The Quality of Life and Perceived Health Education Needs of Type 2 Diabetic Clients in Negros Oriental, Philippines

Evalyn E. Abalos
Grace A. Gloria
Michael B. Obate
Veveca V. Bustamante
Marnesa P. Campoy
College of Nursing, Silliman University
Dumaguete City, Philippines

This paper examines the factors influencing the quality of life (QoL) of Type 2 Diabetes Mellitus clients and their perceived health education needs. The 55 respondents of the study were recruited through convenience sampling from four diabetes clinics in Dumaguete City, Negros Oriental. The Ferrans and Powers Quality of Life Index (QLI) was administered, a test that has four subscales, namely: [1] health and functioning, [2] social and economic, [3] psychological/spiritual, and [4] family subscales. The subscale scores and the overall QoL score were then correlated with the profile of the respondents. The results showed no significant relationship between the socio-demographic profile and the overall QoL score, but only between individual QoL subscales such as educational level and the social and economic subscale, monthly family income and the social and economic subscale, and monthly family income and family subscale. The health topics they reportedly needed include blood sugar monitoring, diet, exercise and medications. Meanwhile, a health education program based on the specified needs should be developed and integrated into the curriculum of nursing students.

KEYWORDS: Quality of Life, Type 2 Diabetes Mellitus, Ferrans and Powers Quality of Life Index, health education needs, nursing curriculum

INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic disorder affecting 3.4 million Filipino adults, with an estimated 4.9 million more on the verge of developing the disease (IDF, 2010). Of the ten leading causes of mortality in the country, diabetes ranked eighth in 2006 (Department of Health, 2011). Complications and disabilities of DM include non-traumatic amputations, end stage kidney disease, blindness, heart disease, and stroke (Centers for Disease Control and Prevention, 2011). The study done by Soria, Vega, Abenir-Gallardo, Velandria, and Punzalan (2009) utilized a glucose homeostasis study (n=2,122) in six of the 17 administrative regions of the Philippines over a 9-year period from 1998 to 2007. The findings revealed an alarming growth of diabetic people in the country that warranted early aggressive intervention for prevention and management.

Globally, the countries with the highest prevalence in 2000, and highest projected numbers for 2030 were India, China, and USA. Italy ranked 9th in the list in 2000 but is predicted to be replaced by the Philippines in 2030 (Wild, Roglic, Green, Sicree, & King, 2004). According to UNITE for Diabetes Philippines (n.d.), a coalition of organizations that care for individuals with DM, Filipinos with fasting blood sugar (FBS) greater than 125 mg/dl had increased from 3.9% in 1998 to 4.8% in 2008 while those with DM based on history had increased from 2.6% in 2003 to 4% in 2008. When those who had pre-diabetes (10.2%) were added, the prevalence rose from 7.2% to 17.8%. This means that one out of every five Filipinos is likely to develop diabetes or pre-diabetes (UNITE for Diabetes Philippines, n.d.). These trends were substantiated by the authors through observation during supervision of students in hospital and community sites, prompting the development of the current study.

The chronic nature of DM has an impact on the quality of life (QoL) which, according to Rubin (2000), is recognized as an important health outcome, in that it represents the ultimate goal of all health interventions. To elaborate further, Rubin (2000) stated that:

> Although health care providers sometimes focus on medical outcomes alone when assessing the efficacy of their interventions, any person with diabetes will tell you that these outcomes are truly meaningful only to the extent that they affect physical, emotional, and social well-being—that is, quality of life (p. 21).

Many studies have been conducted on the quality of life (QoL) of clients with DM, utilizing specific QoL instruments. Among these, the

study of Ghanbari, Yekta, Roushan, and Lakeh (2005) focused on nine QoL dimensions: physical function, pain, daily activities, feelings, sleep, relationships with relatives, overall health, problems with diabetes, and satisfaction with diabetes treatment methods. Their study sought to assess the pattern of relationships between personal background characteristics and the nine dimensions of QoL among outpatients in Iran. Moreover, Huang and Hung (2007) explored QoL and its predictors among middle-aged and elderly outpatient cases with DM in Taiwan. The results showed that diabetic self-care behaviors, economic status, and frequency of hospitalization were predictors of QoL.

