

Evaluating Self-Management Experience of Type 2 diabetes Among Black Africans In Liverpool

Dr Olutoyin Elizabeth Okeya

Faculty of Health, Social Care and Medicine. Senior Lecturer, Edge Hill University, Ormskirk, Lancashire, UK

Abstract

This study examined the relationships between self-management, years of experience and diabetes management among Black Africans in Liverpool. The research adopted quantitative techniques, a well-structured questionnaire was employed to obtain information from the targeted population and Chi-square analytical technique was used for the purpose of validating the hypotheses. It was found that the relationship between diabetes self-management, treatment behaviour and experience of type 2 diabetes self-management was corroborated. The study thus showed that factors contributing to self-management of type 2 diabetes positively affected experience of type 2 diabetes self-management among the Black Africans in Liverpool. It also revealed that the selected respondents have received diabetes self-management education from at least one healthcare professional, which points to the fact that the self-management is well appreciated and recognised, as an effective initiative for the management of diabetes among the Black Africans in Liverpool. It was concluded that the experience on the management of type 2 diabetes is a significant factor in the self-management of diabetes among black Africans in Liverpool.

Keywords: *Diabetes mellitus, self-management, type 2 diabetes, patient empowerment*

I. INTRODUCTION

Diabetes mellitus (DM) is a condition in which the amount of glucose in the blood is too high because the body cannot use it properly. Glucose comes from the digestion of starchy foods, sugar and other sweet foods, and from the liver. Insulin is vital for life. It is a hormone produced by the pancreas, which helps the glucose to enter the cells where it is used as fuel by the body. Diabetes is a chronic disease for which

control of the condition demands patient self-management (Steinsbekk et al., 2012; Fisher et al., 2012; World Health Organization (WHO) 2014), and self-management behaviours include monitoring blood glucose levels, taking medication, maintaining a healthy diet and regular exercises. DM is a clinical syndrome characterised by hyperglycaemia due to an absolute or relative deficiency of insulin (Diabetes UK 2010b).

There are two main types of diabetes, Type 1 diabetes develops if the body is unable to produce any insulin and Type 2 diabetes develops when the body can still make some insulin, but not enough, or when the insulin that is produced does not work properly (known as insulin resistance) (Kahn, Cooper and, del Prato 2014). Diabetes can influence everyday social interactions in many ways; the patient must restrict the types and amounts of foods they ingest, they might have to monitor their blood glucose levels at specific times during the day, and medication might be necessary at times when the individual is engaged in social activities (Kralik, Price, & Telford 2010).

Traditionally, self-care is a multi-dimensional concept and has different definitions. According to Orem (2001) 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.

In line with Orem, (2001), Nam et al., (2011) defines self-care as an individual's task and a result of lay decisions about proper behaviour to profit health, prevent additional illness, limit illness, re-establish health, and maintain independence based on rules of

adherence and on factors arising from individual perspective. Other authors such as Mathew et al. (2012) defined self-care as self-management of diabetes by self-administration of therapeutics; synonymous with control of symptoms and management of the disease (Broadbent, Donkin and Stroh 2011). Shrivastava, Shrivastava and Ramasamy (2013) defined self-care management as an evolutionary process of development of knowledge or awareness by learning to survive with the complex nature of the diabetes in a social context.

Funnell, 2013; Anderson and Funnell (2013) and Angamo, Melese and Ayen (2013) argued that self-care in diabetes is a critical factor to keep the disease under control and about 95 per cent of care of the diseases usually carried out by the affected individual or their families consists of self-monitoring of blood glucose (SMBG), nutrition, physical activity, and compliance to medication. Self-care activities refer to behaviours such as following a diet plan, avoiding high fat foods, increased exercise, self-glucose monitoring, and foot care (Glasgow et al., 2013; Pal et al., 2013). In addition, Hajos et al., (2013) and Nicolucci et al., (2013) stated that self-care encompasses not only performing these activities but taking consideration of the interrelationships between them and implementation of appropriate changes in the regular life cycle is crucial.

