DIABETES MELLITUS

Quality of Life and Its Associated Factors among Type 2 Diabetes Patients in Malaysian Primary Health Care

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ABSTRACT

Objective: This study aims to measure the QoL and its associated factors among T2DM patients in Malaysia.

Design: This is a cross sectional study and the sample was collected among T2DM patients who attended the Seremban 2 Health Clinic, Malaysia from December 2014 till March 2015.

Materials and Methods: Data was collected via self-administered questionnaires that consisted of questions on patients' demographics, clinical variables and questions from the validated Malay version of the "Diabetic Quality of Life (DQoL)" questionnaire.

Results: A total of 536 patients participated in the study. On a Likert scale of five points, the mean (SD) of the average scores for overall, satisfaction, impact and worry were 2.0 (0.5), 2.5 (0.9), 2.1 (0.5) and 1.2 (0.7) respectively. Age (p = 0.002), ethnicity (p = 0.044), status of diabetes treatment (p = 0.046), whether or not patients had attended a diabetes course (p = 0.025) and status of nephropathy (p = 0.032) were associated with QoL.

Discussion: The QoL among T2DM patients in Malaysia is considered satisfactory although the domain on satisfaction with regards to diabetes treatment had contributed to slightly poorer QoL.

Conclusion: Other factors that could contribute to better QoL also need to be emphasized besides monitoring and controlling the patients' clinical outcomes.

INTRODUCTION

Diabetes mellitus is an overwhelming and debilitating non-communicable disease, not only imposing many physical complications but also affecting mental health and quality of life as a consequence[1,2]. People living with diabetes are often challenged and burdened by the daily management demands of the disease. Patients must deal with their diabetes all day, every day, making countless decisions in an often futile effort to approximate the non-diabetic metabolic state. Diabetes therapy, such as taking insulin, can substantially affect quality of life either positively, by reducing symptoms of high blood glucose, or negatively, by increasing symptoms of low blood glucose[3].

In order to limit the disease progression and manage its complications when they occur, constant and long-term medical care is required. Projections show that the world prevalence of type 2 diabetes among adults (aged 20-79 years) will increase to 7.7%, and 439 million adults by 2030. Between 2010 and 2030, there will be a 69% increase in numbers of adults with diabetes in developing countries and a 20% increase in developed countries[4]. In Malaysia, the prevalence of diabetes mellitus is 22.9% and the mortality rate is 1.4 persons per 100 person-years[5,6].

Since the final and ultimate goal of health interventions is quality of life, it is important to recognise it as a health outcome. Furthermore, health is defined not only by the absence of disease and infirmity, but also by the presence of physical, mental and social well-being[7]. Therefore, health related quality of life is essentially the goal of all health interventions and is an important health outcome. There is a growing interest in health-related quality of life as people realise the impact of psychosocial factors on the outcomes of physical health.

Measures of a certain disease alone is insufficient to measure health status, and subjective measures of health and well-being are needed to provide a multidimensional view point[8]. Diabetes Quality of Life (DQoL) questionnaire is one of the tools that is widely used to measure quality of life for diabetes patients[9-11]. The questionnaire consists of three main domains which are impact of diabetes, worry about diabetes, and social/vocational concerns[12]. This study used the DQoL questionnaire and the aim of this study is to determine the quality of life among patients with diabetes and also to study the associated factors that contribute to their quality of life.