Health education is an important aspect in diabetes management. Tang, Pang, Chan, Yeung, and Yeung (2008) conducted a study on diabetic control focusing on health literacy, complication awareness, and diabetic control in Chinese patients and concluded that educational strategies need to account for the patient's health literacy levels and self care skills in order for them to improve their diabetic control and avoid complications. Since a diligent search reveals that no studies have been published on QoL of people with DM in the province of Negros Oriental, this paper explores such issue and further connects it to the patient's socio-demographic profile, which may be a potentially important contributing factor to their QoL scores. The perceived health education needs of the respondents are likewise discussed. In doing so, it is anticipated that the findings will provide evidence for subsequent nursing interventions and academic curriculum development.

METHODS

A descriptive-correlational design was employed with respondents who were recruited through convenience sampling from four diabetes clinics in Dumaguete City. To recruit a sufficient number of respondents, the researchers allocated about two to four hours a day for approximately two months (January 8 to March 5, 2011) for recruiting and data collection. Those qualified to be respondents needed to be between 40 to 60 years old, diagnosed with Type 2 DM, with or without complications, able to read and write in English or Visayan (a local language), willing to participate in the study, and residents of Negros Oriental. Approval to implement the study was first secured from the Ethics Committee of the College of Nursing

of Silliman University. After which, permission to perform data collection was obtained from doctors from the four diabetes clinics in Dumaguete City, the capital city of the province, Negros Oriental.

Three sets of questionnaires were used to gather data. Two of these were formulated by the authors: [1] a questionnaire on the respondent's socio-demographic and medical profile; and [2] a questionnaire regarding their health education needs. The third and main questionnaire was the Ferrans and Powers QLI Diabetes version, which is a customized test that "measures both satisfaction and importance regarding various aspects of life" (University of Illinois at Chicago [UIC], n.d.). With permission from the original authors, Carol Estwing Ferrans and Marjorie Powers, the questionnaire was translated into Visayan, the local language in Dumaguete City. The QLI tool is comprised of five scale scores: a total scale or over-all QoL score, and 4 subscales: [1] health and functioning subscale; [2] social and economic subscale; [3] psychological/spiritual subscale; and [4] family subscale. According to UIC (n.d.), 48 studies that have used the said tool utilized a Cronbach's alpha coefficient ranging from 0.73 to 0.99. In 24 studies, alphas ranged from 0.70 to 0.94 for the health and functioning subscale, and from 0.78 to 0.96 for the psychological/spiritual subscale. Another 23 studies reported social and economic subscale alphas ranging from 0.71 to 0.92 while 19 studies reported ranges of 0.63 to 0.92 for the family subscale (UIC, n.d.).

Below are the items in the Ferrans and Powers' QoL Index with their corresponding numbers in the questionnaire as adapted and administered to the respondents to measure their quality of life according to the different subscales, given their health condition as diabetics.

Health and Functioning Sub-scale
1. Health
2. Health care
3. Energy (fatigue)
4. Ability to take care of yourself without help
5. Ability to control blood sugar
6. Changes made in life because of diabetes
7. Control over life
8. Chances for living as long as you would like
12. Sex life
17. Ability to take care of family responsibilities
18. Usefulness to others
19. Worries
26. Things for fun
27. Chances for a happy future

Psychological/Spiritual Sub-scale
28. Peace of mind
29. Faith in God
30. Achievement of personal goals
31. Happiness in general
32. Life satisfaction in general
33. Personal appearance
34. Self

Family Sub-scale
9. Family health
10. Children
11. Family happiness
13. Spouse, lover, or partner
15. Emotional support from family

Social and Economic Sub-scale
14. Friends
16. Emotional support from people other than your family
20. Neighborhood
21. Home
22/23. Job/not having a job
24. Education
25. Financial needs

Descriptive statistics were utilized to describe the profile of the respondents and their QoL scores on the different subscales while Pearson's r, Chi-square, Fischer's exact test were used to test the relationships between the variables (i.e., socio-demographic and QoL subscale scores). The possible range for the final scores was 0 to 30. Thus, to get the descriptive value of the QoL scores, the researchers developed a six-level scale: worst= 0-4.99, poor= 5.0-9.99, fair= 10.00-14.99, good= 15.00-19.99, very good= 20.00-24.99, and excellent= 25.00-30.00.