The National Service Framework (NSF) (DoH, 2003) for Diabetes therefore set out a vision for diabetes services in England was delivered in 2013. A key objective of the National Service Framework for Diabetes (Begum and Por 2010; DoH, 2001a) is to empower people with diabetes. This was supported by Carey, Davies and Khunti (2012a) and Begum & Por, (2010) who believe that empowering people with diabetes helps them to make informed choices. There is great potential for people with diabetes to manage their own care if they know what they can and should do. Empowerment is a patient-centred, collaborative approach tailored to match the fundamental realities of diabetes care. (Funnell et al., 2011) define patient empowerment as helping patients discover and develop the inherent capacity to be responsible for one's own life. Since initially proposed in diabetes, there has been a growing recognition that, although health professionals are experts on diabetes care, while patients are the experts on their own lives (Funnell 2010). This approach recognises that knowing about an illness is not the same as knowing about a person's life and that, by default, patients are the primary decision-makers in control of the daily self-management of their diabetes. The philosophy of patient empowerment comprises of engaging and involving patients in their diabetes care and giving them purely factual

information about their disease in a strict teaching and learning format, has received much attention recently and has proven successful in diabetes management (Schaeffer, Van Borkulo & Morales, 2010).

Black and minority ethnic groups are at a higher risk of having diabetes and need to access culturally competent information and education on diabetes. The main issues identified for these groups are: Knowledge of diabetes, its risk factors and consequences, blood glucose control and quality of life tend to be poorer in ethnic community minorities. Though there are diverse studies on the self-management of type 2 diabetes management, this study focused on Black Africans with type 2 diabetes in self-managing their condition in Liverpool which is yet to be explored.

II. METHODS

This research study employed quantitative research method to examine the relationship between self-management and prevalence of type 2 diabetes. A well-structured questionnaire was designed to collect data 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.

Questionnaires were distributed to thirty black Africans between the age forty to seventy-nine living in Liverpool with the diagnosis of diabetes ranged from three months to thirty years and above. Five participants were in their forties, eight participants were in their fifties, ten participants were in their sixties, seven participants were in their seventies. Six of the participants were married, four of the participants were widowed, five were divorced, three were separated, and two never married. Self-identified religious affiliation revealed that twenty-one (70%) were Christian, six (20%) were Muslim and three (10%) were not religious. Twenty-three ($\approx 80\%$) of the participants reported being overweight at the time of diagnosis. All of the participants have had a diabetes self-management health talk at least once since being diagnosed. Because some people of African origin living in the United Kingdom migrated from different African countries, all participants self-identified their country of origin. For this study all participants were referred to as Black Africans.

The variable 'diagnosed' (time since diagnosis) was used to formulate two classes: mildly experienced and highly experienced. This new variable 'experience' was then used for the analysis. This provided the opportunity to carry out the chi-square test of independence on the data, which could not be properly

done due to the size of the sample and multiple classes yielding many cells with expected counts far too small for the chi-square test.

The Pearson’s chi-square statistic is for the rxc contingency table (r rows and c columns) as

$$X^2 = \sum \sum \frac{(n_{ij} - \hat{\mu}_{ij})^2}{\hat{\mu}_{ij}}$$

where n_{ij} represents the observed frequency of the i^{th} row and j^{th} column of the contingency table, and $\hat{\mu}_{ij}$ is the corresponding expected frequency for the $(ij)^{th}$ cell.

The expected cell frequency is estimated as

$$\hat{\mu}_{ij} = \frac{n_i \cdot n_j}{n_{..}}$$

III. RESULTS AND INTERPRETATION

Table 1: Contingency table for the chi-square test of independence showing observed and expected cell counts and the observed marginal totals (n_i, n_j).

	No	Yes	Row Totals
Group 1	$n_{11}(\mu_{11})$	$n_{12}(\mu_{12})$	$n_{1.}$
Group 2	$n_{21}(\mu_{21})$	$n_{22}(\mu_{22})$	$n_{2.}$
Column Totals	$n_{.1}$	$n_{.2}$	$n_{..}$

The chi-square independence test can be used to test the independence of two variables. The null hypothesis and alternative hypothesis are given as:

H_0 : The opinion about the factor is independent of the group.

H_1 : The opinion about the factor depends on the group.

The Pearson X^2 statistic is then computed and on the basis of the value of this statistic, a decision is made whether to reject or accept the null hypothesis.

For a specified value of the level of significance of the test ($\alpha=0.05$, or $\alpha=0.01$), where a decision to reject the null hypothesis or not to reject it is made. The null hypothesis is rejected if the value of X^2 is greater than the corresponding value from the chi-square distribution with $(r-1)(c-1)$ degrees of freedom ($\chi^2_{(r-1)(c-1)}$).

Also, some decisions were made on the basis of the p-value of the test. The p-value is a kind of evidence against accepting the null hypothesis. If the p-value is less than the specified level of significance (α), the null hypothesis will be rejected, and if the p-value is greater than α , the null hypothesis will be accepted. So, the null hypothesis will be rejected if $p\text{-value} < \alpha=0.05$.

Knowledge of diabetes education programmes and support systems for self-management

Table 2: In the past, I have received diabetes self-management education from (check all that apply).

