Assessing Diabetes Education and Self-Management Program on Quality of Life among Young Diabetic Patients: Case of Klang Valley, Malaysia

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Abstract

Background: The recent National Health and Morbidity survey showed that the number of diabetics in Malaysia is increasing rapidly and the disease is declaring more young Malaysians as its victims. As a result, the Malaysian public and private health sectors are urged to conduct diabetes awareness and self-management programs to promote healthy living among diabetic patients. Objective: The objective of this paper is to assess the effect of satisfaction of diabetes education and self-management programs on the quality of life of young diabetic patients. Results: The results showed that program satisfaction is a significant contributor of physical and psychological well-being aspects of quality of life in young diabetic patients. However, program satisfaction does not show a significant relationship with social attribute of quality of life of diabetic patients. Conclusion: This study may contribute to the Diabetes Association to improve quality of life of young diabetic patients.

INTRODUCTION

Diabetes mellitus is commonly known as diabetes and is a disorder in the way a person’s body converts food to provide energy needed for the daily life. It is a condition whereby there is an abnormally high sugar (glucose) level in the blood (American Diabetes Association, 2013). For an ordinary individual without diabetes, his or her sugar level in the blood is controlled by the produced insulin. Insulin is a hormone that is produced by the pancreas. However, in a diabetic patient, his or her body is unable to produce or properly use insulin in order to convert the food consumption into energy (Beaser and Hill, 1995). Besides that, when a diabetic patient does not have sufficient or total absence of insulin, it causes the patient to experience hyperglycaemia when the sugar level in the patient’s blood is high. A diabetic patient would also experience hypoglycaemia when the sugar level in the blood reduces if there is excessive insulin in the body.

Glycated haemoglobin (HbA1c) is a form of measurement to measure a diabetic patient’s average glucose level over a period of three months (Saudek and Brick, 2009). For patients that have been diagnosed with diabetes mellitus, higher amount of HbA1c indicates a poorer control of blood glucose level. American Diabetes Association recommends that a diabetic patient should have an HbA1c value of below 6.5%. If an individual has an HbA1c value of between 6.5 – 7.5%, he or she has a satisfactory control of diabetes. However, a patient with an HbA1c value of more than 7.5% has a poor diabetic control.

There are two major types of diabetes, namely Type 1 and Type 2 diabetes. Individuals with Type 1 diabetes are also known as those that are insulin dependent or “juvenile diabetics”. Type 1 diabetes is caused by the cell-destruction of insulin-producing the pancreatic beta-cell, which is an organ that is responsible for the insulin production (William, 2012). The cell-destruction is attacked by the misdirection of immune system and that the exposure of certain viral infections could trigger the abnormal responses to the antibody. For an individual that has been diagnosed with Type 1 diabetes, their pancreas produce very little or no insulin at all, which is essential for regulating blood sugar level. As a result of these, it leads to absolute insulin deficiency and causes the body to depend on insulin injections (Hart, et al., 2012). Byrne, et al. (2012) also claims that individuals with Type-1 diabetes are required to carry out daily blood glucose monitoring in order to maintain a good glycaemic control in order to avoid any complications.

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On the contrary, individuals with Type 2 diabetes, also known as non-dependent diabetics, are able to produce some amount of insulin in their body, but the amount produced is not sufficient enough to maintain a normal blood sugar level. As a result, these individuals only need to consume oral hypoglycaemic agents (tablets) and do not require daily insulin injections to survive. Type 2 diabetes can be due to the complication of genetic and environmental factors (American Diabetes Association, 2013). Although an individual has a strong genetic inclination of being diagnosed with diabetes, the risk is greater when the individual’s lifestyle is associated with obesity, insufficient of physical activity as well as poor diet (Eckert, 2012).