RESULTS

Demographic profile

Of the 55 respondents of the study, majority belonged to the age group of 53 to 60 years. They were mostly females (69%), Roman Catholics (83%), college educated (65%), and earned a monthly family income between PhP10,001-PhP20,000.00 (33%).

Table 1.

Demographic and Economic Profile of Respondents (n=55)

	Frequency	Percent
Age		
41-44	2	3.64
45-48	6	10.91
49-52	14	25.45
53-56	17	30.91
57-60	16	29.09
Gender		
Female	38	69.09
Male	17	30.91
Religion*		
Roman Catholic	45	83.33
Protestant	4	7.41
Others	5	9.25
Educational Attainment		
College	36	65.45
Doctoral	2	3.64
Elementary	8	14.55
High School	6	10.91
Masters	3	5.45
Monthly Family Income*		
Less than 10,000	16	29.63
10,001- 20,000	18	33.33
20,001- 30,000	8	14.81
30,001-40,000	9	16.67
More than 40,000	3	5.56

*With 1 missing data

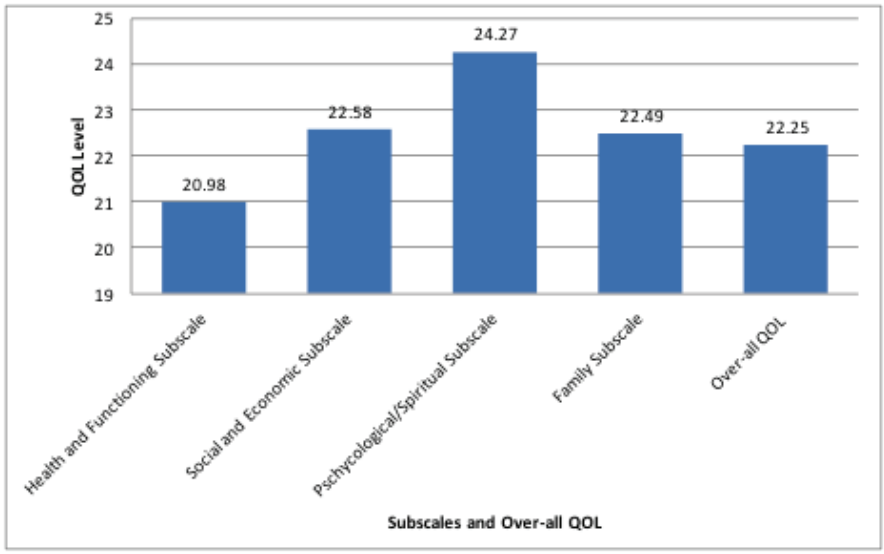
Majority of the respondents had Type 2 DM for the past 4 years while only 2 had the disease for 20 years or more (see Table 2). Furthermore, 22 of them reported changes in vision (micro-vascular complication) while 20 patients reported cardiovascular complications (e.g., hypertension).

Table 2.

Medical Profile of Respondents

	Frequency	Percent
Duration of Diabetes Mellitus		
0-4 years	24	43.63
5-9 years	14	25.45
10-14 years	10	18.18
15-19 years	5	9.10
20 years and above	2	3.64
Complications*		
Changes in vision	22	40.00
Cardiovascular	20	36.36
Peripheral Neuropathy	11	20.00
Kidney	2	3.63
Delayed Healing/ Infection	2	3.63

*Multiple responses allowed



*Where: mean = 22.5, standard deviation S = 3.5

Figure 1. QoL Subscale Scores and Over-All QoL Score

Quality of life in the different subscales

The over-all QoL score and the scores of the respondents on the four Sub-scales were all very good (20.98 - 24. 27) as shown in Figure 1. The results indicate homogeneity of the sample with regard to rating their quality of life. With respect to individual scores, the subscale with the highest score was the psychological/spiritual, followed by social/economic, and family. Understandably, health and functioning scored the least but still rated as very good.