Table 1: Demographic Profile of Patients (N = 536)

	Mean (SD)	n (%)
Profile		
Age (in years)	56.6 (10.83)	
<30		5 (0.9)
30-60		342 (63.8)
> 60		189 (35.3)
Sex		
Male		248 (46.3)
Female		288 (53.7)
Ethnicity		
Malay		299 (55.8)
Chinese		62 (11.6)
Indian		168 (31.3)
Others		7 (1.3)
Marital status		
Married		440 (84.3)
Single		17 (3.3)
Divorced		17 (3.3)
Widowed		48 (9.2)
Education level		
None		29 (5.5)
Primary school		74 (14.1)
Secondary school/Certificate		285 (54.3)
Diploma/Bachelor degree		119 (22.7)
Master/PhD		18 (3.4)
Household income		
Less than RM 1000		150 (30.2)
RM 1001-RM 2000		126 (25.4)
RM 2001-RM 3000		79 (15.9)
RM 3001-RM 5000		90 (18.1)
More than RM 5001		51 (10.3)

[a] Median (IQR)

Table 3: The descriptive statistics for DQoL and the domains

Variable	n	mean	Standard deviation
Overall DQoL	263	2.03	0.487
Satisfaction	344	2.48	0.863
Impact	325	2.09	0.493
Worry	506	1.17	0.650

Table 2: Clinical characteristics of patients (N = 536)

	Mean (SD)	n (%)
BMI	28.6 (5.42)	
Underweight (<18.5)		5 (1.0)
Normal (18.5-22.9)		57 (11.3)
Overweight (23.0-27.4)		161 (31.9)
Obese (?27.5)		281 (55.8)
Current treatment		
None (Diet and exercise)		14 (2.6)
Tablet (Oral anti-diabetic agent)		341 (64.2)
Tablet and insulin		145 (27.3)
Insulin only		31 (5.8)
Specialist reference		
Yes		232 (43.9)
No		271 (51.2)
Unsure		26 (4.9)
Attended diabetic course		
Yes		201 (37.9)
No		310 (58.4)
Unsure		20 (3.8)
Clinical		
Hypertension		
No		171 (31.9)
Yes		365 (68.1)
Dyslipidemia		
No		291 (54.3)
Yes		245 (45.7)
HbA1c	7.7 (2.4)a	
Good (< 7)		167 (32.6)
Poor (≥ 7)		345 (67.4)
Complications		
Retinopathy		
Yes		28 (5.2)
No		508 (94.8)
Nephropathy		
Yes		18 (3.4)
No		518 (96.6)
Neuropathy		
Yes		6 (1.1)
No		530 (98.9)
Heart disease		
Yes		25 (4.7)
No		511 (95.3)

[a] Reported in median (IQR)

MATERIALS AND METHODS

Data Collection

Data was collected at the Seremban 2 Health Clinic, Negeri Sembilan during the patients routine clinical appointment. Data collection was completed in 3 months from December 2014 till early March 2015. Patients who are Malaysian citizens aged 18 and older were identified and their consent was obtained for involvement in the study. The survey was self-administered where the DQoL questionnaires were distributed amongst these patients. Their socio-demographic and clinical data were also recorded. Clinical data were observed from patients' medical record from their last follow-up. Those unable to read and write in the Malay language were excluded from the study. Ethical approval was received on 18th July 2014 by the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia with the NMRR ID of NMRR-14-522-19377.

Diabetes Quality of Life (DQoL) Questionnaire

A validated Malay version of the DQoL questionnaire was used throughout this study as an instrument for data collection[13]. The Malay version was used since Malay is the national language in Malaysia and is widely used throughout the nation. The DQoL questionnaire focuses on three different domains which are patients' satisfaction of the treatment, impact of diabetes towards patients' daily life and patients' worries towards their diabetes and social life. Apart from DQoL questions, the patients' socio-demographic and medical background data were also gathered in order to access patients' characteristics towards different DQoL scores.

The DQoL scores were calculated by adding up all the patients' responses in the subscales. Afterwards, the total score was divided by the number of items in the subscale. Impact items 8 and 16 are reversed questions thus the responses for these two items were reversed first before the score calculation took place. As for the total DQoL score, it was derived through summation of all 46 items responses and divided by the total number of items in DQoL questionnaire. The higher the DQoL score, the poorer the quality of life of the patients'. Patients with any unanswered questions were treated as missing, and thus excluded from the DQoL score calculation.

