of the disease at the community level resulting in complications at time of presentation [9]. It has been observed that 25–30% of admissions in medical (non-surgical) wards in Nigeria are due to diabetes and it has been associated with the rising prevalence of end-stage kidney disease, erectile dysfunction, stroke and lower extremity amputations in the country [8].

The results of the Diabetes Attitudes Wishes and Needs [DAWN] study conducted in several countries worldwide indicated that 41% of patients have poor psychological well being and only 10% reported receiving psychological treatment [18]. Also, nurses perceived psychosocial stress more frequently than physicians and were more likely to relate poor self-care behaviours with psychosocial problems even though they did not refer to mental health practitioners [18]. Another critical factor in patients' sense of wellbeing is the relationships that they have with family members, colleagues at their workplace, or group of friends and this in turn leads to more effective self-management of diabetes [19]. Also, the diversity of beliefs and daily routines indicate that there is a need for culturally tailored support packages to promote effective health practices.

2.3 Organization of DM Care in Nigeria

2.3.1 Primary prevention

Results from a risk assessment survey conducted in Ogun state, Nigeria, showed a significantly high prevalence for some of the risk factors for diabetes mellitus. 38.1% of the females and 5.3% of males had values for waist circumference above normal ranges, 19.2% were obese and 28.9% were overweight. Undiagnosed diabetes was 5.05% and mean total risk score was 5.60 ± 3.90 [4]. Screening is always intended to identify people who are at risk for developing a health condition so that appropriate intervention can be undertaken [20]. Primary intervention, particularly for adults, should include regular blood pressure checks, cholesterol, weight, oral hygiene, and immunizations. Assessment should include the evaluation of body mass index [BMI], waist

circumference, and overall medical risk [20]. This should be followed-up by assessing level of knowledge of health behaviours and providing means of education as well as avenues to accessing affordable preventative services.

In Nigeria, several efforts are being made by non-governmental organizations, faith-based organizations and some government bodies to conduct free medical check-ups for communities in a bid to educate, identify high-risk individuals and refer, as well as generate data for research and also to publicize certain products or brands. Some of the recommendations advocated for by a review paper include diabetes health education in primary and secondary schools (with emphasis on nutrition, exercise, and healthy lifestyle); national plan for good diet, cessation of smoking and excess alcohol; and checking of blood glucose yearly from age 30 years [12]. The Diabetes Association of Nigeria, in 2013, introduced the National Guideline for Diabetes Management in Nigeria, which the Federal Ministry of Health of Nigeria acknowledged as a working tool.

Primary prevention of type two DM among susceptible individuals is as simple as healthy diet and physical activity [1]. However, these seemingly simple health behaviours can be motivated by environmental factors most of which encourage sedentary behaviours, and high-energy low-nutrient diets which increase the susceptibility to metabolic disorders like diabetes and obesity. These environments are found in all aspects of most civilized economies permeating families and community living hence the need to introduce strategies at the grass-root levels.

2.3.2 Secondary prevention

In order to achieve early diagnosis and treatment, population screening is paramount. This is especially important due to the asymptomatic preclinical phase of the disease. A small number are discovered during public health screening programs, routine medical screening programs, and pre-employment medical checks, or for investigation of other conditions, such as infertility, hypertension, or stroke [8]. Reducing the prevalence of diabetes requires widespread awareness on healthy behaviours at the primary prevention level.

Diabetes self-management education [DSME] is recognized as an integral component of care according to the clinical guidelines for diabetes management in Nigeria [21]. It is established that the best persons to manage a disease that is affected by daily fluctuations in environmental stress, exercise, diet and infections are the patients themselves and their families. DSME is a significant non-drug approach to managing diabetes and is done to complement medication regimen. DSME in Nigeria is a routinized affair that occurs on every clinic visit and typically involves a team-based approach. The components of DSME as stipulated in the clinical guidelines for diabetes management in Nigeria include the following [21]:

Self-monitoring of blood glucose [SMBG] - patient and relatives are to be educated on how to adjust therapy based on blood glucose results; insulin dose, food, and exercise in response to measured blood glucose values. These skills are to be evaluated at each clinic visit.

Foot care: Patients are taught to inspect feet on a daily basis, wear comfortable and well fitting shoes, to engage in proper nail care preferably by filing the nails and to avoid walking with bare feet.

Exercise: The guideline encourages regular physical activities or exercise to prevent type 2 diabetes mellitus; aerobic or endurance exercise such as walking or running is also recommended and the avoidance of strenuous exercises if blood glucose is > 250 mg/dl (14 mmol/L) or less than 80 mg/dl (4.5 mmol/L).