No significant relationships were found to exist between total QoL score and the socio-demographic profile of the respondents (Table 3). Significant relationships are, however, seen when socio-demographic variables are correlated with specific subscales (Table 4 and Table 5).

Table 3.

Socio-demographic Variables Correlated with Total Quality of Life Score.

Socio-demographic Variables	Test Statistic	Correlation Coefficient	p-value	Remarks
Age	Pearson's r	-.066	0.63	No significant relationship
Sex	Chi-square	0.29	0.86	No significant relationship
Education	Chi-square	2.86	0.24	No significant relationship
Income	Spearman's rho	0.202	0.139	No significant relationship
Religion	Chi-square	1.27	0.53	No significant relationship

Demographics versus quality of life subscale scores

The correlation analysis shows that between the four subscales and the selected demographic variables, there were no significant relationships between [1] the demographic variables and the health and functioning subscale and [2] the demographic variables and the psychological and spiritual subscale. However, there was a significant relationship between [1] educational attainment and the social and economic subscale and [2] family income level and the social and economic subscale (see Table 4). There was also a significant relationship between the family income level and family subscale (see Table 5).

Table 4.

Relationship Between Social and Economic Subscale and Socio-demographic Variables.

Socio-demographic Variables	Test Statistic	Correlation Coefficient	p-value	Remarks
Age	Pearson's r	-.063	0.645	No significant relationship
Sex	Fisher's Exact Test	2.45	0.534	No significant relationship
Education	Fisher's Exact Test	39.544	0.000	With significant relationship
Income	Spearman's rho	0.480	0.000	With significant relationship
	Kendall's Tau-b	0.368	0.000	With significant relationship
Religion	Fisher's Exact Test	27.349	0.739	No significant relationship

Table 5.

Relationship Between Family Subscale and Socio-demographic Variables.

Socio-demographic Variables	Test Statistic	Correlation Coefficient	p-value	Remarks
Age	Pearson's r	-0.085	0.535	No significant relationship
Sex	Fisher's Exact Test	2.924	0.592	No significant relationship
Education	Chi-square	4.23	0.12	No significant relationship
Income	Spearman's Rho	0.312	0.241	With significant relationship
	Kendall's tau-b	0.019	0.019	With significant relationship
Religion	Fisher's Exact Test	40.68	0.923	No significant relationship

The social and economic subscale describes, among others, how important and satisfied patients are with respect to their education and income. Based on the profile, majority of the patients have attained college education and earned more than PhP10,000/month. Similarly, only income is significantly related to the family subscale which has to do with how patients perceive the importance of meeting family health and other emotional needs. The table therefore shows how education and income are two socio-demographic variables that are related to the patient's quality of life.

Perceived health education needs

Table 6 summarizes the respondents' answers to the items in the third part of the questionnaire. Among the topics which the respondents identified to be part of a potential diabetes management class are blood sugar monitoring, diet, exercise and medications.

Table 6.

Topics the Respondents Would Like to Be Included in an Education Program.

Topics	Frequency	%
Blood sugar monitoring	48	87.27
Diet	41	74.54
Exercise	39	70. 90
Medications	39	70.90
Complications of Type 2 DM	38	69.09
Stress management	37	67.27
Risk factors of Type 2 DM	37	67.27
Disease process (DM)	26	47.27
Others (did not specify)	4	.07

*Multiple answers allowed

An overwhelming majority (89.09%) of the respondents expressed desire to attend a diabetes management class if this would be available to them. Saturday is the most preferred (38.18%) day. Other preferred days are Friday, Wednesday and Monday. Most respondents (47.27%) want the class to be conducted in the morning.

DISCUSSION

Health conditions of respondents

Majority of the respondents were between 53-60 years old and were females. It stresses the fact that the risk of acquiring Type 2 DM increases after age 40, and is more likely for females than males (Huether & McCance, 2005). Considering the chronic nature of disease development, majority of the respondents had developed Type 2 DM during their middle adulthood. If the disease is not managed properly, this may lead to acute and chronic complications associated with the condition and consequently, low quality of life (Wändell, 2005; Issa & Baiyewu, 2006).

