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Identification of barriers to self-management for people with type II diabetes

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Abstract

Background: Loss of β -cell function results in elevated blood sugar which is monitored with the help of HbA1c test, ideally people with diabetes should have an HbA1c level of below 6.5% for most people with diabetes and below 7.5% for those at severe risk of hypoglycaemia. These levels are open to negotiation between the individual patient and their doctor.

Objectives: analysing the risk of complications from the condition if hyperglycaemia continues, including retinopathy.

Methods: Participants were recruited globally using diverse recruitment strategies. The aim of this sampling method was to get a combination of participants with diverse experiences and identify common patterns that cut across the population sample with regards to the topic of interest. Additionally, the advertisement was placed in local digital newspapers, Twitter and Facebook pages that specialize in diabetes support. Data collection was conducted over a period of a year. There was no limit to sample size so as to capture the most number of individuals with type 2 diabetes.

Results: In addition, participants possessed a high ability to recognize the effect of missed physical activity or excess carbohydrate consumption on their health and knew the corrective steps to take. The lowest scores were in the areas of skills for: identifying and managing the impact of stress on diabetes exercise planning to avoid hypoglycemia and interpreting blood glucose patterns. In relation to participants' self-efficacy levels, the highest scores were in confidence to reduce risk by preventing and monitoring diabetes complications.

Conclusion: Educational reinforcement using technological devices such as mobile application has been highlighted as an enabler of diabetes self-management and it could be employed as an intervention to alleviate identified gaps in diabetes self-management. Furthermore, improved approaches that address financial burden, work and environment-related factors as well as diabetes distress are essential for enhancing diabetes self-management.

Keywords: β -cell, blood sugar, hypoglycaemia, retinopathy, neuropathy, insulin resistance

Introduction

Type II diabetes is a growing public health concern characterised by insulin resistance, insulin being the hormone which controls blood sugar, and loss of β -cell function, that results in elevated blood sugar which is monitored with the help of HbA1c test, ideally people with diabetes should have an HbA1c level of below 6.5% for most people with diabetes and below 7.5% for those at severe risk of hypoglycaemia^[1]. These levels are open to negotiation between the individual patient and their doctor. There is a risk of complications from the condition if hyperglycaemia continues, which include retinopathy, neuropathy, and nephropathy that can lead to blindness, loss of limbs and renal failure respectively, it can also lead to result in heart attack or stroke and loss of life.² The aetiology of type II diabetes is complicated and involves several risk factors like genetics, obesity, physical inactivity, ethnicity, and lower socioeconomic status in developed countries^[3]. Those of South Asian, Middle Eastern, African, Polynesian and Hispanic descent and the indigenous people of Australasia and America have a greater risk of developing diabetes than European populations^[4]. It can be controlled medically either through oral medication or insulin which is injected^[5]. Alongside medical treatment, people with type II diabetes can undertake a range of self-management practices with the aim of improving glycaemic control^[6]. These practices include dietary changes associated with diabetes, undertaking exercise, taking medications, attending medical appointments, monitoring the condition such as through the use of blood sugar monitors or foot care^[7].

Together these practices can be collectively termed as self-management. The overall objective of this research was to explore the patients' perceptions about barriers to self-management of diabetes.

Materials and Methods

A maximum variation purposive sampling technique was employed in recruiting participants who had type II diabetes. Participants were recruited globally using diverse recruitment strategies. The aim of this sampling method was to get a combination of participants with diverse experiences and identify common patterns that cut across the population sample with regards to the topic of interest. Additionally, the advertisement was placed in local digital newspapers, Twitter and Facebook pages that specialize in diabetes support. Data collection was conducted over a period of a year. There was no limit to sample size so as to capture the most number of individuals with type II diabetes. The study requested participants' socio demographic characteristics old, gender, educational level and geographic location. Details of the recruitment strategy and participants' characteristics are fully described in our previous publication. This was followed by qualitative telephone interviews of a subsample of the participants so as to supply a more complete and comprehensive understanding of the results which were integrated into the info interpretative phase. Quantitative data were obtained through a web survey that focused on assessing participants' self-reported skills and self-efficacy (confidence) as a part of the factors that enable diabetes self-management. Qualitative data were collected with the help of individual telephone interviews which explored

additional factors that are barriers to diabetes self-management. This was followed by qualitative telephone interviews of a subsample of the participants so as to produce a more complete and comprehensive understanding of the results which were integrated into the information interpretative phase. For the statistical analysis SPSS version 23 was used.