Dietary management: Dietary prescription is based on the following; carbohydrates [60–70%], protein [20–25%] and fat [15–20%]. A food pyramid for people living with diabetes is used to educate on appropriate dietary guidelines.

Secondary prevention entails additional screening for high-risk groups such as eye-exams, more frequent blood pressure checks, cholesterol checks and also preliminary screening for family members such as gestational diabetes and for children. High-risk individuals include: overweight/obese individuals, persons with family history of the diabetes mellitus. The basis of management should be an equal emphasis on medication adherence and Diabetes Self-Management Education [DSME]. In Nigeria, primary care centres are ill-equipped to diagnose and manage diabetic cases hence referral is made to secondary and tertiary institutions. Also, this referral networks tend to be one-way with follow-up still being managed by

health professionals at both higher levels of care. This situation renders primary care providers persistently incapable of contributing their educational and follow-up quota at the community based level. The result is an overburdening of the secondary and tertiary institutions, reduction in the quality of care provided due to overcrowding and poor doctor-patient ratio as well as inadequate materials to provide in-patient and out-patient services to people seeking diabetic care. Challenges encountered by patients at this level include prolonged waiting times for appointments, long waiting hours in the outpatient clinics, and long queues waiting for medications [8].

2.3.3 Tertiary prevention

Some tertiary centres have a small number of endocrinologists, diabetologists, dieticians, nutritionists, physical therapists, diabetes nurses, with only a minute few hospitals capable of boasting of certified diabetic educators, chiropodists and podiatrists [8].

2.4 Effective Forms of Care

The context of patient-centred care involving DM self-management and patient education have for a long time only encompassed lifestyle-related strategies and medical management. These evidence-based strategies are limited to nutrition therapy, physical activity and pharmacotherapy. However, with a shift in focus from disease management to health promotion and disease prevention, there is an urgent need for low cost, effective and easily implementable primary and secondary prevention approaches as well as tertiary strategies that delay disease progression, complications, and associated deterioration in function in patients with diabetes [22]

Health care for people living with diabetes in Nigeria is central to secondary level institutions. The pattern of care entails diagnosis based on established clinical guidelines involving fasting blood sugar, 2 hr post-prandial tests and HbA1C conducted on random basis due to cost effectiveness. Patients are then referred to diabetic educators for occasional nutritional education on how to manage their health status and avoid complications. This follows regular clinic visits done on a monthly or bimonthly basis which entails general health educational sessions given by nurses and other members of the health care teams with the hope of improving self-management skills. During these brief sessions given in the main language of the environment and mixed with English language, different topics ranging from self-monitoring of glucose, insulin administration, feet care and other issues are discussed. Patients can ask questions during these sessions but due to the large groups of people at a time as well as late arrivals by some patients, there remains a limit to how much information is assimilated and integrated to promote self-empowerment. The clinic visit ends with a consultation by a medical practitioner, majorly an Endocrinologist, who provides medical management as appropriate for each patient. The results from various surveys on self-care practices as well as the prevalence of late detection and complications show that more initiatives are needed to promote improvements in patient outcomes. Care coordination whereby there is holistic and an unbroken chain in the information received by a patient also needs to be reviewed in accordance with results from the DAWN [Diabetes Attitudes Wishes and Needs] study where patients complained that there was poor collaboration between physicians and other members of the health care team [18]. All in all, the Nigerian system, as elaborately designed is burdened by the high population demanding its attention. The primary care level remains an untapped resource for diabetes self-management.

The main goals in diabetes care as put forward by [23] are good quality of life, good metabolic control and minimization of complications caused by diabetes. Several models have been designed with these goals in view. In a Shanghai study, a Chronic Disease Self-management Program (CDSMP) was introduced in a six-month follow-up, randomized control trial. Patients who received treatment had significant improvements in weekly aerobic exercise, practice of cognitive symptom management, self-efficacy to manage own symptoms, and self-efficacy to manage own disease in general [24]. The three components of the Chronic Care Model [CCM: Patient self-management, delivery system design and community resources; have made the model a widely acceptable and utilized framework for improving diabetes care in the community [22].

Self management education has been reported to bring about improved knowledge, self-care behaviour, improved clinical outcomes such as lower A1C, lower self-reported weight, improved quality of life, healthy coping and lower costs in patients with diabetes [22]. A number of programmes have been designed, founded on

the Chronic Care Model, aimed at promoting self-management education through culturally appropriate strategies. Two of such programmes involve team-based approaches and peer-led education and interventions. These methods are evidence-based and have yielded commendable results for both patients and health professionals.

