QUALITY OF LIFE AND COMPLIANCE AMONG TYPE 2 DIABETIC PATIENTS

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Abstract. A cross-sectional study was conducted to explore the quality of life (QOL) and compliance among type 2 diabetic patients in Saraburi Province, Thailand. Compliance was assessed by evaluatiing dietary intake and life style patterns useful for diabetes patients to maintain health and prevent complications of the disease. A multistage sampling technique was used for selecting patients from 2 districts (Wihan Daeng and Nong Don) and subjects were classified into 2 groups according to a quality of life (QOL) score (good = 70, poor to moderate = 94) using WHOQOL-BREF-THAI criteria. Data were collected from September to December 2007 using a self-administered questionnaire. Simple descriptive statistics were used to provide basic information about the two groups and for analytical purposes the chi-square test and multiple logistic regression were applied. The majority (78.7%) of study participants were females. Most patients belonged to the age groups of either ≥ 50 years (50%) or 40-49 years (36.6%). Bivariate analysis revealed socio-demographic factors were not significantly associated with QOL ($p>0.05$). As far as compliance was concerned dietary control and drug intake were significantly associated with QOL ($p<0.05$). Multivariate analysis indicated that overall compliance was associated with QOL (OR = 1.91, 95% CI = 1.02-3.57). We conclude that good QOL is significantly related to good compliance. Therefore, diabetic patients should be made aware that following the suggestions to prevent side effects of the disease and trying to stay healthy despite suffering from the disease will significantly improve their QOL.

INTRODUCTION

The number of people with diabetes mellitus (DM) is steadily increasing in Southeast Asia due to population growth, aging, urbanization, and the increasing prevalence of obesity as well as physical inactivity (WHO and IDF, 2004). The prevalence of DM is dramatically rising worldwide; 171 million people suffered from diabetes in 2000, and it is expected that this figure will double to 366 million by 2030 (Wild *et al*, 2004). In Thailand, the prevalence of DM has risen from 5.7% in 1991 to 9.6% in 2000 (Thai Multicenter Research Group on Diabetes Mellitus, 1994; Aekplakorn *et al*, 2003). The biggest impact is felt by adults of working age in developing countries.

The World Health Organization (WHO) has established two main objectives in caring for diabetic patients: first, maintain the health and quality of life of individuals with diabetes through effective patient care and education and second, treat and prevent complications of the disease which should decrease morbidity and mortality as well as reduce treatment lost.

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To achieve these objectives is not easy unless there is a good cooperation from patients. However, if these objectives can be achieved, diabetic patients may obtain the same quality of life as healthy people. The goals of this investigation were to explore the quality of life (QOL) of type 2 diabetic patients and relate QOL to compliance.

MATERIALS AND METHODS

Study population and data collection

A cross-sectional study was conducted from September to December, 2007 in order to study compliance and QOL of type 2 diabetic patients in Saraburi Province, Thailand. A multistage technique was used to select DM patients from the health centers in 2 districts of the province (Wihan Daeng and Nong Don). The paricipants of the survey were allocated to 2 groups according to a good- or moderate to poor QOL (good = 70, moderate to poor = 94) using WHOQOL-BREF-THAI criteria (Mahatnirunkul *et al*, 1998). The WHOQOL-BREF-THAI is a Thai version of a QOL (as an individual's perception of their position in life) assessment instrument developed by the WHO (Harper and Power, 1998). Subjects with scores ≥ 96 were classified as having good QOL.

Each subject gave written consent to participate in the study after details of the study were described. A face to face interview was conducted and the weight and height were measured by trained health staff. The questionnaire consisted of 3 parts: socio-demographic indicators, information about the health of the patients and their compliance in terms of dietary control, physical exercise, medication use and foot care.

For describing socio-demographic factors simple descriptive statistics were used. Bivariate analysis was performed using the chi-square test to differentiate proportional exposures between DM patients with good and moderate to poor QOL to determine categorical variables suitable for multiple logistic regression analysis, which was used to estimate the adjusted odds ratios and their 95% CI for OR as measures of association including identification and adjustment for confounding variables. Statistical significance was set at a p-value < 0.05.

Sample size

The sample size was calculated using the following formula (Lemeshow *et al*, 1990):

$$n = \frac{\left\{Z_{\alpha/2}\sqrt{2P(1-P)} + Z_{\beta}\sqrt{P_1(1-P_1)+P_o(1-P_o)}\right\}^2}{(P_1-P_o)^2}$$

Where n = the minimum number of DM patients to be included, P_o = the proportion of good compliance in the moderate to poor QOL group = 0.40, P_1 = the proportion of good compliance in the good QOL group = 0.70, $Z_{\alpha/2}$ = 1.96 at α = 0.05, Z_{β} = 1.64 at β = 0.05, P = 0.55 (P_1 and P_o were obtained by a pilot study); the sample size in each group was at least 69 individuals.

The study proposal was reviewed and approved by the Ethics Committee for Human Research of the Faculty of Public Health, Mahidol University.

RESULTS

The main baseline and demographic characteristics of the patients are given in Table 1. The majority (78.7%) of study participants were females. Most patients belonged to the age group of either ≥ 50 years (50%) or 40-49 years (36.6%). Seventy-eight point one percent finished only primary school. Most were married (79.3%), and Buddhist (98.2%). About half (53.7%) had a body mass index (BMI) < 25 kg/m^2. The average monthly family income was < 5,000 baht in 54.9% and many (47.6%) were employees.

On bivariate analysis, factors significantly associated with QOL by the Pearson

Table 1
Baseline and demographic characteristics of type 2 diabetes patients.

