RESEARCH ARTICLE

DIABETES PATIENTS NEED SUPPORT TO PRACTISE SELF-MONITORING OF BLOOD GLUCOSE LEVELS

Philip C. Onuoha and Chidum E. Ezenwaka

The Diabetes and Metabolism Research Group, Faculty of Medical Sciences,
The University of the West Indies, St Augustine Campus, Trinidad and Tobago

ARTICLE INFO	ABSTRACT

Diabetes self-management practice is one of the strategies for diabetes control. A previous European study have shown that knowledge, support, motivation and empowerment are important factors that influence diabetes self-management. The present study sought to determine if Trinidad and Tobago type 2 diabetes patients who self-managed their diabetes through self-monitoring of blood glucose levels (SMBG) needed and/or received any support. Thus, 416 primary care type 2 diabetes patients who use personal glucose meters to self-monitor their blood glucose levels were consecutively recruited and interviewed at the clinics between September 2010 and March 2011. The patients aged between 35 and 93 years old. About 79% of the patients were either retired or unemployed and about 94% had no private health insurance policies. The majority (86%) of the patients did not belong to any diabetes support group. The majority (86%) of the patients live with family members while 14% live alone. Although 60% of the patients thought that they needed support to practice SMBG, 74% specifically indicated that they needed family support to practice SMBG. It is concluded that diabetes patients who attempt self-management of their diabetes needs the support and encouragement of both family members and the healthcare team

INTRODUCTION

A recent research report showed that 80% of the annually estimated four million diabetes-related deaths occur in the developing countries (Roglic *et al*., 2010). The diabetes-related mortality is essentially related to complications arising from poor long standing blood glucose control. For instance, in Trinidad and Tobago type-2 diabetes patients at the primary care settings had a mean glycated hemoglobin A_{1c} (HbA$_{1c}$; index of long-term blood glucose control) level as high as 8.5% (Ezenwaka *et al*., 2009). Poor monitoring of blood glucose levels should be of some concern to healthcare professionals working in the developing countries given that there is a parallel relationship between glycated hemoglobin A_{1c} levels and the risk of micro- and macro-vascular complications (Stratton *et al*., 2000). Thus, as glycaemic control is central to diabetes treatment and management, patients with diabetes would be better off with self-monitoring of blood glucose levels to reduce plasma glycaemia and coronary heart disease risk profile (Ezenwaka *et al*., 2011).

*****Corresponding Author: Dr Philip Onuoha,**
The Diabetes and *Metabolism Research Group, Faculty of Medical Sciences, The University of the West Indies, St Augustine Campus, Trinidad and Tobago.*

In developing countries, this expectation is not fully achieved partly because of the paucity of diabetes health educators and dieticians (Brackenridge *et al*., 1999) and largely due to poor economic resources and constraints. The later factor is exemplified from the report that the annual national budgetary allocation for healthcare in India is about 14% (US$4.5 billion) of the estimated annual direct and indirect cost (US$31.9 billion) for diabetes care for 2010 (Tharkar *et al*., 2010). The Indian experience, though a fast developing economy, is a direct reflection of the general uptake of diabetes care in many developing countries. Interestingly, a recent study from the Republic of Ireland identified "knowledge, "support", "motivation" and "empowerment" as important factors in diabetes self-management initiative (Murphy *et al.,* 2011). The identified factors in Irish patients are essential enablers for diabetes self-management. Although there has been suggestion for increased diabetes self-management education in the developing countries (Ezenwaka *et al*., 2011), it is still unclear how the factors identified in the Irish patients would reflect in Trinidad and Tobago patients. For instance, while diabetes patients in the USA access new diabetes information from the healthcare professionals (nurses and doctors) (Rosheim *et al.,* 1999), diabetes patients in Trinidad and Tobago access similar information from print and electronic media (Ezenwaka *et al*., 2003). Thus, given that diabetes self-management practice is one of the strategies for

diabetes control, the present study sought to determine if type 2 diabetes patients who self-managed their diabetes through self-monitoring of blood glucose levels needed and/or received any support.