Table 4: The p-values indicating factors associated with DQoL, by multivariate analysis using ANCOVA

Variable	Overall	Satisfaction	Impact	Worry
Profile				
Age	0.543	0.935	0.069	**0.002**
Sex	0.306	0.549	0.050	0.055
Ethnicity	0.110	0.361	0.573	**0.044**
Marital status	0.121	0.156	0.531	0.350
Education level	0.707	0.969	0.602	0.840
Household income	0.798	0.863	0.504	0.065
BMI	0.295	0.715	0.278	0.218
Current treatment	0.545	0.924	0.770	**0.046**
Specialist reference	0.888	0.441	0.740	0.222
Attended diabetic course	0.250	0.409	**0.025**	0.896
Clinical				
Hypertension	0.468	0.438	0.534	0.923
Dyslipidemia	0.514	0.714	0.178	0.107
HbA1c	0.052	0.472	0.634	0.399
Complications				
Retinopathy	0.770	0.545	0.269	0.083
Nephropathy	**0.032**	0.522	0.902	0.139
Neuropathy	0.696	0.867	0.799	0.250
Heart disease	0.812	0.730	0.309	0.743

The p-value with less than 0.05 were bolded

Table 5: Significant factors associated with DQoL, detailed results from multivariate analysis using ANCOVA

Variable	Marginal mean*	95%CI**	P value
Outcome: Overall QoL			
Complication (Nephropathy)			0.032
Yes	3.2	2.5, 3.9	
No	2.7	2.1, 3.3	
Outcome: QoL (Impact)			
Attended diabetes course			0.025
Yes	2.7	2.1, 3.2	
No	2.5	2.0, 3.1	
Unsure	2.4	1.8, 3.1	
Outcome: QoL (Worry)			
Age			0.002
< 30	2.3	1.5, 3.1	
30-60	1.2	0.7, 1.6	
> 60	1.1	0.6, 1.5	
Ethnicity			0.044
Malay	1.5	1.0, 2.0	
Chinese	1.8	1.3, 2.3	
Indian	1.5	1.0, 1.9	
Others	1.4	0.6, 2.2	
Current treatment			0.046
Non-pharmacological	1.6	1.0, 2.2	
Oral anti-diabetic agent	1.7	1.2, 2.2	
Oral anti-diabetic agent & insulin	1.6	1.1, 2.1	
Insulin only	1.3	0.7, 1.8	

Statistical Analyses

Descriptive analysis was conducted to describe the demographic profile and clinical parameters of respondents. Analysis of Covariance (ANCOVA) was applied to assess factors that contribute towards quality of life of the diabetic patients. There were three main categories of factors that were identified earlier in study, which were the socio-demographic characteristics of the patients, the patients' clinical background and complications. The age group is divided into three categories such as less than 30 years, 30 to 60 years and more than 60 years. The age 18 to 30 considered as provisional adulthood and the initiation to First Adulthood[14]. The age of 30 to 60 considered as middle adulthood and 60 years and more considered as late adulthood. In Malaysia, the age between 30 and 60 are usually active workers and 60 years and above usually are non-active workers or not working. Clinical factors consisted of the body mass index (BMI), current treatment, specialist reference, attendance to a diabetic course, presence of hypertension, presence of dyslipidemia and HbA1c level.

Complication factors focused on the presence of retinopathy, nephropathy, neuropathy and heart disease. Some common socio-demographic factors were analysed such as age, gender, ethnicity, marital status, educational level and household income. Prior to that, the socio-demographic and clinical characteristics of all patients who participated were assessed descriptively to have a background idea on the study sample. IBM SPSS statistics of version 20 was used for data analysis (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.)

RESULTS

A total of 536 patients who fulfilled the inclusion criteria were involved in this study. As shown in Table 1, the mean age of the patients was 56.6 (10.8) years. Among them, 63.8% were within the age group of 30-60 years and 53.7% were female patients. Malays comprised of more than half of the total participants. More than three-quarter of the participants were married while others were either single, divorced or widowed. Most of the participants with diabetes were in the lower income bracket.