Peer supporters are individuals undergoing similar experience common to a population of interest and who have gained adequate experiential knowledge which can be used to educate other people facing similar and familiar challenges. Peer support is an effective form of empowering the individual with diabetes through provision of advice on day-to-day disease management, providing emotional and social support, linkages to clinical care and a proactive flexible attitude towards fellow patients [25]. In the United Kingdom, peer advisers in diabetes were found to be effective in providing one-to-one psychosocial support and advice on self-management and WHO has endorsed peer support as a low cost and flexible intervention [25]. The models of peer support include face-to-face self-management program, peer leaders/ coaches/mentors, community health workers, telephone-based peer support and web-and email-based peer support [25]. This is another untapped resource in the Nigerian communities and further research on the possibility of peer support in improving self-empowerment for diabetics need to be explored.

Team-based approaches such as Nurse-Community Health Worker [CHWs], pharmacist/ CHW teams; physician and community linkages, etc have also provided complementary skills to support patients [26]. The collaborative efforts of a multidisciplinary approach, as shown in Table 2, have useful advantages which research proves to promote diabetes self-education and management skills.

2.5 Adherence to Treatment of Diabetes

A consistent goal in the management of Diabetes is to empower the individual with knowledge to engage in healthy behaviours that would protect and promote their health. Most interventions designed to reduce the tendency to develop complications seeks to influence patient self-care or self-management behaviours [27]. The interventions listed in Table 1; have a recurring theme which points to interventions focused on individual patients, interventions that target health providers and interventions at the community or system level. Thus, in order to solve the problem of poor adherence, a combination of multiple approaches aimed at modifying both the behaviours of affected individuals as well as changes in the larger environmental systems that shape and modify behaviours is necessary.

2.6 Factors Influencing Diabetes Self Management

Factors influencing attitudes and practices to self-care have been traced to poor knowledge of the disease, its risk factors and complications [23]. Diabetes self-care activities are behaviours aimed at successfully managing the disease and it requires both dietary and lifestyle modifications. Adequate glycaemic control, prevention of complications and disability as well as rehabilitation constitutes the needs of people living with diabetes [27]. Self-care behaviours have been identified to be essential for good quality of life and they include: varying nutrition to daily needs, insulin dose adjustments to actual needs, regular exercise, self-monitoring of blood sugar, medication compliance, healthy coping, good problem-solving skills, and risk-reduction behaviours [23,27]. It has been shown that individuals who actively participate in their care have experienced better management of their disease and also improved self-confidence which leads to improved quality of life.

Active participation in self-care behaviours requires knowledgeable individuals. Results from a meta-analysis conducted in India on self-management education for adults with type-2 diabetes showed improvement in glycemic control only at early follow-up visits with observed decline within three months due to lack of continuous education [27]. In a cross-sectional study conducted in Ibadan, Western Nigeria, only 10.3% could identify the cause of diabetes and 77.7% were unaware that poor control of blood glucose levels could result in complications; polyuria was the only identified sign of hyperglycaemic state and this was done by 37.4% of the respondents [28]. In another study conducted by [10] in one Nigerian tertiary centre, medication adherence was 60.2%, and self-blood glucose monitoring was performed by 25.4%. It was also shown in the same study, that 46 – 83% of patients resort to unorthodox methods of diabetes management due to the low perception of care from orthodox centres. Complaints stemmed from prolonged waiting times for appointments, long waiting hours in the

outpatient clinics, and long queues waiting for medications.

In the eastern part of Nigeria, a cross-sectional study on knowledge of self-care practices among respondents from two states yielded the following results. Medication knowledge positively correlated with medication adherence. Most patients were not aware that diabetic drugs were taken for life and some believed that diabetes can be cured after a period of anti-diabetic regimen along with the combination of herbs and other alternative therapies [13,5]. It was also found that most patients experienced signs of hypoglycaemia but confused it to be hyperglycaemia with poor knowledge of either of the two complications [5].

Further findings on monitoring fasting blood sugar showed that respondents believed that fasting blood sugar, FBS, can be used to monitor 2 to 3 months of blood sugar control, hence, monitoring of blood sugar was done during clinic visits which were 2-3 months apart with only rare conduction of HbA1c tests due to its cost [5]. While there is a high level of awareness of the need to engage in self-glucose monitoring, this knowledge rarely translates into active practice as shown by 3.4% among people with diabetes in rural settings to 73% in urban settings [13]. In fact, some diabetics still employ crude urine testing in monitoring blood-glucose; clinitest tablets, urine dipsticks, some taste the urine for glucose and some watch for the gathering of ants after passing urine on the floor [29,16].

