Knowledge of Diabetes Education Programmes and Support Systems on Type 2 Diabetes Self-Management among Black Africans in Liverpool

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Abstract: *The study evaluates the knowledge of diabetes education programmes and support systems on Type 2 diabetes self-management among Black Africans in Liverpool. Self-management of diabetes takes into consideration the choices that people with diabetes must make on a daily basis. A total of thirty participants, 43.3% males and 56.7% females, with type 2 diabetes of age range between 40 – 79 years completed questionnaires combined with semi-structured interview (n=30). The duration of their diabetes was between 1-30 years. The study adopts non-probabilistic, snowball sampling approach as the primary and most effective strategy for choosing participants for data collection and employs descriptive and multiple Regression Statistical Analysis. Based on these findings, it was suggested that improving knowledge of people with diabetes is of utmost importance in order for them to control or prevent the complications associated with the disease among others.*

Keywords: *Type 2 diabetes, Self-management, Support systems.*

I. Introduction

Type 2 diabetes mellitus consists of an array of dysfunctions characterized by hyperglycaemia and resulting from the combination of resistance to insulin action, inadequate insulin secretion, and excessive or inappropriate glucagon secretion[1]. Diabetes poses a great economic challenge on the individual, national healthcare system and economy as a whole[1] and theGlobal Burden of Disease (GBD) also reported that Type 2 diabetes is one of the biggest challenges facing health systems and societies today[2]. In the United Kingdom, the cost for diabetes-related care was almost 9% of the total health care expenditure in 1996[3]. UK policymakers have described the burden associated with the progressive nature of diabetes in terms of direct costs to the NHS and associated healthcare support services; indirect costs to the economy due to loss of productivity; and the personal impact of diabetes, and complications for patients and their families National guidelines, such as those produced by the National Institute for Health and Clinical Excellence in the United Kingdom also have recommended involving patients in setting individual HbA1c targets[4]. The expenditure was mostly incurred by the incidents of complications of diabetes, including congestive heart failure, neuropathy, ischemic heart disease, nephropathy, and cerebrovascular disease. The complications of renal disease secured the second highest percentage of patients with end-stage renal disease, and diabetic nephropathy. In addition there are multiple indirect costs of diabetes that are hardly measured; these include mortality rates, premature mortality, and other factors, such as sick days, employment considerations, income, family home care, and transportation costs [5,6,7]. Thus, preventing the complications of T2DM is the key to reduce the expenditure of health care and this can be achieved through diabetes self-management[8].

Traditionally, self-care is a multi-dimensional concept and has different definitions. The approach to this study was derived from Dorothea Orem's self-care nursing theory between 1959 and 2001 self-care model[9]. According to model of nursing used in rehabilitation and primary care settings to encourage patients to be as independent as possible, Self-care was defined to be a personal activity to take care and maintain own self health and illness and prevention of disease related complications. This can be accomplished through managing and continuing healthy lifestyle activities in areas of physical activity, nutrition, medication and so on. In line with this, Orem described self-care agency as the ability of oneself to assess, monitor, and take decision on behalf of own life situation. The central philosophy for Orem's nursing theory is that all "patients wish to care for themselves". They can recover more quickly and holistically if they are allowed to perform their own self-cares to the best of their ability. However, while self-management is the cornerstone to achieve glycaemic control, self-management strategies include weight loss, eating a healthy diet, engaging in regular physical activity, and blood glucose self-monitoring. Nevertheless, managing diabetes on a day-to-day basis is not always easy, as

individuals must balance self-management behaviours with their preferences or desires for food or activity[10, 11]. Self-management means that people have to make choices and decisions about how to manage their life and their diabetes. Through good self-management, people with diabetes can improve their quality of life and reduce the risk of developing complications. It can also help to prevent hospital admissions, or make those times when they do need to go into hospital, for whatever reason, a better experience, with a reduced length of stay [12].People with type 2 diabetes needs to be supported to enable them to self-manage and the type of support people need will vary depending on how they are managing or whether they feel the need to access that support. It is of vital importance that people are able to manage their lives with diabetes.