Results

The mean scores for each of the items across the skills and self-efficacy domain was studied. Scores were highest in the skills for knowing the appropriate time to check blood glucose levels in order to reflect the impact of meals consumed or medications/ physical activities. In addition, participants possessed a high ability to recognize the effect of missed physical activity or excess carbohydrate consumption on their health and knew the corrective steps to take. The lowest scores were in the areas of skills for: identifying and managing the impact of stress on diabetes exercise planning to avoid hypoglycemia and interpreting blood glucose patterns. In relation to participants' self-efficacy levels, the highest scores were in confidence to reduce risk by preventing and monitoring diabetes complications and using blood glucose results to plan for meal intake. Participants scored lowest in their confidence for healthy coping with stress and adjusting medications or food intake to reach targeted blood glucose levels. There was a strong positive correlation between the scores in the two domains, $p < 0.001$, where higher levels of perceived skills were associated with higher levels of perceived self-efficacy as shown in Table 1 and 2.

Table 1: Participants skills and self-efficacy (confidence) ratings to perform diabetes self-management

Skills	Mean	SD
I am able to portion out and choose foods that have the minimal balance between carbohydrates, proteins and vegetables to keep my blood sugar on target	7.32	1.87
I know how my diabetes insulin and medication works in my body and at what time of the day I should check my blood sugar (BS) to make sure my dose is correct	7.74	2.27
If I eat too much carbohydrate, or do not engage in my regular physical exercise, I know how my body will react and the steps to take to get it back on track	7.32	2.25
When I am planning to exercise, I know what changes I need to make to avoid low blood sugar before, during and after exercise	6.77	2.38
I know when to check my blood sugar if I wanted to see how my body reacted to a meal	7.77	2.23
When I am sick, I know what to do differently with my medications, fluids intake, food intake, blood sugar testing and when to go to the hospital	6.81	2.57
I know how to identify stress in my life and how it can impact my diabetes management and overall health	6.80	2.33
When I look at my blood sugar in my meter or in my log book in a given week, I could explain to my diabetes educator or doctor what my blood sugar pattern is	6.82	2.48
I know what the ABCs (HbA1c ^b , Blood Pressure and Cholesterol) of diabetes are, what my targets are and how they impact my diabetes	7.11	2.44
Avg score on skills	7.14	1.87

Self-Efficacy	Mean	SD
I feel confident that I can plan meals and snacks effectively in a way that it will not raise my blood sugar unnecessarily above my targets	7.20	2.01
I am confident that I can implement stress management techniques in my lifestyles	6.70	2.18
I am confident that at the next time I am eating out in my home, I will be able to plan and select the foods that best keep my blood sugar under control	7.01	2.30
I am confident that I can plan ahead for what to do and how to react either before, during or after exercise to avoid a low blood sugar	6.82	2.22
I am confident that I can choose a healthy physical activity for myself and include it in my schedule	7.11	2.43
I am confident that I can adjust my insulin or medication doses on my own, to reach the target blood sugar levels	6.77	2.55
I am confident that I can commit to preventing and monitoring my diabetes complications such as seeing my eyes doctor at least once in a year and checking my feet on daily basis	8.00	1.77
I am confident that I can use my blood sugar results to make changes to my diet and/or insulin to help keep my blood sugar	7.01	2.51

in target		
Avg. score on confidence	7.12	1.80

Table 2: Comparison Between Skills And Self Efficacy Of The Participants

Variables	Skills			Self-Efficacy
	mean \pm SD	p-value	mean \pm SD	p-value
Type of Diabetes		$p < 0.001$		$p = 0.02$
Type 2	6.56 ± 2.10		6.87 ± 1.93	
Duration of diagnosis (years)				
<1	6.18 ± 1.42		6.40 ± 1.48	
1–5	6.88 ± 2.18		7.10 ± 1.66	
6–10	6.87 ± 2.04		6.94 ± 2.05	
10–15	7.01 ± 1.48		7.22 ± 1.07	
>15	8.22 ± 1.12		7.85 ± 1.10	