Table 2 describes the clinical characteristics of patients. The mean BMI is 28.6 (5.4) kg/m² and most patients in this study were obese (55.8%). 64.2% were treated with oral anti-diabetic agents and only 2.6% fell under the category of controlled diabetes. Out of all patients, 68.1% and 45.7% had hypertension and dyslipidemia respectively. Four

complications were recorded among the patients such as retinopathy (5.2%), nephropathy (3.4%), neuropathy (1.1%) and ischemic heart disease (4.7%). Table 3 shows descriptive statistics for DQoL and each domain in DQoL. The mean (SD) scores for overall, satisfaction, impact and worry are 2.0 (0.5), 2.5 (0.9), 2.1 (0.5) and 1.2 (0.7) respectively.

Table 4 shows the factors that associated with the domains in DQoL questionnaires. The DQoL has an overall score and also the score for the three domains which are satisfaction, impact and worry respectively. Meanwhile, there are three categories of factors of interest which are the patients' sociodemographic profile, patients' clinical background and medical complications. For the overall DQoL average score, complication of nephropathy was the only factor that showed an association (p = 0.032) with the outcome. Since higher scores indicate poorer quality of life, patients with nephropathy have poorer quality of life (marginal mean with 95%CI = 3.2 with 2.5,3.9) compared to those without nephropathy (marginal mean with 95%CI = 2.7 with 2.1,3.3) (Table 4 and Table 5).

For impact, attendance to a diabetic course was the only significant factor (p < 0.05). Patients that had attended a diabetic course (marginal mean with 95%CI = 2.7 with 2.1,3.2), scored higher impact scores compared to those that had never attended a course (marginal mean with 95%CI = 2.5 with 2.0,3.1) (Tables 4 and 5). For the domain of worry, there were only three factors that showed an association. The factors were age (p = 0.002), ethnicity (p = 0.044) and current treatment received (p = 0.046). Younger patients aged less than 30 years (marginal mean with 95%CI = 2.3 with 1.5,3.1) have higher worry scores when compared to those aged between 30-60 (marginal mean with 95%CI = 1.2 with 0.7,1.6) and more than 60 (marginal mean with 95%CI = 1.1 with 0.6,1.5) (Table 4 and Table 5).

Within ethnicity, the Chinese have higher worry scores (marginal mean with 95%CI = 1.8 with 1.3,2.3) and the lowest score was for other ethnicity (marginal mean with 95%CI = 1.4 with 0.6,2.2). As for current treatment received, patients that take tablet only (marginal mean with 95%CI = 1.7 with 1.2,2.2) had higher worry than those that take insulin only (marginal mean with 95%CI = 1.3 with 0.7,1.8) as their diabetic treatment. Of all the factors of interest, there were no factors that had an impact towards satisfaction (Table 4 and Table 5).

DISCUSSION

The present study used the specific QoL instrument for diabetes mellitus which is DQoL. Previous studies have reported the QoL among T2DM patients using Euro QoL 5D or Short Form-36 (SF-36) instruments[15,16]. In general, the participants of the study were found to have a moderate to good quality of life. This was based on overall average score and average domains scores such as satisfaction, impact and worry. For the domains of satisfaction, impact and worry, the higher the score the poorer the QoL. Out of a Likert scale of 1 to 5, almost all domains reported at average score of below 2.5 except for the satisfaction domain.

The patients had moderate satisfaction (average satisfaction score = 2.5) but better QoL in terms of impact (average impact score = 2.1) and worry (average worry score = 1.2). The results could reflect the conditions of patients where only a minority (less than 6.0% among the respondents) have already at least one diabetic complication. Other research suggests however, that persons with diabetes have a reduced health related quality of life[17]. Chronic diseases including diabetes have profound psychological impacts, especially if the treatment regimen is complex and incurs financial costs and needs imposed by the disease itself[18,19].