In reality, it is difficult to prescribe a standard behaviour for a diabetic patient because self-care is a fluid rather than static state [13]. However, the main treatment behaviours recommended for controlling diabetes include: dietary changes, taking medications, exercising, foot care, monitoring blood sugar, and interaction with health care providers.

1.1 Knowledge of T2DM

Many people are unaware that they have T2DM[14]. It can lead to long-term complications including eye problems, kidney disease, foot ulcers and cardiovascular disease. On average at age 55, the life expectancy of people with T2DM is 5 to 7 years less than for the general population [15]. Together with its irreversible complications, diabetes mellitus finally leads to disability, mortality, and premature mortality; thus the burden to society is massive [16]. Therefore, the rapidly increasing incidence of diabetes has been given priority by both the authorities and the health care professionals. The quality of diabetes care generally remains suboptimal worldwide, regardless of a particular country's level of development, and health care system [17, 18]. The National Diabetes Audit of England and Wales show that in those with Type 1 and Type 2 diabetes, 43% and 63% respectively received eight out of the nine National Institute for Health and Care Excellence recommended annual care processes (urinary albumin, eye screening, foot examination, smoking review, body mass index, cholesterol, blood creatinine, HbA1c, and blood pressure). These completion rates were slightly lower than those from the previous year[19].

The major issue of diabetes care is focused on preventing or delaying longstanding complications, which is the major drain of health care resources. However, people with T2DM, before developing into chronic complications, remain symptomless for years without urgent characteristics[20], the earlier the onset of type 2 diabetes takes place, the more complications of diabetes will ensue, and the treatment costs will increase substantially [21,16].

1.2Social support and T2DM

In general, social support is characterised by giving assistance and protection [13]. Having supportive relationships in which the person feels encouraged by those around them can be helpful in both practical ways, for example, encouraging them to attend their health appointments, and to feel that they are not completely isolated. Patients' perceptions of encouragement from relatives, family, friends, and health care providers can help them comply with diabetes treatment and management [22]. This involves the degree to which a person's basic needs of affection, esteem, belonging, identity, and security are supported through interaction with others. Social support implies the availability of resources and psychological functions which the receiver processes as supportive behaviours. Therefore, social support is a sort of communication or exchange of resources and increases the well-being of the receiver. The family's function as a resource and support may enhance lifestyle adjustment. The network of supporting resources, friends, family, and neighbourhood support from social-ecological resources can mediate behaviour changes such as increasing physical activity and reducing fat consumption. TheBlack Africans' cultural beliefs and social and family structure are among the factors that make up their social support by family members taking care of each other. The young generation of a family traditionally assumes responsibility for elderly parents. Adult children are expected to support their elderly parents and to take care of their parents when the latter get sick. Social stigma can prevent an individual from disclosing an illness-identity from the others, which may lead to avoiding self-care activities every time he or she cannot hide self-care activities from the public[23]. Also, different genders have different social support. Due to their role of caregivers to their own family, women tend to have less support from families, and multiple family members could hinder them from self-management[24, 25]. In contrast, men who are married tend to have their wife or partner to prepare proper food for them thus they tend to have better self-management. Self-management extensively involves daily activities, thus carrying out self-management is influenced by many factors[26]. As a result, it is necessary to consider a healthcare plan that is flexible enough to suit all the situations regarding self-care.

Support from health care providers is an important motivational factor for self-management behaviours. Information and practical support will encourage adults with diabetes to self-manage their diabetes [27]. Health care providers can motivate patients to self-manage diabetes through provision of empathetic,

practical, and individualised support [28, 29] for instance, support about diet and meal planning, such as what food to buy and how to prepare their food. The informational support should be applicable to the living situation and specific to an individual's problem to be more effective at helping people adjust their behaviours.

Overall, various types of support and resources can help make adaptation of self-management behaviours easier for people with diabetes. Personal efforts aided by social support may enhance levels of adherence to self-management activities. Though daily living tasks can be barriers for diabetes care, helpful resources from family and friends and the neighbourhood social context can motivate patients to follow their diabetes regimen and actively manage their diabetes.