Discussion

This study found that women preferred eating sweet food and beverages more than men, whereas men were less concerned about drug adherence as well as blood glucose monitoring. This finding was incongruent with a study done in Thailand, which found that men were more confident about treatment effectiveness than women.⁸ Another study shows that men focused on blood glucose monitoring, whereas women focused on food restrictions to control their blood glucose level^[9]. Through our findings, we can identify some barriers and tell patients to implement the effective DMSM practices. Perceived severity has a vital role in explaining health-related behaviors and increasing precautionary actions. Using a chronic care model (CCM), investigators identified all barriers to DMSM practice among patients with Type 2 DM, including low perceptions about susceptibility and severity of the illness. Attitudes and beliefs are two crucial factors which influence the perceptions about the susceptibility and severity of the illness. A similar findings were observed in an study conducted in the UK shows that personal perception was associated with unawareness of physical exercise^[9]. Another study showed the association between personal perception and attitudes toward self-care with higher points of self-care practice^[10]. One study also reported that patients attitudes have a vital role in patients willingness to focus onto the diabetes management^[11]. Another reason for low perception of susceptibility of illness was caused by doubt about expected benefits and efficacy of treatment.¹² Exercise was the hardest part of the constraints perceived by the participants based on their viewpoints, including feeling tired and uncomfortable after doing exercise.

This is likely to be the biggest reason for them to spend their time earning money without doing any exercise. Incongruent findings with the current study were obtained in a UK study, which revealed that T2DM patients intended to substitute exercise with household work when they stayed at home^[13]. This perspective is also associated with a disproportionate burden on diabetic patients, particularly women, and affects their marriage potential^[14, 15]. The strategies can include family education, This study found that women preferred eating sweet food and beverages more than men, whereas men were less concerned about drug adherence as well as blood glucose monitoring. This finding was incongruent with a study done in Thailand, which found that men were more confident about treatment effectiveness than women^[8]. Another study shows that men focused on blood glucose monitoring, whereas women focused on food restrictions to control their blood glucose level^[9]. Through

our findings, we can identify some barriers and tell patients to implement the effective DMSM practices. Perceived severity has a vital role in explaining health-related behaviors and increasing precautionary actions. Using a chronic care model (CCM), investigators identified all barriers to DMSM practice among patients with Type 2 DM, including low perceptions about susceptibility and severity of the illness, inadequate knowledge and skills about diabetes mellitus self-management, lack of motivation to perform the diabetes mellitus self-management, insufficient manpower, and social exclusion and feelings of embarrassment. Attitudes and beliefs are crucial factors which influence the perceptions about the susceptibility and severity of the illness. A similar finding in an study conducted in the UK mentioned that personal perception was associated with unawareness of physical exercise.⁹ Another study showed the association between personal perception and attitudes toward self-care with higher scores of self-care practice^[10]. One study also reported that patients' attitudes have a vital role in patients' willingness to adhere to diabetes management^[11]. Another reason for low perception of susceptibility and severity of illness was caused by doubt about expected benefits and efficacy of treatment^[12]. Doing diabetes management such as exercise was the hardest part of the constraints perceived by the participants based on their viewpoints, including feeling too lazy to do exercise and feeling tired and uncomfortable after doing exercise.

Another finding also indicated that participants were busy in their daily work which is likely to be the biggest reason for them to spend their time earning money without doing any exercise. Incongruent findings with the current study were obtained in a study performed in UK, which revealed that Type 2 DM patients intended to substitute exercise with household work when they stayed at home^[13]. One of the significant constraints toward the implementation of the self-management program in the community was the high workload of HCPs. The shortage healthcare workers due to a high turnover rate and unequal distribution in the remote areas was found to be a major issue of healthcare services in dealing with long term care especially toward home visits for continuing care and follow-up to strengthen self-management practice and to prevent diabetes complications. It is also associated with a disproportionate burden on diabetic patients, particularly women, and affects their marriage potential^[14, 15]. Therefore, healthcare workers, who mainly work with diabetes patients, should ask for consent and negotiate with both type of DM patients and their families before control and prevention strategies. The

strategies may include family education, community education and capacity building for health workers as a core component in delivering diabetes programs and capacity building for healthcare providers as a core component in delivering diabetes programs and activities.

Conclusion

Educational reinforcement using technological devices such as mobile application has been highlighted as an enabler of diabetes self-management and it could be employed as an intervention to alleviate identified gaps in diabetes self-management. Furthermore, improved approaches that address financial burden, work and environment-related factors as well as diabetes distress are essential for enhancing diabetes self-management.

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