Table 3 sums up the presence of complications related to Type 2 DM as reported by the respondents. The option of reporting multiple complications was made available in the questionnaire, resulting to 57 responses for five types of complications. The complications were categorized according to the body organs affected. Majority of the respondents (n=22) reported changes in vision (e.g., blurred

vision, difficulty in reading, development of cataract, spots in vision). Twenty respondents reported cardiovascular-related complications (e.g., hypertension, stroke, cardiomegaly or enlarged heart). Pain and numbness of extremities (peripheral neuropathy) was also reported by 11 respondents. Furthermore, two respondents had complications related to the kidney and another two experienced delayed healing and infection. All reported complications are known complications associated with chronic and poorly managed DM.

Changes in vision, peripheral neuropathy, kidney-related complications, and delayed healing and infection are considered as microvascular complications or complications which affect the small blood vessels, including the capillaries. Cardiovascular complications, on the other hand, are considered macrovascular or those affecting the large blood vessels (Smeltzer, Bare, Hinkle, & Cheever, 2010). Hypertension is a common health problem in people with diabetes; it predisposes them to have a cerebrovascular accident or stroke (LeMone, Burke, & Bauldoff, 2010). Diabetes is also associated with the development of other vascular complications such as coronary heart disease and neuropathies. These complications may arise from an acute onset or chronic progression of the disease. Hence, the aim of Type 2 DM management is to prevent the development of such complications while preserving the quality of life.

Results show that even with chronicity of DM and the existence of complications, the Total QoL score of the respondents was *very good* (Figure 1). This is contrary to the study of Wandell (2005) which suggests that the existence of vascular diseases such as coronary heart disease and stroke were found to be predictors for worse health-related quality of life (HRQoL) or were considered significant factors in decreased HRQoL. The scores in the four subscales (Health and Functioning, Social and Economic, Psychological/Spiritual, and Family) and over-all QoL scores of the respondents were above 20 or *very good*. Contrary to the study of Fatemi and Taghavi (2009) in Iran, none among the respondents of the present study reported any sexual problems, which can also be a complication of Type 2 DM.

With advances in treatment, dietary modification, and lifestyle change, people with Type 2 DM are living longer with their condition. However, the presence of complications in the study population has an implication on the need for long-term medical attention in order to manage them as well as limit the possible threat of more serious complications and consequently, shorter life-expectancy. Given the chronic nature of the disease, patients in the study population with

complications will have to be financially capable in order for them to avail of medical needs. Thus, there is also a need to emphasize prevention and treatment of existing complications.

Relationship between socio-demographic variables and QoL subscales

The results show that there were no significant relationships that exist when the total QoL score and the socio-demographic profile of the respondents were computed (Table 3). *This means that the correlation between any of the socio-demographic variables with the total QoL is weak*. This finding probably suggests a limitation related to the sample size (55) and the use of convenience sampling which does not allow for wider variability to allow correlation of the socio-demographic variables with the total QoL which is scored as very good across the different subscales. Significant relationships are, however, seen when socio-demographic variables are correlated with specific subscales (Table 4 and 5).

Table 4 shows that the social and economic subscale has a statistically significant relationship with two socio-demographic variables: educational attainment (Fisher's Exact test, where p-value = 0.000) and monthly family income (Spearman's Rho test and Kendall's Tau-b test, where p-value = 0.000). Thus, it can be inferred that one's level of education and income can affect one's quality of life. A person who has attained higher education will have a better QoL since one of the aspects in the successful management of DM is being able to understand its causes and its complications, the rationale for the different medications, how to manage stress, and even the selection of a proper diet. Likewise, when one has a good income, he/she can purchase the needed medications and can afford the doctor's consultation fees and laboratory examinations which are to be done regularly such as fasting blood sugar, glycosylated hemoglobin test, liver and kidney function tests, and lipid panel test, among others. Medications and laboratory tests entail expenses and long term management of Type 2 DM can be costly. In the United States, in 2002 the per-capita cost of health care was $13,243 for people with diabetes while it was only $2,560 for those without diabetes (Khardori, 2012). Similarly, in a cost-of-illness analysis study conducted in Iran, Type 2 DM consumes more than 8.69% of the country's total health expenditure and aside from the quantified costs, it also has high intangible costs on society in terms of reduced

quality of life (Javanbakht et al., 2011).