Type 2 diabetes is up to six times more common in people of South Asian descent and up to three times more common among people of African and African-Caribbean origin living in the UK compared with the white European population [30, 31, 32]. In addition to their diet, statistics show that they are less likely to participate in at least moderate-intensity physical activity for 30 minutes continuously a week than the general population, however Black Caribbean men are the only subgroup of an ethnic minority population that are not less physically active than the general population in England [33, 34, 35].

II. Hypotheses
The following hypotheses were set up for the study:
1. There is no significant relationship between type 2 diabetes patients' knowledge of diabetes education programmes and support systems for self-management.
2. There is no significant combined contribution of the predictor variables (knowledge and support system) on the criterion variable (self-management).
3. There is no significant relative contribution of the predictor variables (knowledge and support system) on the criterion variable (self-management).

III. Methods
This research was designed to explore the ways in which Black Africans with type 2 diabetes understand and manage their disease, and their perceptions of diabetes self-management as received from diabetes health educators, important team members in diabetes self-care, and diabetes management programmes. Therefore, a descriptive design of the ex-post-facto type was used.

Samples of thirty (30) Black Africans with type 2 diabetes were selected through a purposive sampling technique. The participants in this study were recruited via their churches and community associations. The mean age of the respondents was 50.3 while the standard deviation was 17.7 and the age range was 40-79 years. Seventeen were males (56.7%) and thirteen (43.3%) were females. Out of these, 4 (13.3%) respondents were divorced; 19(63.3%) were married; 2(6.7%) were never married; 2(6.7%) respondents were separated while 3(10.0%) have lost their spouse (widowed). It was revealed further that 6 (20.0%) respondents were Ghanaians; 4 (13.3%) were from Kenya; 15 (50.0%) were Nigerians; while the last 5 (16.7%) were from Sierra Leone.

Three self-structured and validated instruments namely Support System for Self-management Scale; Knowledge of Diabetes Education Scale; and Diabetes Self-management and Treatment Behaviour Scale were used for this study. In order to facilitate the analysis of the data generated from this study, this study employs descriptive analysis and multiple Regression Statistical Analysis.

IV. Results And Discussion
Table 1: Number of participants that received diabetes self-management education

Self-management education given by	Frequency	Percentage of total
Doctor **Yes** **No**	24 6	80.0% 20.0%
Nurse **Yes** **No**	14 16	46.7% 53.3%
Dietician **Yes** **No**	18 12	60.0% 40.0%
Friend with diabetes **Yes** **No**	16 14	53.3% 46.7%
Family member with diabetes **Yes** **No**	19 11	63.3% 36.7%
Reading brochures and books **Yes** **No**	20 10	66.7% 33.3%

At least one health professional **Yes** **No**	30 0	100% 0%
Doctor and Nurse **Yes** **No**	10 20	33.3% 66.7%
Doctor and Dietician **Yes** **No**	18 12	60.0% 40.0%

All the participants (100%) have received diabetes self-management education from at least one health professional, however, 80% received their education from the doctor, 67% acquire their knowledge from reading brochures and books, 63% got their knowledge from family member with diabetes, 60% from the dietician, 53% from friend with diabetes and 47% from the nurse.
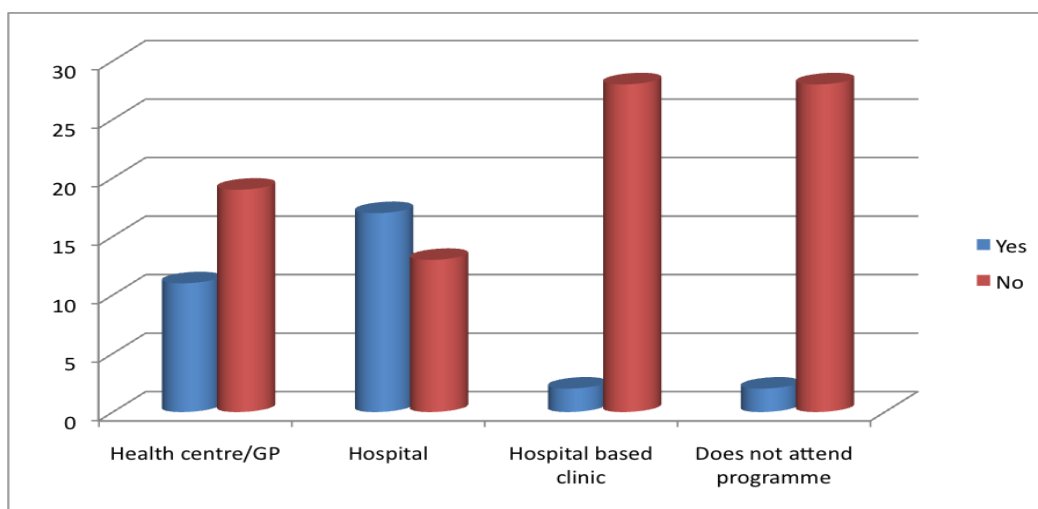