According to New Straits Time (2012), it was reported that Malaysia has the highest diabetes rate in the region. Based on the Second National Health and Morbidity survey, there are over 3.4 million Malaysian citizens that are being diagnosed with diabetes in year 2010 which takes up approximately 11.8% of the total population in Malaysia, and this figure is projected to hit 4.5 million by 2020 (Zakaria, 2013). The more worrying statistics is that the disease is affecting more young Malaysians compared to five year earlier in 2006, particularly in the 30 to 39 age group - almost doubling from 4.9% to 9.4% from those aged between 30 and 34 years and from 6.4% to 10.9% for those between 35 and 39 (Edwards, 2013). Adding to that, President of Malaysian Endocrine and Metabolic Society (MEMS) stated that the numbers of adults being diagnosed with diabetes is increasing rapidly could be due to the increasing rate in obesity in Malaysia (Lai, et al., 2012). Furthermore, the consequences of the rising number of diabetics is that people living with diabetes could strain the public healthcare system as the cost of treatment for diabetics to account for 16% of the national healthcare budget of RM 2.4 billion (Edwards, 2013).

**Literature Reviews:**

**Diabetes Awareness and Self-Management Programs:**

In view of dealing with the increasing number of diabetic patients in the country, public and private medical institutions in Malaysia are urged to conduct diabetes awareness and self-management programs in order to promote healthy living among diabetics. These programs have been used to create awareness for better care and prevention of diabetes via education, counselling and practical help as some diabetics may not know how best to take care of themselves. The effectiveness of the program for diabetics depends on the capability of diabetics to successfully keep up effective self-management behaviours, such as taking prescribed medications, following diet and exercise programs, self-monitoring, and coping with the stress caused by diabetes. The objective of this paper is to look at how effective is the diabetes awareness and management program in improving the quality of life of diabetic patients, particularly the younger group in Malaysia.

Over the years, many indicators of effectiveness have been proposed. Amongst the various criteria suggested, the concept of satisfaction has become the widely used in evaluating the performance of the program. The individual’s level of satisfaction towards diabetes education and self-management programs is relevant as it provides the necessary information required for feed-back in the existing program and feed-forward into future program. The diabetic patients’ experience with the diabetes education and self-management program generally includes guidance on how to manage the disease and prevent complications, and advice on maintaining healthy lifestyle and dietary management to delay complications.

Brod, et al. (2006) found strong relationship between diabetes management programs and quality of life of diabetic patients. According to their study, diabetic patients that are satisfied with the diabetes education and self-management program have the higher tendency to maintain a better quality of life. In order to evaluate the effectiveness of the diabetes awareness and management program from one of the private hospitals in Klang Valley Malaysia, this paper provides empirical evidence about whether the satisfaction of diabetes education and self-management programs plays a significant role on the quality of life of young diabetic patients in Malaysia.

**Quality of Life:**

Quality of life is being highlighted as the outcome of assessment of individuals that have been diagnosed with diabetes in this study. It is important to null over the quality of life issues in diabetic patients (Mlynarczynk, 2013). This is because being diagnosed with diabetes requires considerable effort and time to deal with interference that might affect the patient’s ability to perform an activity and cope with diabetes (Mlynarczynk 2013; Porojan, et al., 2012).

Quality of life may have been defined in relation to the expectation and comparison of an individual with others in terms of what a person lacks rather what a person has (Bowling and Windsor, 2001). Akranaviciute and Ruzevicius (2007) defined quality of life as the satisfaction of an individual’s life as compared to the individual’s ideal life. The quality of life of an individual can encompass the individual’s fulfilment and the ability to lead a ‘normal life’ (Bowling and Windsor, 2001).

Additionally, Hornquist (1982) argued that human needs are the basic establishment for quality of life and quality of life is the degree of satisfaction of those needs. Dediya and Kong (1995) defined quality of life as the degree of the need of satisfaction in terms of physical health, psychological feeling and social interaction. As
such, quality of life is a multidimensional concept in an individual’s perception of physical health, emotional well-being (happiness and life satisfaction) and social relationship (family, friends, peers and environment) in a complex way (Saeed, et al., 2012; Donald, et al., 2013).

**Physical Attribute of Quality of Life:**

Several researchers have stated that considering health related quality of life is important when accessing the patient’s healthcare. Cornell (2010) defined health in the context of quality of life as the individual’s or patient’s appraisal of the satisfaction about his or her health as compared to what the individual perceives to be ideal. Similarly, The World Health Organisation (WHO) defines health as a state of physical, social well-being, mental rather than merely the absence of disease (Raphael, et al., 1996).