MATERIALS AND METHODS

Subjects and protocol: The study methods and protocol are as previously published (Ezenwaka *et al*., 2011) Briefly 416 type 2 diabetes patients visiting the Lifestyle Disease Clinics were consecutively recruited and interviewed at the primary care clinics between September 2010 and March 2011. All patients were managed on oral hypoglycaemic agents and/or diet and exercise. Additionally, they were certified as practising self-monitoring of blood glucose using personal glucose meters at home during the study period. The questionnaire was pre-tested on a set of patients and later administered by two previously trained Research Assistants. The Research Assistants were recruited from the community and were able to explain the contents of the questionnaire in a local English dialect for easy of understanding. During the study, the Research Assistant(s) explained the details of the study to the patients and requested for volunteers amongst patients that use personal glucose meters to monitor their blood glucose levels. To guarantee the confidentiality of the interview, the questionnaires were administered to the patients at the private areas of the clinics after they have given their voluntary consent (usually oral) to participate in the study. All the patients were ascertained to be willing and capable of answering the questions contained in the research questionnaire. The study protocol was initially reviewed and approved by our institutional Ethics Review Committee.

RESULTS

The background characteristics of the patients studied are shown on Table 1. The patients aged between 35 and 93 years old (means ±SE; 60.0 ± 0.6). About 79% of the patients were either retired or unemployed and about 94% had no private health insurance policies. The majority (86%) of the patients did not belong to any diabetes support group. The majority (86%) of the patients live with family members while 14% live alone.

Although 60% of the patients thought that they needed support to practice SMBG, 74% specifically indicated that they needed family support to practice SMBG. However, while 73% of the patients received "maximum support" from their family members, others received "minimum" (13%) or "no support" (7%) Table 2.

DISCUSSION

The analysis of the data of the present study showed that type 2 diabetes patients in Trinidad and Tobago who practice self-monitoring of blood glucose levels (SMBG) considered support, especially from family members, as critical in the practice of SMBG. Ironically, the majority of the patients did not belong to any diabetes support group where they are likely to find peers to share supportive knowledge. The implications of these and other findings are further discussed taking into consideration the need for diabetes self-management education in the developing countries (Ezenwaka *et al*., 2011). In this study, it is rather surprising that the greater majority (86%) of the participants did not belong to any diabetes support group and ironically the patients recognised the importance of support in the practice of SMBG. Nonetheless, the observation is consistent with a recent report where type 1diabetes patients who completed the "Dose Adjustment for Normal Eating Programme" identified "support" as one of the important factors that influence diabetes self-management in Irish population (Murphy *et al.,* 2011). In the current study, the patients believe that family members are critical in effective self-management of their diabetes. The observation is not entirely unexpected given that most of the patients were elderly, not highly educated and unemployed Table 1. It is likely that most of the patients might have included financial, physical and materials assistance in the "support" they expect from their family members. For instance, unemployed elderly patient would practically depend on the support of the family members for the provision of the glucose test-strips and other accessories for SMBG since these are not yet included in the medical prescription in Trinidad and Tobago unlike in developed countries (Storimans *et al.,* 2004). Similarly, an elderly patient (> 70 years) would most likely depend on family members to use the glucose meters to correctly do the glucose testing and reading.