Figure 1: Diabetes management programmes attended and place of attendance

Fig. 1 above shows that majority (53%) of the respondents are presently attending hospital for their diabetes management programme and (33%) are attending health centre/GP practice. While (7%) are presently attending hospital based clinics, the remaining (7%) are not attending any T2DM management programme.
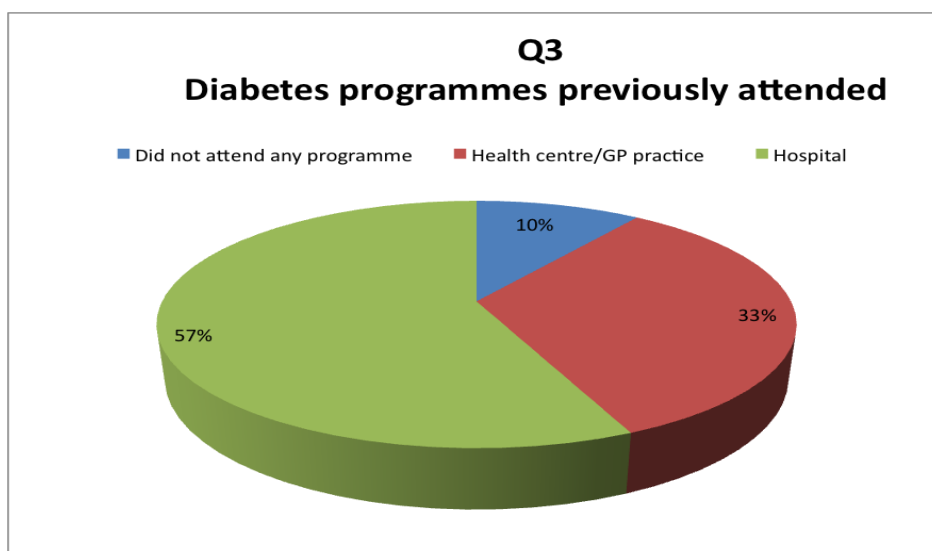

Figure 2: Location of diabetes programme previously attended

Fig. 2 above indicates that 10% did not attend any diabetes programme in the past. 33% of the diabetes patients attended diabetes meeting at the health centre or GP practice, while 57% attended diabetes meeting at the hospital.

Table 2:*Chi-square Table Showing the Relationship between Knowledge of diabetes education programmes and support systems on type 2 diabetes self-management among Black Africans in Liverpool*

	Knowledge of Black Africans with type 2 diabetes			
Support Level	**Adequate**	**Moderate**	**Inadequate**	**Total**
High	9 (6.9)	4 (5.3)	3 (3.7)	**16**
Moderate	3 (4.8)	4 (3.7)	4 (2.6)	**11**
No Support	1 (1.3)	2 (1.0)	0 (0.7)	**3**
Total	**13**	**10**	**7**	**30**

The expected frequencies are in brackets

Table 3: Correlation matrix of the relationship between Knowledge of diabetes education programmes and support systems on type 2 diabetes self-management among Black Africans in Liverpool

	Calculated value (χ^2_{cal})	df	Critical value (χ^2_{tab})	P value	Remarks
Knowledge and Support System	4.310	4	0.711	0.05	Significant