The economic subscale correlated with income may be expected to be significant since this subscale and income are redundant. On the other hand, it could be possible that income as a socio-demographic variable is not significantly related with the economic subscale. As a variable, income may not be associated with quality of life among type 2 diabetic patients due to other complex factors present such as the lack of social support, unemployment, and the presence of multiple complications, e.g. microvascular and macrovascular, that limit one's activities of daily living. The study of Issa and Baiyewu (2006) showed that poor QoL was associated with the presence of physical complications that included hypertension, cataract, weight loss, and sexual impairment among others.

In this study, the monthly family income of most of the respondents is between PhP10,001-20,000 which is above the poverty level of PhP7,000 according to the estimates of the National Statistical Coordination Board. This implies that they can at least afford minimum health costs related to Type 2 DM management. Dr. Tommy Ty Willing, President and Chairman of Diabetes Philippines, estimates that a Filipino diabetic would spend PhP106 per day for medication maintenance using generics drugs (the more complications, the more medications needed), PhP1,000 more every two to three months for regular blood tests, and PhP2,000 to PhP5,000 more every week if the diabetic patient needs to have dialysis which is ideally done every other day (Pazzibugan, 2009). Similarly, the cross-sectional study of Ayalon et al. (2008) among those with diabetes (n=400) showed that those who reported difficulties meeting basic needs, diabetes-related complications, worse subjective health, and dissatisfaction with medical care were more likely to report worse QoL.

Table 6 shows that in the family subscale, there is a significant positive relationship between monthly family income and the family subscale score (Spearman's Rho test and Kendall's Tau-b tests p-value of 0.019). This means that areas of family life of the respondents (family health, children, family happiness, spouse/partner, and emotional support) are all important and satisfactory. In many societies, the family is considered the basic unit of a community by which its members are nurtured and shaped. Families—regardless of their cultural background—share common functions such as producing children, providing affection and emotional support, maintaining and protecting the health of its members, and providing security. Furthermore, the health of individual family members can affect the

health of the family as a unit and vice-versa (Allender & Spradley, 2001). Thus, the ability of a family to perform its varied functions determines to a large extent its health status.

From the result, it can be implied that the respondents with adequate income are more able to accomplish the different family functions that are seen to contribute to QoL. More specifically, the QoL of the respondents with type 2 DM is related to their satisfaction and the importance given to the areas of family life with the provision of an adequate monthly family income. This can also be related to the earlier result pointing out to a significant relationship between family income and the social and economic subscale (Table 5).

Perceived health education needs

Identified topics which participants prefer to be included in a diabetes management class are: blood sugar monitoring, diet, medications, and exercise. This implies that participants lack the necessary knowledge needed to appropriately manage the disease. The study of Hawthorne, Robles, Cannings-John, and Edwards (2008) revealed that culturally appropriate health education for Type 2 DM in ethnic minority groups improved blood sugar control in participants, compared with those receiving 'usual' care, at three and six months post-intervention. Patients who are knowledgeable about their disease condition are able to do self-management. In fact, Holmström and Rosenqvist (2005), posit that patients with Type 2 DM need extensive support and education to learn to manage and live with their illness. Similarly, in a meta-analysis of 11 studies to evaluate the efficacy of self-management education on GHb (GlycoHemoglobin which measures the blood sugar for approximately 3 months) in adults with Type 2 DM, results showed that self-management education improves GHb levels at immediate follow-up, and increased contact time increases the effect. The benefit declines one to three months after the intervention ceases, however, suggesting that learned behaviors change over time, thus it is recommended that further study is needed to develop interventions effective in maintaining long-term glycemic control (Norris, Lau, Smith, Schmid, & Engelgau, 2002). Blood sugar monitoring, diet management, and compliance to medications are important aspects for blood sugar/glycemic control. In addition, Brown (1988) conducted a meta-analysis of 47 studies on the effects of patient teaching on knowledge, self-care behaviors, and metabolic control. Results showed that patient teaching has positive

outcomes in diabetic adults.