Chronic diseases have found to have impending effects on the patient’s health (Al-Mandhari, et al., 2011; Weigner and Neugehauer, 2013). In order to monitor the overall quality of life in patients, the health-related quality of life is an outcome measure that is increasingly used nowadays (Wang, et al., 2011). Studies have proved that individuals that are diagnosed with diabetes mellitus have shown a lower quality of life as compared to non-diabetic individuals.

Studies have shown that a diabetic patient is able to improve his or her glycaemic control with regular exercise (Wasserman and Halseth, 1998). White and Sherman (1999) found a strong relationship between physical activity and diabetes. This is because physical activity would help to decrease the patient’s resistance to insulin which would then lead to the increase in patient’s quality of life. However, the occurrence of hyperglycaemia and hypoglycaemia (fluctuations in blood sugar) restricts diabetic patients to undertake regular physical activities.

Ayalon, et al., (2008) showed that health literacy in diabetes care would increase the patient’s quality of life. Health literacy is the extent to which patients have the capability to acquire and comprehend the basic health information in order to make the right decisions (Moussa, et al., 2012). Moussa, et al. (2012) reported that diabetic patients with low literacy have a higher level of HbA1c glycaemic control than those patients with higher literacy. The effect of having high level of HbA1c glycaemic control would eventually affect the patient’s physical health and the overall quality of living.

**Psychological Well-Being Attribute of Quality of Life:**

Social scientists have focused on psychological well-being aspect of quality of life in terms of happiness and life satisfaction. Well-being includes an individual’s long-term levels of life satisfaction and pleasant and unpleasant affects (Diener, 2009). Veenhoven (1991) defined well-being of an individual as the degree to which an individual judges the overall quality of his or her life as a whole in a favourable way. According to Diener (2009), individuals with high levels of well-being are individuals who make positive appraisal of their life events. As such, it can hypothesized that psychological well-being could affect the quality of life of diabetic patients.

Several studies have found a significant correlation between psychological well-being and the quality of life of diabetic patients (Saatci, Tahmiscioglu, Bozdemir, Akpinar, Ozan and Kurda, 2010). As pointed by Young and Unachukwu (2012), the disease poses a great demand in the patient’s lifestyle once an individual is being diagnosed with diabetes. As a result, those demands posed to the patient’s lifestyle can lead to negative and detrimental effects on the patient’s well-being.

The adverse emotional response in diabetic patients includes the loss of self-confidence, depression, dissatisfaction, fear and demoralisation (Fenwick, et al., 2012). It is due to the fact that stress caused by diabetes poses a negative emotional response to patients as most diabetic patients are not only worried about the glycaemic control but also the long-term complications (Wang, et al., 2011).

**Social Attribute of Quality of Life:**

Social support or relationships can be defined as the understanding and help that is given to an individual (Saeed, et al., 2012). The support given includes providing informational and emotional assistance, understanding, reassurance as well as other forms of tangible support (Goz, et al., 2007; Mlynarczyk, 2013). The research in Helgeson (2003) found that the relationship between quality of life and social support is linear which indicates the more social support that an individual receives, the better is the individual’s quality of life.

There have been many evidences that social support shows the strongest relationship to the quality of life of an individual. The social support received becomes more helpful when it comes from family, friends or even healthcare professionals. Diabetic patients generally require more social support from the people around. In fact, Debona and Cachia (2007) showed a stronger relationship between social relationships and quality of life of diabetic patients. Besides that, several studies have found that social support has beneficial effect on the diabetes management (Goz, et al., 2012; Saeed, et al., 2012) and the support would help diabetic patients to adjust to the new lifestyle and the medical treatment.
Researchers believe that the supportive behaviour given is not only a function that is available to who is being supportive, but also how the support is given by people around is being perceived by the receiver. These must be an association between the support given and how the support is perceived (Mlynaczyk, 2013). Debono and Cachia (2007) found diabetic patients are easily to feel lonely, unsupported and believing that no one around them is able to understand how it feels to cope with diabetes.