Self-management education given by	Frequency	Percentage of total
Doctor		
Yes	24	80.0%
No	6	20.0%
Nurse		
Yes	14	46.7%
No	16	53.3%
Dietician		
Yes	18	60.0%
No	12	40.0%
Friend with diabetes		
Yes	16	53.3%
No	14	46.7%
Family member with diabetes		
Yes	19	63.3%
No	11	36.7%
Reading brochures and books		
Yes	20	66.7%
No	10	33.3%
At least one health professional		
Yes	30	100%
No	0	0%
Doctor and Nurse		
Yes	10	33.3%
No	20	66.7%

Doctor and Dietician		
Yes	18	60.0%
No	12	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 that I presently attend are held at (check all that apply):

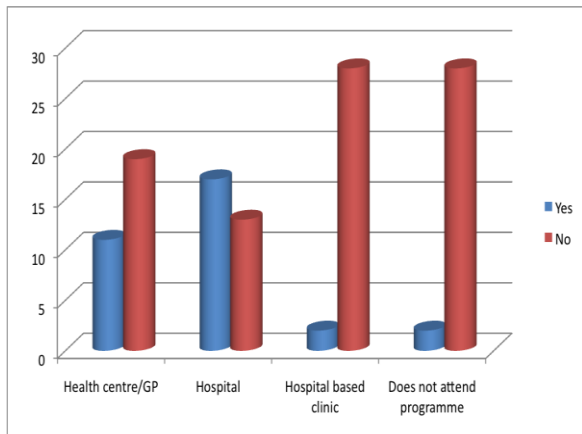


Figure 1 above shows that majority (53%) of the respondents are presently attending hospital for their self-management programme and (33%) are attending health centre/GP practice. While (7%) are presently attending hospital-based clinics, the remaining (7%) are not attending any self-management programme.

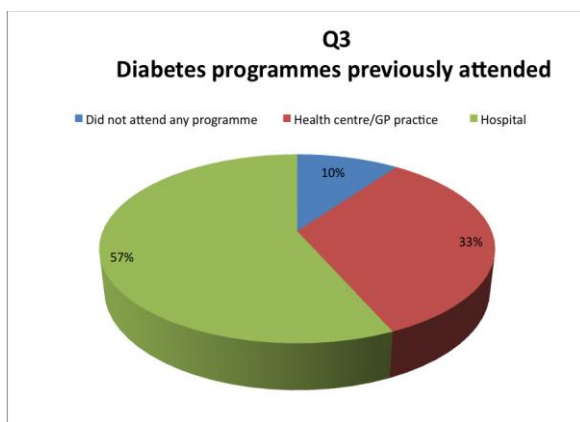


Figure 2: Location of diabetes programme previously attended

Figure 2 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.

Research Hypothesis 1: Number of years of experience of diabetes self-management has no significant relationship with support system for self-management of type 2 diabetes among the Black Africans in Liverpool

Table 2: Testing Hypothesis 1

Remark: Chi square test of independence between years of experience of diabetes self-management

Years of experience of Diabetes self-management * Support systems for self-management Crosstabulation

			Support systems for self-management	
			No	Total
Years of experience of diabetes self-management	Mildly Experienced	Expected Count	24.0	24.0
		% within Experience of Diabetes self-management	100.0%	100.0%
		% within Support systems for self-management	80.0%	80.0%
Very Experienced	Expected Count	6.0	6.0	
		% within Experience of Diabetes self-management	100.0%	100.0%
		% within Support systems for self-management	20.0%	20.0%

Total	Expected Count	30.0	30.0
	% within Experience of Diabetes self-management	100.0%	100.0%
	% within Support systems for self-management	100.0%	100.0%

Chi-Square Tests

	Value
Pearson Chi-Square	. ^a
N of Valid Cases	30

a. No statistics are computed because Support systems for self-management is a constant.

Interpretation

For the number of years of experience of diabetes self-management, items were re-categorised to mildly experienced and very experienced based on when they were diagnosed with their type 2 diabetes from 3 months to up 30 years. All items were also categorised on the basis of the number of 1's (Yes) and 0's (No) to form a single variable H1, called support system for self-management of diabetes. For each respondent, a score of 0 was given if the number of zeroes exceeds the number of 1's; otherwise a score of 1 was given. The corresponding contingency table showed only one category. All the respondents fell into the 0 group (No). Due to this fact, the chi-square test cannot be performed, as support system for self-management is a constant. There is thus no significant difference among the group of mildly experienced and very experienced respondents.