On the other hand, misunderstandings about illness and treatment among Swedish patients with Type 2 DM were qualitatively studied by Holmström and Rosenqvist (2005). Results revealed that misunderstandings of diabetes and its treatment were common and numerous despite regular checkups and good access to care. The patients adhered to prescribed regimens but did not know why they performed many routines or how they could benefit from them. Thus, it is of prime importance that the identified needs of the Type 2 diabetic clients in Negros Oriental become the basis for the development of a health education program specifically suited for them and for such program to be effectively delivered in a medium they can understand.

CONCLUSION AND RECOMMENDATIONS

The study concludes that the sample of respondents with Type 2 DM have very good quality of life based on the ratings they gave through the Ferrans and Powers QoL index. More specifically, education and income are significantly related with the social and economic subscale; and income with the family subscale, while age, gender, and religion were not significantly related to all four subscales and the total QoL. Majority of the respondents have obtained a higher education with an income above the poverty threshold.

Given the limitations of the study, the conclusions can be drawn only with respect to the sample size, that despite having type 2 DM for more than four years, with several complications, they have very good satisfaction with the different aspects of their life. This may be attributed to their adequate income and attainment of a higher education which allows them to better take care of themselves since this disease condition requires them to purchase medications and understand the complex treatment regimen.

It is recommended to further study the correlation between disease duration and complications with QoL scores. Also, a study which compares the QoL of those with Type 2 DM and those without Type 2 DM (comparison group) with similar socio-demographic profiles can be done. A health education program for diabetic patients based on their specified needs should be developed. This health education program can be made available to clients via tele-nursing (use of internet or cellular phones) and can be integrated into the nursing curriculum of students.

ACKNOWLEDGMENTS

The authors would like to express their heartfelt gratitude to the following: Silliman University through the Research and Development Office for the research grant; Dr. Enrique Oracion, Director of Research and Development Center for his very able and inspiring guidance all throughout the study; the respondents of this study; the panel members of the research public presentation—Dr. Millard Mamhot, Dr. Walden Ursos, and Prof. Roy De Leon; the late Dr. Maria Teresita Sy-Sinda, who encouraged us to do this research; Dean Florenda F. Cabatit of the Silliman University College of Nursing for her support; and Ms. Mayross P. Café who was with the team in the early part of the conception of this topic.

REFERENCES

Allender, J., & Spradley, B. (2001). *Community health nursing concepts and practice* (5th ed.). Philadelphia, PA: Lippincott Williams & Wilkins.

Ayalon, L., Gross, R., Tabenkin, H., Porath, A., Heymann, A., & Porter, B. (2008). Determinants of quality of life in primary care patients with diabetes: Implications for social workers. *Health and Social Work, 33*(3), 229-236.

Brown, S. (1988). Effects of educational interventions in diabetes care: A meta-analysis of findings. *Nursing Research, 37*(4), 223-230.

Centers for Disease Control and Prevention [CDC]. (2011). *National diabetes fact sheet: National estimates and general information on diabetes and prediabetes in the United States, 2011*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

Department of Health [DOH] (2011). Mortality: Ten (10) leading causes. Number and rate/100,000 population Philippines. 5-year average (2001-2005) & 2006. Retrieved from http://www.doh.gov.ph/node/198

Fatemi, S. S., & Taghavi, S. M. (2009). Evaluation of sexual function in women with type 2 diabetes mellitus. *Diabetes and Vascular Disease Research, 6*(1), 38-39. doi: 10.3132/dvdr.2009.07

Ghanbari, A., Yekta Z. P., Roushan Z. A., & Lakeh, N. M. (2005). Assessment of factors affecting the quality of life in diabetic patients in Iran. *Public Health Nursing, 22*(4), 311-322.

Hawthorne, K., Robles, Y., Cannings-John, R., & Edwards, A.G. (2008). Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups. *Cochrane Database of Systematic Reviews, 16*(3), CD006424. doi: 10.1002/14651858.CD006424. pub2.

Holmström, I. M., & Rosenqvist, U. (2005). Misunderstandings about illness and treatment among patients with type 2 diabetes. *Journal of Advanced Nursing, 49*(2), 146-154.

Huang, M.-C., & Hung, C.-H. (2007). Quality of life and its predictors for middle-aged and elderly patients with type 2 diabetes mellitus. *Journal of Nursing Research, 15*(3), 193-201.