Family members are seen as the most valuable support to the health management of diabetic patients. Additionally, peers and friends are also important sources to provide emotional support to diabetics, especially to patients in the adolescent stage. Studies in Ashraff, et al., (2013) have indicated that the supports from both family and friends have been significantly associated with better self-management and adjustments of diabetes, which result in high quality of living.

In addition to family members and friends, nurses have also been identified to play a major role in providing support to diabetics. Studies in the Cross-National Diabetes Attitudes and Wishes and Needs (DAWN) have shown that nurses are able to provide the best possible care and support they can for their patients (Donohue-Porter, 2012). In another study of Connell, et al (1994), social support or relationships have also been significantly correlated to the low levels of depression among diabetic patients.

Given the preceding discussion, several hypotheses were developed as follows:

H1: Satisfaction of diabetes education and self-management program is a significant contributor of physical attribute of quality of life after controlling for demographic characteristics of young diabetics.

H2: Satisfaction of diabetes education and self-management program is a significant contributor of psychological well-being attribute of quality of life after controlling for demographic characteristics of young diabetics.

H3: Satisfaction of diabetes education and self-management program is a significant contributor of social attribute of quality of life after controlling for demographic characteristics of young diabetics.

**MATERIALS AND METHODS**

In this survey, 70 young adults with diabetes were interviewed. Questionnaires were used as the instrument to collect responses from this group of diabetics who already participated and attended the diabetes education and management program by one of private hospitals in Klang Valley Malaysia. The questionnaires used consisted information relating to demographic characteristic of diabetics, program satisfaction and attributes of quality of life in diabetic patients as the outcome measure of this study is the three attributes of quality of life in diabetic patients and the explanatory variable that has been used in this study is the satisfaction of diabetes education and management program.

Responses were scored on a five-point scale ranging from 1 for ‘strongly disagreed’, 2 for ‘disagreed’, 3 for ‘neutral’, 4 for ‘agreed’ and 5 for ‘strongly agreed’. All questions used in the survey were derived from previous literatures of Tan (2013), Gurkova, et al., (2009), Hart, et al., (2003), Debono and Cachia (2007), Young and Unachukwu (2012), and Atasoy, et al., (2013).

It is common to use an index or highly correlated items to develop the constructs of the study. In this study, program satisfaction was measured using an index based on five questions (alpha = 0.893). Similarly, an index of three attributes of quality of life was computed to each respondent as the mean of their total scores on five questions each (see Table 1). The results of Cronbach’s alpha were satisfactory between 0.742 and 0.920, indicating questions were measuring the same underlying variable.

**Table 1: Variables Used in the Survey.**

<table>
<thead>
<tr>
<th>Variables Used in the Survey</th>
<th>Number of items</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program satisfaction</td>
<td>5</td>
<td>0.742</td>
</tr>
<tr>
<td>Physical attribute of quality of life</td>
<td>5</td>
<td>0.881</td>
</tr>
<tr>
<td>Psychological well-being attribute of quality of life</td>
<td>5</td>
<td>0.908</td>
</tr>
<tr>
<td>Social attribute of quality of life</td>
<td>5</td>
<td>0.920</td>
</tr>
</tbody>
</table>

**RESULTS AND DISCUSSION**

Table 2 showed the summary of demographic profiles of respondents in the study. There were more female respondents (52%) than male respondents. The more representation of female respondents could be due to the willingness of female patients to answer the questionnaire. In terms of duration of diabetes, 49% of the respondents having diabetes diagnosed for less than 5 years, 20% were in the range of 5 to 10 years and 31% of the respondents with diabetes for more than 10 years. Table 2 also showed the frequency and percentage of respondents by their current diabetes treatment. 57% of the respondents were on insulin treatment and 43% of...
respondents were on oral hypoglycaemic agents. Lastly, majority of respondents had their HbA1c level in the range of 7 to 10 (60%), followed by less than 7 (28.6%), and 10 and above (11.4%), respectively.