With respect to physical activity, the findings from the two eastern states study indicated that while most of the patients knew the importance of regular physical activity, there was lack of knowledge on the need to measure blood glucose before and after such activity and neither were they aware of the need to modulate anti-diabetic drugs after physical activity [5]. There is also a misdirection concerning physical activity with diabetics believing that exercise is aimed at losing weight rather than keeping fit and also general advice on exercise is given to patients with no specifications nor guidelines to how much or how frequent exercises should be done [16].

Table 1. Team based approach to clinical management of diabetes [2]

Professionals involved in the care	Recommended goals of therapy
Short-term management Involved in core care, provide support and structured education for patients • Primary care physician • Diabetes specialist nurse • Certified diabetes educator • Dietician • Physical activity specialist	**Lifestyle goals** Smoking cessation Weight loss achieved with **Diet** • Calorie restriction to 1,500 kcal/day • Fat intake restricted to 30% - 35% of total daily energy uptake with saturated fat < 10.7% • 10% monounsaturated fatty acids, eg, olive oil • Avoidance of trans-fats • Fiber intake restricted to 30 g per day **Physical activity** • 2.5 – 5 hours/week moderate-intensity physical activity • 1 – 2.5 hours/week vigorous-intensity exercise • Limit total time spent being sedentary
Long-term management • Endocrinologist • Ophthalmologist • Podiatrist • Renal and cardiac physicians • Mental health practitioners • Pharmacists • **Social workers**	**Pharmacotherapy** Glycaemic control (individualized) • HbA1c <7% • Fasting plasma glucose 3.9 – 7.2 mmol/L • Postprandial glucose < 10 mmol/L Lipids • Total cholesterol < 4 mmol/L • LDL cholesterol < 2.6 mmol/L (<1.8 if CVD) • HDL cholesterol > 1.04 mmol/L (males), >1.3 (females) • Triglycerides < 1.7 mol/L • BP <130/80 mmHg

Table 2. Factors affecting adherence to therapy for the control of diabetes and interventions for improving it [27]

Diabetes	Factors affecting adherence	Interventions to improve adherence
Socioeconomic-related factors	Cost of care, Patients aged over 25 years (adherence to physical activity), Older adolescents (insulin administration and self-monitoring of blood glucose), Males (adherence to diet and physical activity), Females (adherence to physical activity and diet), Environmental high-risk situations, Patients aged less than 25 years (adherence to physical activity, Younger adolescents (insulin administration and self-monitoring of blood glucose) Social support Family support	Mobilization of community-based organizations; Assessment of social needs; Family preparedness
Health care team/health system-related factors	Poor relationship between patient and physician	Multidisciplinary care; Training of health professionals on adherence Identification of the treatment goals and development of strategies to meet them; Continuing education; Continuous monitoring and reassessment of treatment; Systems interventions: Health insurance for nutrition therapy; Telephone reminders to patients, Chronic care models
Condition-related factors	Depression Duration of disease	Education on use of medicines
Therapy-related factors	Complexity of treatment Less frequent dose Monotherapy with simple dosing schedules Frequency of self-care behaviours	Patient self-management; Simplification of regimens; Education on use of medicines
Patient-related factors	Depression; Stress and emotional problems; Alcohol abuse; Positive self-esteem; Self-efficacy	Behavioural and motivational interventions; Assessment of psychological needs

There is a need to increase sensitization of newly diagnosed patients as well as undiagnosed individuals in order to prevent the incidence and/or prevalence of diabetic complications. Perceived seriousness of the disease was low in this study which affected the attitude to knowledge seeking behaviours and self-care attitudes [5]. It was also found that more knowledge was recorded among people with longer duration of diabetes who are motivated to seek help while experiencing certain complications but no mention of rehabilitative care was provided.

Several beliefs exist about appropriate dietary requirements in attaining good glycaemic control in DM. Most people living with diabetes deny themselves of carbohydrates or only consume minimal quantities preferring to eat monotonous meals [16] which are propagated as safe by diabetic educators and peers. This erroneous belief have led to acute hypoglycaemic states

especially when such individuals persist with prescribed anti-diabetic dosage regimens while having already low blood sugars. The Federal Ministry of Health, Nigeria has put together standard guidelines for several health conditions with diabetes inclusive, yet, the accessibility of this information seems limited to the acute care settings. There is a need to bring to the community this information in order to maximize utilization by those who need it the most.