Table 1. Background characteristics of the type 2 diabetes patients studied

Parameters	All patients N=413	Males N=113	Females N=303
Age (yr.)	60.0 ± 0.6	62.0 ± 1.1	60.3 ± 0.7
Duration of diabetes (yr)	11.8 ± 0.5	11.9 ± 1.1	11.7 ± 0.5
Ethnicity			
• African descent (%)	155 (37.3)	49 (43.4)	106 (35.0)
• East Indian descent (%)	207 (49.8)	54 (47.8)	153 (50.5)
• Mixed ethnicity (%)	50 (12.0)	8 (7.1)	42 (13.9)
• Others	4 (1.0)	2 (1.8)	2 (0.7)
Employment status			
• Employed (%)	88 (21.2)	28 (24.8)	60 (19.8)
• Retired/unemployed (%)	327 (78.6)	85 (75.3)	242 (79.9)
Levels of education			
• Primary school attended (%)	234 (56.2)	61 (54.0)	173 (57.1)
• Secondary school attended (%)	118 (28.4)	38 (33.6)	80 (26.4)
• Tertiary institution (%)	48 (11.5)	12 (10.6)	36 (11.9)
• No formal education	16 (3.8)	2 (1.8)	14 (4.6)

Table 2. Health information characteristics of the type 2 diabetes patients studied

Parameters	All patients N=413	Males N=113	Females N=303
Membership of diabetes support group:			
• Yes (%)	57 (13.7)	8 (1.9)	49 (11.8)
• No (%)	359 (86.3)	105 (25.2)	254 (61.1)
Living arrangement:			
• Live alone (%)	57 (13.7)	17 (4.1)	40 (9.6)
• Live with family (%)	355 (85.5)	96 (23.1)	259 (62.4)
• Live with non-family members (%)	3 (0.7)	-0-	3 (0.7)
Do you think you need support to practice SMBG?			
• Yes (%)	164 (39.6)	55 (13.3)	109 (26.3)
• o (%)	247 (59.9)	57 (13.8)	191 (46.1)
• Do not know (%)	1 (0.2)	-0-	1 (0.2)
Whose support do you need to practice SMBG?			
• Family (%)	303 (74.1)	89 (21.8)	214 (52.3)
• friends (%)	10 (2.4)	1 (0.2)	9 (2.2)
• Healthcare provider (%)	22 (5.4)	2 (0.5)	20 (4.9)
• Everybody (%)	74 (18.1)	20 (4.9)	54 (13.2)
What level of family support do you currently get in practising SMBG?			
• Adequate support (%)	24 (5.8)	8 (1.9)	16 (3.9)
• Maximum support (%)	301 (72.6)	86 (20.8)	215 (51.8)
• Minimum support (%)	52 (12.6)	12 (2.9)	40 (9.7)
• No support (%)	30 (7.3)	6 (1.5)	24 (5.8)
• Do not know (%)	6 (1.5)	-0-	6 (1.5)

These are challenges that would certainly influence self-management of diabetes in this population in addition to constraints of poor economic resources. For instance, in Trinidad and Tobago medications that are not readily available in the public pharmacy are usually obtained at private pharmacies at the patient's own cost; and this includes glucose test-strips that are not currently covered in insurance policies. This is the general trend in many developing countries as previously identified (Debussche *et al*., 2009). It is not clear why the patients in this study did not consider it necessary to be part of the existing Diabetes Association. Although the study was not designed to seek reasons or otherwise for not belonging to diabetes support groups, we can speculate that the observed low level of membership in diabetes support groups might be associated with ignorance of the benefits of being a member of diabetes association. Interestingly, diabetes support groups such as the Diabetes Association of Trinidad and Tobago offers educational and material support to members.

It is also possible that the healthcare team may not have emphasised the need to join diabetes support group when the patients were initially diagnosed. It should be noted that there are several structured educational intervention programmes for educating and training diabetes patients to reduce glycaemia and improve general well being of the patients (Li *et al.,* 2008; Sun *et al.,* 2008). These intervention programmes could be adapted and modified to suit the cultural settings of different populations in the developing countries. Thus, diabetes patients could benefit from such educational programmes when they identify with support groups where information about diabetes is shared. This suggestion needs self-motivation on the part of the patients, a factor we have positively identified amongst our primary care patients that were empowered (Ezenwaka *et al*., 2011). It is therefore concluded that diabetes patients who attempt self-management of their diabetes needs the support and encouragement of both family members and the healthcare team. We recommend that healthcare professionals working in both developed and developing countries should emphasise the importance of joining diabetes support groups to the patients especially the newly diagnosed.

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