The results in Table 2and 3indicated a significant relationship between knowledge of diabetes education programmes and support systems for type 2 diabetes' self-management among Black Africans in Liverpool. Since the calculated χ^2 of 4.310was greater than the critical or table value (χ^2 = .711) at p-value of 0.05, the null hypothesis was rejected while the alternate one is accepted. The findings imply that the knowledge of diabetes education programmes among Black Africans with type 2 diabetes in Liverpool is related to thesupport systems for self-management. This result is in line with [36]s study which showed that diabetes patients with inadequate health literacy and hypertension have poorer disease knowledge than those with adequate health literacy. Also, [37] reported that knowledge of diabetes and its complications is an integral part of comprehensive diabetes care and management. This study lends credence to the findings of [38]that improving knowledge of people with DM is associated with better practices in prevention and control of the disease.

Table 4:*Model Summary of the multiple Regression Analysis of combined contribution of the predictor variables on the criterion variable*

Model	R	R^2	Adj. R^2	SE	Change Statistics				
					R^2 Change	F Change	d f 1	d f 2	Sig. F Change
Predictor Variables	.495	.245	.241	8.107	.241	19.543	1	29	.000

a. Predictors: (Constant), knowledge of diabetes, support system
b. Dependant Variable: self-management

The results in Table 4 revealed that the predictor variables (knowledge of diabetes education programmes and support systems) combine to determine self-management (R = 495; R^2 = 245; Adj. R^2 = .241; F= 19.543; P < .05) [1, 29]. This revealed that knowledge of diabetes education programmes and support systems accounted for 24.1% of the variance observed in the self-management among Black Africans with type 2 diabetes. This finding rejected the hypothesis, which stated that there is no significant combined contribution of the predictor variables (knowledge and support system) on the criterion variable (self-management). Therefore, it could be deduced that knowledge of diabetes education programmes and support systems to a large extent will influence the degree of self-management among type 2 diabetes' patients. This outcome corroborated the earlier studies which have shown that social support mediated an improvement of self-care and lifestyle adaptation in patients with chronic illness [39, 40, 41]. Support from family members, health care providers, and friends enhanced adherence to self-care behaviours in Thai people with cardiovascular disease[40].

Table 5:*Coefficients of Relative contribution of knowledge of diabetes education programmes and support systems on type 2 diabetes' self-management*

	Unstandardized Coefficients		Standardized Coefficients	T	Sig
	B	SE	Beta		
(Constant)	23. 008	12.837		18.194	.000
Knowledge	.411	.085	.701	6.904	.000
Support System	.377	.071	.616	5.081	.003

a. Predictors: (Constant), knowledge of diabetes,support system
b. Dependent Variable: self-management

The results in Table 5 revealed the strength of causation of the predictor variables (knowledge of diabetes education programmes and support systems) on the criterion variable (type 2 diabetes' self-management). The most potent predictor of type 2 diabetes' self-management among the two predictor variables of the study is knowledge of diabetes education programmes (β = .701; t = 6.904; p <.05).This study lends credence to the findings of[38]that improving knowledge of people with DM is associated with better practices in prevention and control of the disease; and followed by support system (β= 616; t = 5.081; p <.05). The null hypothesis of no relative contribution of the predictor variables on the criterion variable was by this finding rejected.

The study of [28] supported the outcome of the findings on the social support that health care providers can motivate patients to self-manage [42] diabetes through provision of empathetic, practical, and individualised support. Also, support about diet and meal planning, such as what food to buy and how to prepare their food. The informational support should be applicable to the living situation and specific to an individual's problem to be more effective at helping people adjust their behaviours.

V.   Conclusion

Knowledge of diabetes education programmes and support systems are key factors that contribute to self-management of type 2 diabetes positively among Black Africans in Liverpool with type 2 diabetes. This study equally established a positive relationship between knowledge of diabetes education programmes and support systems in relation to the experience of self-management or treatment behaviours among black African living in Liverpool, United Kingdom. Therefore, a good knowledge and understanding of self-management by both care providers as well as patients is the key towards prevention and reduction of diabetes complications and mortality. In addition it is important to have an evaluation of the improvement that can be expected from diabetes self-management and the impact on quality of life from diabetic control.

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