These results point to the need for effective forms of educational forums for chronic illnesses like diabetes. An avenue where people can be interacted with at their community level will provide the advantage of encouraging involvement of these patients and their families in their own care. Self-management requires access to services provided by professionals and social support from lay leaders to encourage healthy behaviours [25]. Developing and evaluating low cost strategies that build on available resources to empower patients is necessary for all societies especially developing economies. Optimal outcomes in diabetes care have been reported to occur when there is a partnership among patients and families, health care teams and community supporters [25].

Effective management of diabetes requires ongoing self-care which is often achieved through DSME and diabetes self-management support; DSMS [30]. Programmes emphasizing self-management provide an ideal framework for a systematic approach. Evidence-based health care delivery models such as the chronic care model provide opportunities that enhance access and sustainability of DSME and DSMS [30]. With respect to integrating diabetes education into the chronic care model, the following recommendations were made: Collaboration with multiple stakeholders – national and local health care systems and communities to provide more effective diabetes management and make better use of the health care system [30]. Other suggested ways include meaningful use of technology which supports a comprehensive clinical information system, patient-provider partnerships in treatment decision discussions which supports more active role in managing their health and engaging in setting goals that promotes behaviour change; and finally the active use of diabetes educators as a resourceful member of the multi-disciplinary team [30].

2.7 Community Based Care

As a result of the complex set of social, cultural, behavioural, environmental and biological factors amidst others, which affect the management of diabetes, approaches that incorporate education, social support, and community programs are needed to promote diabetes care [30]. Community based care takes into consideration the cultural diversities of people living within a particular community and seeks to highlight healthy practices that strengthen the links between clinical guidelines and individual preferences. This is highly beneficial because most decisions about self-care are made on a daily basis by patients and their families.

Research has shown that disease management initiatives which are culturally-tailored and involves collaboration between the community and the health systems; improve health outcomes and significantly reduce the burden of disease among underserved populations [31,32,33]. Most of the daily decisions impacting diabetes self-management are greatly influenced by the support available in the community [25]. The choice of healthy eating habits and regular physical activity is highly dependent on materials and infrastructure available within the community.

Interventions that are designed for general populations may not benefit disadvantaged groups either due to language difficulties, cultural beliefs, transportation, getting time off work, child care, and low health literacy in addition to financial barriers to care [32]. It was also found that successful interventions among disadvantaged populations had the properties of being intensive, involving communities and face-to-face interventions, development of skills to promote behaviour change, promoting health provider skills in correlating interventions to patient-centred assessment as well as involving multidisciplinary approaches [32]. More effective diabetes self-management interventions involved community settings with active, hands-on, participatory, and behavioural approaches which addressed socio-contextual issues [32].

Community Health Workers [CHWs] are patients, peers of patients, or other lay community members without formal medical training, who receive training as part of an intervention in order to provide support for patients. Combining CHWs and nurses to provide comprehensive care management which includes care coordination,

patient education and referral/navigation among community resources to support lifestyle changes have been shown to be effective in diabetes management [31]. Nurses can provide clinical care and high-level patient education and care coordination, while CHWs can address socio-cultural barriers to care, provide basic health education and care coordination, and help patients connect to resources within the community [31]. Community Health Workers proved to be an efficient intervention scheme for various community based services in Nigeria such as HIV/AIDS and Directly Observed Therapy for Tuberculosis management but for effective impact, it has been shown that provision of clinical related services is best provided in a complementary fashion by formally trained medical practitioners [34] such as community health nurses working at the primary care level.

2.8 Barriers to Community Based Care for DSME in Nigeria

2.8.1 Patient level

This includes motivation to adopt strategies that are not culturally or religiously favorable; poor turn-out and loss to follow-up due to distance between community centers and clients residence, failure to maintain participants interests, resources for information on preventive practices and non-adherence resulting in complications requiring hospital based care.

2.8.2 Provider level

This includes reluctance of health care workers to participate in community-based programs because of the uncertainty of the quality of advice that such programs provide and the desire to protect their role as providers of diabetes education. Poorly trained CHWs in DSME and continuous improvement programs to identify problems and solutions are also barriers to community based care.

2.8.3 Systemic level

This includes personnel, materials and financial constraints. These issues are also encountered in different settings around the world as reported by a study conducted in Ireland [35] In Nigeria, the primary care level is not only poorly staffed but also exhibits limited infrastructure and consistent supply of necessary materials for care provision.