Huether, S. E., & McCance, K. L. (2004). *Understanding pathophysiology* (3rd ed.). Missouri, MO: Mosby.

International Diabetes Federation [IDF]. (2010). Prevalence estimates of diabetes mellitus (DM), 2010 – WP. Retrieved from http://www.idf.org/content/wp-data

Issa, B. A., & Baiyewu, O. (2006). Quality of life of patients with diabetes mellitus in a Nigerian teaching hospital. *Hong Kong Journal of Psychiatry, 16*(1), 27-33.

Javanbakht, M., Baradaran, H. R., Mashayekhi, A., Haghdoost, A. A., Khamseh, M. E., Kharazmi, E., & Sadeghi, A. (2011). Cost-of-illness analysis of type 2 diabetes mellitus in Iran. *PloS One, 6*(10), e26864. doi: 10.1371/journal.pone.0026864

Khardori, R. (2012, January 25). Type 2 diabetes mellitus. Retrieved from http://emedicine. medscape.com/article/117853-overview

LeMone, P., Burke, K., & Bauldoff, G. (2010). *Medical surgical nursing: Critical thinking in client care* (Vol. 2). Canada: Pearson Education.

National Statistics Coordination Board [NSCB]. (2011, February 8). One family per 100 was lifted out of food poverty in 2009. Retrieved from http://webcache.googleusercontent.com/search?q=cache:http://www.nscb.gov.ph/pressreleases/2011/PR-22011-SS2-01_pov2009.asp

Norris, S., Lau, J., Smith, S., Schmid, C., & Engelgau, M. (2002). Self-management education for adults with type 2 diabetes: A meta-analysis of the effect on glycemic control. *Diabetes Care, 25*(7), 1159-1171.

Pazzibugan, D. (2009, October 29). 4.9 million Filipinos risk contracting diabetes. *Philippine Daily Inquirer*. Retrieved from http://newsinfo.inquirer.net/breakingnews/nation/view/20091029-232942/49M-Filipinos-risk-contracting-diabetes

Rubin, R. R. (2000). Diabetes and quality of life. *Diabetes Spectrum, 13*(1), 21. Retrieved from http://journal.diabetes.org/diabetesspectrum/00v13n1/pg21.htm

Smeltzer, S. C., Bare, B. G., Hinkle, J. L., & Cheever, K. H. (2010). *Brunner and Suddarth's textbook of medical surgical nursing*: In one volume (12th ed.). Philadelphia, PA: Lippincott Williams & Wilkins.

Soria, M. L., Sy, R. G., Vega, B. S., Ty-Willing, T., Abenir-Gallardo, A., Velandria, F., & Punzalan, F. E. (2009). The incidence of type 2 diabetes mellitus in the

Philippines: A 9-year cohort study. *Diabetes Research and Clinical Practice, 86*(2), 130-133.

Tang, Y. H., Pang, S. M., Chan, M. F., Yeung, G. S., & Yeung, V. T. (2008). Health literacy, complication awareness, and diabetic control in patients with type 2 diabetes mellitus. *Journal of Advanced Nursing, 62*(1), 74-83. doi: 10.1111/j.1365-2648.2007.04526.x

University of Illinois at Chicago [UIC]. (n.d.). Quality of life index Ferrans and Powers. Reliability and Validity. Retrieved from http://www.uic.edu/orgs/qli/reliability/reliabilityhome.htm

UNITE for Diabetes Philippines. (n.d.). Philippine practice guidelines on the diagnosis and management of diabetes mellitus. Retrieved from http://www.diabetesphil.org/html/files/clinical_practice_guidelines_draft.pdf

Wändell, P. E. (2005). Quality of life of patients with diabetes mellitus: An overview of research in primary health care in the Nordic countries. *Scandinavian Journal of Primary Health Care, 23*(1), 68-74. doi: 10.1080/02813430510015296

Wild, S., Roglic, G., Green, A., Sicree, R., & King, H. (2004). Global prevalence of diabetes: Estimates for the year 2000 and projections for 2030. *Diabetes Care, 27*(5), 1047-1053. doi:10.2337/diacare.27.5.1047