Table 2: Demographic characteristics of respondents.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>51.4</td>
</tr>
<tr>
<td>Female</td>
<td>48.6</td>
</tr>
<tr>
<td>Duration since diagnosis</td>
<td></td>
</tr>
<tr>
<td>Less than 5</td>
<td>48.6</td>
</tr>
<tr>
<td>5-10</td>
<td>20.0</td>
</tr>
<tr>
<td>Above 10</td>
<td>31.4</td>
</tr>
<tr>
<td>Current treatment</td>
<td></td>
</tr>
<tr>
<td>Insulin</td>
<td>57.1</td>
</tr>
<tr>
<td>OHA (Oral hypoglycaemic agents)</td>
<td>42.9</td>
</tr>
<tr>
<td>HbA1c level</td>
<td></td>
</tr>
<tr>
<td>Below 7</td>
<td>28.6</td>
</tr>
<tr>
<td>7-10</td>
<td>60.0</td>
</tr>
<tr>
<td>Above 10</td>
<td>11.4</td>
</tr>
</tbody>
</table>

Regression Analysis:

Table 3: Regression Results.

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>t</td>
<td>B</td>
</tr>
<tr>
<td>Constant</td>
<td>2.267**</td>
<td>4.686</td>
<td>1.693**</td>
</tr>
<tr>
<td></td>
<td>(0.484)</td>
<td></td>
<td>(0.491)</td>
</tr>
<tr>
<td>Program Satisfaction</td>
<td>0.307**</td>
<td>2.698</td>
<td>0.444**</td>
</tr>
<tr>
<td></td>
<td>(0.114)</td>
<td></td>
<td>(0.116)</td>
</tr>
<tr>
<td>Female</td>
<td>-0.039</td>
<td>-0.284</td>
<td>0.017</td>
</tr>
<tr>
<td></td>
<td>(0.138)</td>
<td></td>
<td>(0.140)</td>
</tr>
<tr>
<td>Male (ref)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration &lt; 5</td>
<td>0.164</td>
<td>1.033</td>
<td>-0.130</td>
</tr>
<tr>
<td></td>
<td>(0.159)</td>
<td></td>
<td>(0.161)</td>
</tr>
<tr>
<td>Duration 6 – 10</td>
<td>-0.033</td>
<td>-0.174</td>
<td>-0.069</td>
</tr>
<tr>
<td></td>
<td>(0.189)</td>
<td></td>
<td>(0.192)</td>
</tr>
<tr>
<td>Duration &gt; 10 (ref)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulin</td>
<td>0.228</td>
<td>1.592</td>
<td>0.132</td>
</tr>
<tr>
<td></td>
<td>(0.144)</td>
<td></td>
<td>(0.146)</td>
</tr>
<tr>
<td>OHA (ref)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HbA1c &lt; 7</td>
<td>0.469</td>
<td>1.901</td>
<td>0.915**</td>
</tr>
<tr>
<td></td>
<td>(0.247)</td>
<td></td>
<td>(0.250)</td>
</tr>
<tr>
<td>HbA1c 7 – 10</td>
<td>0.156</td>
<td>0.757</td>
<td>0.520*</td>
</tr>
<tr>
<td></td>
<td>(0.206)</td>
<td></td>
<td>(0.209)</td>
</tr>
<tr>
<td>HbA1c &gt; 10 (ref)</td>
<td>0.179</td>
<td>0.390</td>
<td>0.550</td>
</tr>
<tr>
<td>Adjusted R square</td>
<td>3.144</td>
<td>7.304</td>
<td></td>
</tr>
<tr>
<td>Sig</td>
<td>0.007</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

Figures in parenthesis are standard errors; ** Significance at 0.01 levels; * Significance at 0.05 levels
Model 1: Dependent variable is physical attribute of quality of life;
Model 2: Dependent variable is psychological well-being attribute of quality of life;
Model 3: Dependent variable is social attribute of quality of life
Ref: reference group

The results in Model 1 revealed that all other thing being equal, program satisfaction was statistically significant related to physical attribute of quality of life with the p-value of 0.009. As noted earlier, regular exercise is important to diabetics as they are able to prevent any blood glucose fluctuations with mild to moderate physical activities. Through participating and attending the relevant diabetes self-management and educational programs, appropriate exercise programs and guidelines will be identified and recommended by the registered exercise physiologist, which in turn improve the quality of life among young adults with diabetes. Similarly, a balanced, healthy and nutritional diet is critical for managing type 2 diabetes symptoms. With the relevant information given by registered dietitians in the diabetes education and self-management program, the health-relating quality of life in young diabetic patients could improve. These results are consistent with those obtained by Ayalon, et al., (2008). They explained that the acquisition and application of health literacy skill from the educational program is important step towards preventing diabetics from achieving a low quality of life.