Another factor is lack of integration between primary and secondary level of care [36] Referral system in Nigeria remains effectively one-way which hampers the team-based care highly needed in DSME. Up till date, primary care level has not been well incorporated into providing DSME at the community level.

2.9 Factors That Can Promote Community Based Care for DSME in Nigeria

- Training CHWs on diabetes self-management education and incorporating them as part of a team based approach. CHWs, under supervision, can provide culturally appropriate health education and can lead activities such as exercise groups, recruit new participants into the program, help individuals access healthcare, provide encouragement, informal counseling and social support.
- Conducting home-based care efforts for high-risk individuals in order to identify recurring trends in barriers to self-management support. This can inform care for health care providers and community health workers.
- Encouraging peer support models using informed and activated patients to provide unique advice, under supervision, to other individuals living with diabetes. It has the advantage of providing interaction among people of similar socio-economic levels that can reinforce self-care skills that are affordable and accessible at each level.
- DSME should be culturally inclusive, sensitive, and supportive, and educators need to understand participants' preferred language especially when integrating ethnic differences to nutrition education and cooking demonstrations.
- Promoting social networks such as family supports and linkages with faith-based institutions in order to facilitate follow-up
- Use of reminders and incentives to encourage consistent participation and encouraging diligent participants by making them peer models.
- Active collaboration with health care providers to ensure continuity of care and encourage two-way referrals between the levels of care.
- Publicity efforts at all levels of care and employing all mediums of local communications.

- Quality assurance through continuous improvement programs and program evaluation
- Advocacy efforts to initiate favorable governmental policies that would enforce self-management supports for people living with diabetes across the life span.
- Research efforts to identify factors that can promote utilization of community resources as well as areas requiring health policy reforms for DSME programs in Nigeria. Focused group discussions and in depth interviews can be conducted at structure, process and outcome levels to identify areas for improvements and sustenance.

3. RECOMMENDATIONS

- Continuous training of health care providers
- Introduction of DSME at the primary health care level
- Community involvement in diabetes preventive practices
- Initiating peer support models
- Facilitating culturally sensitive community based care models
- Translating research into action
- Advocacy for diabetes self-management support
- Collaboration between the diverse providers of diabetes care and facilitating linkages to community resources
- Pursuing health policies that will employ the components of the Chronic Care Model in Nigeria.

4. CONCLUSION

In Nigeria, diabetes mellitus is a fast growing epidemic and there is also a high prevalence of the risk factors of the disease within different population groups. Unfortunately, health systems are ill-equipped to meet the growing demands of the population as shown in poor health outcomes. It is also an established fact that Diabetes Self –Management Education [DSME] is a pre-requisite for functional and clinical outcomes as with all chronic illnesses. Hence, self-management support is essential to eradicate the challenges faced by people living with diabetes. The Chronic Care Model emphasises two broad components which include organization of health care and community resources and policies. This review explored the challenges of health care in Nigeria and the barriers as well as facilitators of community based care in promoting healthy self-care behaviours among populations living with diabetes in Nigeria.

There is a need to translate research into action in Nigeria. DSME needs to be affirmed at the primary care level. Linkages between health care providers and community resources such as community health workers and peer support needs to be facilitated by the government. The goal of therapy should be to produce informed and activated patients who can engage in preventive self-care behaviours and actively promote the health and wellbeing of members of their families and communities.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

1. Raimi TH, Alebiosu OC, Adeleye JO, Balogun WO, Kolawole BA, Familoni OB, et al. Diabetes education: Strategy for improving diabetes care in Nigeria. African Journal of Diabetes Medicine. 2014;22(1): 9–11.
2. Ofori SN, Unachukwu CN. Holistic approach to prevention and management of type 2 diabetes mellitus in a family setting. Dove Medical Press. 2014;14(7): 159–168.
(Assessed 11 June 2016)
Available:https://www.dovepress.com/holistic-approach-to-prevention-and-management-of-type-2-diabetes-mell-peer-reviewed-fulltext-article-DMSO
3. Moonaghi KH, Areshtanab HN, Jouyabari L, Bostanabad MA, McDonald H. Facilitators and barriers of adaptation to diabetes: Experiences of Iranian patients. Journal of Diabetes & Metabolic Disorders. 2014;13:17.
DOI: 10.1186/2251-6581-13-17
(Assessed 11 May 2016)
Available:https://jdmdonline.biomedcentral.com/articles/10.1186/2251-6581-13-17