Research Hypothesis 2: Number of years of experience of diabetes self-management has no significant relationship with diabetes self-management and treatment behaviour among the Black Africans in Liverpool

Table 3: Testing Hypothesis

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	.370 ^a	1	.543	1.000	.501	
Continuity Correction ^b	.000	1	1.000			
Likelihood Ratio	.330	1	.566	1.000	.501	
Fisher's Exact Test				.501	.501	
Linear-by-Linear Association	.358 ^c	1	.550	1.000	.501	.408
N of Valid Cases	30					

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is .60.

b. Computed only for a 2x2 table

c. The standardized statistic is -.598.

Remark: Chi square test of independence based on years of experience of diabetes self-management

The relationship between diabetes self-management and treatment behaviour and experience of diabetes self-management was tested using chi-square test of independence. The value of the X² statistic was 0.370, with a p-value of 1, warranting the non-rejection of the null hypothesis of independence. This means that independent of the level of experience of the respondent, they engaged in several activities to manage their diabetes. However, about 92% of the mildly experienced group managed their diabetes through activities prescribed for diabetes self-management such as physical activity/exercise, medication (tablets, insulin, etc), nutrition/diet changes, meal planning, testing/self-monitoring, family support, doctor visits etc, as against about 83% of the very experienced group.

IV. DISCUSSION AND CONCLUSION

This study focused on the relationships between self-management, years of experience and the management of diabetes among black Africans in Liverpool. Two null hypotheses were developed to capture the relationship that exist between self-management, years of experience and the management of diabetes. Using the framework from Department of Health (2003), factors manifesting experience of self-management or treatment behaviours were regressed on the factors contributing to self-management of T2DM. Findings

based on the survey revealed that factors contributing to self-management of T2DM positively affected experience of self-management or treatment behaviours among black African suffering from type 2 diabetes mellitus in Liverpool.

Based on the first hypothesis, the relationship between number of years of experience of diabetes self-management and support system for self-management of type 2 diabetes cannot be performed as support system is a constant. There was thus a general agreement among the respondents which is independent of experience on support system. It is however, believed that optimize diabetes outcomes, the individual needs to possess knowledge and the required support system from various stakeholders (Diabetes UK 2010; Glasgow et al., 2013; Pal et al., 2013), cognitive skills focusing on self-assessment, problem solving, informed decision making, psychomotor skills to perform specific tasks (Orem, 2001) and belief in one's own capabilities to perform certain set of tasks leading to well-being (Bandura, 1997; Maddux 2012).

Based on the second hypothesis it was found that the relationship between Diabetes Self-Management/Treatment Behaviour and Experience of type 2 Diabetes Self-management was also corroborated when the value of the X^2 statistic was 0.370, with a p-value of 1, warranting the non-rejection of the null hypothesis of independence. These findings implied that black Africans living with diabetes in Liverpool recognise self-management, also referred to as self-care, as the performance of preventive or therapeutic health care activities, often in collaboration with health care professionals (Nam et al., 2011); (Cosansu and Erdogan 2013). This self-management is conceptualised as activities undertaken by individuals to promote health, prevent disease, limit illness, and restore health (Nam et al., 2011). There is no standard behavioural prescription that can be given to the diabetic patient because self-care is a fluid rather than static state Beckerle Lavin (2013). However, the main effective treatment behaviours recommended for controlling diabetes include dietary changes, taking medications, exercising, foot care, monitoring blood sugar, and interaction with health care providers (Nam et al., 2011). (Raz et al 2013; Hood et al 2013; Lorig et al., 2013) Secondary treatment activities identified by Nam et al, (2011) for diabetes self-management involve recognising and responding to symptoms, seeking information, managing diagnosed conditions through home appliances, using over-the-counter medicines, or implementing changes in activities. Another study by Beckerle Lavin (2013) also observed that the patient is often required to make complex treatment decisions and vary self-management behaviour from situation to situation. In another vain,

self-management by individuals with diabetes is also reported to be modest, yet appropriate self-management is the cornerstone of glycaemic control (Nam et al., 2011). Though the “cornerstone” may be viewed differently, it is essential for effective diabetes self-management because diabetes is serious, largely self-managed, and a personal responsibility (Funnell et al., 2011) that requires individuals with diabetes to exert this personal responsibility over the day-to-day maintenance of their disease if they are to achieve a stable state of health (Cosansu and Erdogan 2013).

Conclusion

It was concluded that the experience of the management of type 2 diabetes is a significant factor in the self-management of diabetes among Black Africans in Liverpool. Findings show that the respondents have received diabetes self-management education from at least one professional diabetes management expert. This point to the fact that diabetes self-management has been well appreciated and recognised as an effective initiative for the management of type 2 diabetes among Black Africans in Liverpool.

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