As reported in Model 2, this survey supported the hypothesis that program satisfaction was a significant contributor of psychological well-being attribute of quality of life in young diabetics (p value = 0.000), holding
all other factors constant. This finding was consistent with previous studies by Young and Unachukwu (2012) and Weignar and Neugehauer (2013). They found that diabetes education program satisfaction is relevant to psychological well-being attribute of quality of life. As highlighted in literature reviews, the stress caused by diabetes poses adverse emotional responses to the life of patients as they are not only worried about their glycaemic control but also the complications of diabetes. The negative emotions such as anger, fear, depression and frustration can be greatly reduced by learning how to effectively manage and control diabetes by attending and participating into the educational and self-management program.

However, the results in Model 3 shows that program satisfaction was not statistically significant related to social attribute of quality of life in young diabetics of Klang Valley Malaysia, if all other variables remained constant (p value = 0.068). According to this survey, the diabetes education and self-management program does not encourage patients to socialize with others. This finding was inconsistent with the study by Goz, et al., (2012) and Saaed, et al., (2012), who stated that diabetes patients generally require strong social supports from friends and family members in adjusting the lifestyle for their diabetes self-management. Furthermore, Mlynarczyk (2013) found that social support given to diabetic patients are seen as warm and nurturing as it could help reduce the risk of long-term complications. When these patients receive good support and have a good relationship with the people, their quality of life would increase. Additionally, having support and relationship from family and friends are associated with a better management of diabetes (Ashraff, et al., 2013). It is generally believed that the program provides information and promotes behavioural skills that will help patients to manage relationship with others and communicate well with health care professionals. These communication skills, in fact, could enhance patients’ confidence in their ability to live more successfully with their conditions (Heisler, 2007). As such, there is a need to incorporate more workshops in developing effective communication skills amongst diabetics in the program.

Conclusions:

The number of young Malaysian adults being diagnosed with diabetes mellitus is increasing rapidly. This could be due to the fact that young diabetics lack of sufficient knowledge of diabetes, lack of skill to manage diabetes and lack of financial resources for medications. Through participating in the education and self-management program, patients are able to apply newly acquired knowledge to cope with the challenges of living with diabetes. This study is significant as it provides the necessary information on the effectiveness of diabetes educational and self-management program, particularly in improving the quality of life in young diabetics. The results showed that the young diabetic patients in Klang Valley are generally satisfied with the program in the area of improving physical and psychological aspects of quality of life.

In order to improve the program further, it is increasingly important to develop more communication skills trainings for diabetics in order to have effective interactions with others. As shown in the survey, there is still much to study about how best to deliver the educational and self-management program. One way to improve the program is to develop Internet-based program to supplement the formal health care support system for young diabetic patients as they generally are Internet-savvy. Programs using new communication technologies should be encouraged because of their low cost and ease of dissemination.

However, apart from searching for ways on how to improve the program further, the diabetic patient themselves would have to frequently monitor their own blood glucose level in order to have a good diabetes control. Besides that, it is also important for a diabetic patient to have a good and proper diet control. The type of food and the calories intake would have to match up with the insulin dosage that has been prescribed by the doctor. If the food consumption is too much, it would then increase the blood glucose level. The type of food and calories intake plays an important role for a diabetic patient because if the food consumption is excessive, it would also increase the patient’s blood glucose level (vice versa). Another important aspect to improve diabetes care is to monitor personal hygiene. If the patient has a cut or wound, the patient must ensure that the cuts or wounds are properly treated.

REFERENCES