4. Alebiosu OC, Familoni OB, Ogunsemi OO, Raimi TH, Balogun WO, Odusan O, et al. Community based diabetes risk assessment in Ogun State, Nigeria (World Diabetes Foundation Project 08-321). Indian J Endocrinol Metab. 2013;17(4): 653–658.
(Assessed 14 June 2016)
Available:http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3743365/

5. Jackson IL, Adibe MO, Okonta MJ, Ukwe CV. Knowledge of self-care among type 2 diabetes patients in two states of Nigeria. Pharm Pract (Granada). 2014;12(3):404. (Assessed on 14 June 2016)
Available:http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4161403/#B7
(Assessed on 14/06/2016)

6. Pearson ML, Mattke S, Shaw R, Ridgely MS, Wiseman SH. Patient self-management support programs: An evaluation. Final Contract Report (Prepared by RAND Health Under Contract No. 282-00-0005). Rockville, MD: Agency for Healthcare Research and Quality; November 2007. AHRQ Publication No. 08-0011.
(Assessed pm 29 July 2016)
Available:http://www.ahrq.gov/sites/default/files/publications/files/ptmgmt.pdf

7. Issa BA, Baiyewu O. Quality of life of patients with diabetes mellitus in a Nigerian Teaching Hospital. Hong Kong Journal of Psychiatry. 2006;16:27–33.

8. Fasanmade OA, Dagogo-Jack S. Diabetes care in Nigeria. Annals of Global Health. 2015;81(6):821-829.
(Assessed 15 June 2016)
Available:http://www.annalsofglobalhealth.org/article/S2214-9996(15)01309-0/pdf

9. Chinenye S, Young E. State of diabetes care in Nigeria: A review. Nigerian Health Journal. 2011;11(4):101–106.

10. Wandell PE. Quality of life of patients with diabetes mellitus an overview of research in primary health care in the Nordic Countries, Scandinavian. Journal of Primary Health Care. 2005;23(2):68-74.
(Assessed 5 July 2016)
Available:http://www.tandfonline.com/doi/pdf/10.1080/02813430510015296

11. Abanobi OC. Community participation in population-based noninsulin dependent diabetes mellitus control program: A paradigm. International NGO Journal. 2012;7(1):1-8.
(Assessed 29 July 2016)
Available:http://www.academicjournals.org/journal/INGOJ/article-full-text-pdf/8D9466C41112

12. Oputa RN, Chinenye S. Diabetes in Nigeria – a translational medicine approach. African Journal of Diabetes Medicine. 2015;23(1):7–10.

13. Nwankwo CH, Nandy B, Nwankwo BO. Factors influencing diabetes management outcome among patients attending government health facilities in South East, Nigeria. International Journal of Tropical Medicine. 2010;5(2):28-36.
(Assessed on 11 June 2016)
Available:http://www.medwelljournals.com/fulltext/?doi=ijtmed.2010.28.36

14. Maiyaki MB, Garbati MA. The burden of non-communicable diseases in Nigeria; in the context of globalization. Annals of African Medicine. 2014;13(1):1-10.

15. International Diabetes Federation. Diabetes Atlas; 2015. 7th Edition.
(Assessed on 29 July 2016)
Available:http://www.idf.org/membership/afr/nigeria

16. Ogbera AO, Ekpebegh C. Diabetes mellitus in Nigeria: The past, present and future. World J Diabetes. 2014;5(6):905–911.
(Assessed: 10 July 2016)
Available:http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4265879/
(Assessed on 10/7/2016)

17. Okoronkwo IL, Ekpemiro JN, Onwujekwe OE, Nwaneri AC, Iheanacho PN. Socioeconomic inequities and payment coping mechanisms used in the treatment of type 2 diabetes mellitus in Nigeria. Niger J Clin Pract. 2016;19:104-109.

18. Funnell MM. The Diabetes Attitudes, Wishes and Needs [DAWN] Study; 2005. (Assessed 11 July 2016)
Available:http://clinical.diabetesjournals.org/content/24/4/154

19. Chinenye S, Ogbera AO. Socio-cultural aspects of diabetes mellitus in Nigeria. Journal of Social Health and Diabetes. 2013;1(1):15-21.