Factors in the impact and worry domains contributed significantly to the QoL. In this study, younger patients, Chinese patients, patients with oral medication, patients who have attended a diabetic course and patients having nephropathy were associated with lower QoL.

HbA1c levels apparently did not contribute to QoL, although a previous study by Huang and colleagues found that there was an association between HbA1c and DQoL at least with moderate effect[9]. The association might be clearer if the subjects had more diabetic complications.

Studies have proven the long-term effectiveness of structured intensive diabetes education programmes. Patients who have been educated on their condition have less frequent diabetic related hospitalisation rates and lower HbA1c values compared to those who have not received the same education[20]. Education programmes for persons with diabetes affect the patients' knowledge, attitude and practice of care towards the disease. It also affects skills and behaviours in caring for the disease and subsequently physiologic outcomes. The current study found that participants that had attended a diabetic course scored higher on this domain of impact indicating that these persons felt more impact or poorer QoL due to their disease. This could be due to the cross-sectional study design of the study. The participants who report a lower QoL may have just started attending the diabetes course and may not have attended the course long enough to have experienced the benefits.

Younger diabetics tend to worry more about their condition compared to the older age groups, as they are learning how to manage their time and a busy and hectic work schedule around their disease. Working around their eating schedule and taking time off to see healthcare professionals can be challenging at their point in life. For young people, the cost of managing their disease can be a burden. Young adults are also starting to worry about their future, including complications of their disease and whether having diabetes will impact their chances of having a family[21].

There are differences in perceived quality of life between ethnic groups. In the current study Chinese patients reported a lower QoL compared to the other ethnic groups. In a study by Wee, Hwee-Lin, et al, after adjusting for demographic, socioeconomic, and other factors known to influence HRQoL, ethnicity remained an important factor influencing HRQoL in a population-based multi-ethnic sample of diabetic Asians[22]. The type and effect of treatment can also influence the quality of life of diabetic patients. A study by Davis and colleagues has shown that insulin users had worsening quality of life compared to non-users of insulin[23]. However, the finding of the present study found that insulin users had less worry scores and this could be due to the cross-sectional study design. In addition, diabetes mellitus complicated with a co-morbidity is associated with lower quality of life[24]; a finding consistent with the present study where patients with nephropathy reported to have lower QoL.

There are several limitations in this study. Firstly, this being a cross-sectional study means that a causal relationship between variables cannot be identified. Secondly, some items reported missing values that made sample size for domain scores were affected. The missing values occurred were not due to the weakness in the survey administration but in fact it was due to sensitive and irrelevant questions for some patients with regards to DQoL. For example, question on satisfaction (item 10) and impact (item 10) about sexual life in which our respondents might

sensitive to reveal their response or even when they are not married or divorced.

Another question is on impact (item 20) regarding insulin reaction while our respondents might not on insulin treatment. The investigators tried to anticipate the problem by recruited large study sample with more than 500 subjects. Such large study sample is necessary to increase the accuracy of the estimate and also to incorporate missing values[25,26]. The domain scores were consisting of more than 300 subjects except for overall DQoL (n = 263). However, sample size approximate to 300 subjects is sufficient for multiple linear regression and Analysis of Covariance for observational studies[27,28].

CONCLUSION

In conclusion, the QoL of the diabetes patients in the study were better than average except for the domain of satisfaction. In this study, there are no associated factors found towards domain satisfaction. Therefore, further studies need to be carried out to identify various factors that can potentially lead to satisfaction. The relevant actions can then be taken to improve quality of life among patients with T2DM. It is known that diabetes being a chronic illness poses a burden and an opportunity cost for the people who live with it. Although many control programmes and interventions exist, the real social, economic, and functional impact of diabetes on the people who suffer from it has not been critically monitored in populations. Hence, a concerted effort is required from health care funders, health systems, policy makers, and public health programs and agencies along with patients themselves for maintaining and enhancing the quality of life for diabetics.

ETHICAL APPROVAL

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study received ethical approval from Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia with ID: NMRR-14-522-19377.

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