20. Hunt R. Introduction to Community-based Nursing. 4th ed. United States of America. 2009;282-283.

21. Diabetes Association of Nigeria. Clinical Guidelines for the Management of Diabetes Mellitus in Nigeria; 2013.
22. Philis-Tsimikas A, Gallo LC. Implementing community-based diabetes programs: The Scripps Whittier Diabetes Institute experience. Curr Diab Rep. 2014;14(2): 462.
DOI: 10.1007/s11892-013-0462-0.
Pubmed PMCID: PMC3946451.
(Assessed 11 May 2016)
Available:http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3946451/
23. Amente T, Belachew T, Hailu E, Berhanu N. Self care practice and its predictors among adults with diabetes mellitus on follow-up at Nekemte Hospital Diabetic Clinic, West Ethiopia. World Journal of Medicine and Medical Science. 2014;2(3): 1–16.
24. Dongbo F, Hua F, McGowan P, Yi-e S, Lizhen Z, Huiqin Y, et al. Implementation and quantitative evaluation of chronic disease self-management programmein Shanghai, China: Randomized controlled trial. Bulletin of the World Health Organization. 2003;81:174-182.
25. Aswathy S, Unnikrishnan AG, Kalra S, Leelamoni K. Peer support as a strategy for effective management of diabetes in India. Indian J Endocrinol Metab. 2013; 17(1):5-7.
(Assessed 17 July 2016)
Available:http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3659906/
26. World Health Organization. Adherence for Long Term Therapies: Evidence for Future Therapies; 2003.
27. Shrivastava SR, Shrivastava PS, Jegadeesh R. Role of self-care in management of diabetes mellitus. Journal of Diabetes & Metabolic Disorders; 2013. (Assessed 12 May 2016)
Available:https://jdmdonline.biomedcentral.com/articles/10.1186/2251-6581-12-14
28. Adisa R, Fakeye TO, Okorie LK. Knowledge, attitude and self-management practices of patients with type 2 diabetes in an Ambulatory Care Setting in Ibadan, Nigeria. Ethiopian Pharmaceutical Journal. 2010;28:2.
(Assessed 11 July 2016)
Available:http://www.ajol.info/index.php/epj/article/view/79433.
29. Okolie VU, Ehiemere OI, Iheanacho NP, Kalu-Igwe IN. Knowledge of diabetes management and control by diabetic patients at Federal Medical Center Umuahia Abia State, Nigeria. International Journal of Medicine and Medical Sciences. 2009;1(9):353-358.
(Assessed 11 May 2016)
Available:http://www.academicjournals.org/article/article1379237233_Okolie%20et%20al.pdf
30. American Association of Diabetes Educators. Integrating Diabetes Education in the Chronic Care Model - AADE Practice Synopsis; 2014.
(Assessed 10 July 2016)
Available:https://www.diabeteseducator.org/docs/default-source/legacy-docs/_resources/pdf/general/CCM_Synopsis_Final.pdf
31. Peek ME, Ferguson M, Bergeron N, Maltby D, Chin MH. Integrated community-healthcare diabetes interventions to reduce disparities. Curr Diab Rep. 2014; 14(3):467.
DOI: 10.1007/s11892-013-0467-8
PMCID: PMC3956046
(Assessed 17 July, 2016)
Available:http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3956046/
32. Glazier R, Bajcar J, Kennie NR, Willson K. A systematic review of interventions to improve diabetes care in socially disadvantaged populations. Diabetes Care. 2006;29(7):1675–1688.
33. Lorig K, Ritter PL, Villa FJ, Armas J. Community based peer led diabetes self-management. A randomized trial. Journal of Interpersonal Violence. 2009;35(4): 641–651.
34. McDermott RA, Schmidt B, Preece C, Owens V, Taylor S, Li M, et al. Community health workers improve diabetes care in remote Australian Indigenous Communities: Results of a pragmatic cluster randomized controlled trial. BMC Health Services Research. 2015;15:68.
(Assessed 29 July, 2016)
Available:http://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-015-0695-5
35. McHugh S, O'Mullane M, Perrt I, Bradley C. Barriers to, and facilitators in, introducing integrated diabetes care in Ireland: A qualitative study of views in

general practice. BMJ Open. 2013;3:8. DOI: 10.1136.
(Assessed 27 July 2016)
Available:http://bmjopen.bmj.com/content/3/8/e003217.full

36. Bhattacharyya OK, Rasooly IR, Naqshbandi M, Estey EE, Esler J, Toth E, et al. Challenges to the provision of diabetes care in first nations communities: Results from a national survey of healthcare providers in Canada. BMC Health Services Research. 2011;11:283. DOI: 10.1186/1472-6963-11-283
(Assessed 29 July 2016)
Available:http://bmchealthservres.biomedcentral.com/articles/10.1186/1472-6963-11-283

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