Variables	Overall No. (%)	Good QOL[a] No. (%)	Moderate to poor QOL No. (%)
Gender			
Female	129 (78.7)	55 (78.6)	74 (78.8)
Male	35 (21.3)	15 (21.4)	20 (21.3)
Age (yrs)			
30-39	22 (13.4)	9 (12.9)	13 (13.8)
40-49	60 (36.6)	26 (37.1)	34 (36.2)
≥ 50	82 (50.0)	35 (50.0)	47 (50.0)
Mean (SD)	48.56 (7.5)	48.31 (7.9)	48.74 (7.3)
Min-Max	30-59	30-59	30-59
Weight (kg)			
Mean (SD)	65.14 (13.3)	66.16 (15.2)	64.38 (11.7)
Height (cm)			
Mean (SD)	159.57 (6.6)	159.21 (6.8)	159.83 (6.5)
BMI (kg/m^2)			
< 25	88 (53.7)	34 (48.6)	54 (57.4)
25-30	45 (27.4)	23 (32.9)	22 (23.4)
> 30	31 (18.9)	13 (18.6)	18 (19.1)
Mean (SD)	25.71 (5.0)	26.17 (4.9)	25.38 (5.1)
Min-Max	18.39-36.62	18.39-36.62	18.45-35.79
Marital status			
Married	130 (79.3)	60 (85.7)	70 (74.5)
Single	10 (6.1)	3 (4.3)	7 (7.4)
Widowed, Divorced, Separated	24 (14.6)	7 (10.0)	17 (18.1)
Religion			
Buddhism	161 (98.2)	69 (98.6)	92 (97.9)
Other	3 (1.8)	1 (1.4)	2 (2.1)
Education			
Primary school	128 (78.0)	58 (82.9)	70 (74.5)
No formal education	7 (4.3)	2 (2.9)	5 (5.3)
Secondary	21 (12.8)	5 (7.1)	16 (17.0)
Vocational school, Diploma and higher	8 (4.9)	5 (7.1)	3 (3.2)
Occupation			
Agriculturist	27 (16.5)	12 (17.1)	15 (16.0)
Merchant	24 (14.6)	9 (12.9)	15 (16.0)
Employee/Laborer	78 (47.6)	33 (47.1)	45 (47.9)
House work	32 (19.5)	14 (20.00)	18 (19.1)
Government officer, State enterprise	3 (1.8)	2 (2.9)	1 (1.0)
Family income/month (baht)			
< 5,000	90 (54.9)	34 (48.6)	56 (59.6)
5,000 - 9,999	54 (32.9)	26 (37.1)	28 (29.8)
≥ 10,000	20 (12.2)	10 (14.3)	10 (10.6)
Mean (SD)	6,966.95 (6,312.8)	7,812.57 (7,492.54)	6,337.23 (5,220.80)
Median (QD)	5,000 (3,000)	5,940 (3,500)	5,000 (2,500)
Min-Max	1,000-50,000	1,000-50,000	1,000-30,000

[a]QOL = quality of life

Table 2
Sociodemographic factors associated with QOL[a] among type 2 diabetes patients.

Variables	Quality of life		p-value[c]
	Good QOL[b] /total	%	
Gender			0.981
Female	55/129	42.6	
Male	15/35	42.9	
Age (yrs)			0.981
30-39	9/22	40.9	
40-49	26/60	43.3	
≥ 50	35/82	42.7	
BMI (kg/m^2)			0.386
< 25	34/88	38.6	
25-30	23/45	51.1	
> 30	13/31	41.9	
Marital status			0.330
Married	60/130	46.1	
Single	3/10	30	
Widowed, Divorced, Separated	7/24	29.2	
Religion			0.219
Buddhist	69/161	42.9	
Others	1/3	33.3	
Education			0.139
Primary school	58/128	45.3	
No formal education	2/7	28.6	
Secondary	5/21	23.8	
Vocational school, Diploma and higher	5/8	62.5	
Occupation			0.906
Agriculturist	12/27	44.4	
Merchant	9/24	37.5	
Employee/Laborer	33/78	42.3	
House work	14/32	43.7	
Government officer, State enterprise	2/3	66.7	
Family income/month (baht)			0.193
< 5,000	34/90	37.8	
≥ 5,000	36/74	48.6	

[a]QOL = quality of life
[b]Good QOL = the number of patients with good QOL
[c]p-value of the Pearson chi-square test

chi-square test ($p < 0.05$) were the combined factors of compliance with dietary control and medication compliance. Other variables were not significantly associated with QOL (Table 2 and Table 3).

Logistic regression revealed an association between compliance and good QOL (OR = 1.91, 95%CI = 1.02-3.57).

Table 3
Health factors and behavioral compliance associated with QOL[a] among type 2 diabetic patients.

Variables	Quality of life		p-value[c]
	Good QOL[b] /total	%	
Duration of DM (yrs)			0.221
1-5	64/144	44.4	
6-10	6/20	30.0	
FPG (mg/dl)			0.599
≤ 120	22/56	39.3	
121-160	30/63	47.6	
> 160	18/45	40.0	
Systolic BP (mmHg)			0.455
≤ 120	34/71	47.9	
121-140	27/72	37.5	
> 140	9/21	42.9	
Diastolic BP (mmHg)			0.238
≤ 80	44/111	39.6	
81-90	22/41	53.7	
> 90	4/12	33.3	
Overall behavioral compliance			0.042
poor	41/83	49.4	
good	29/81	35.8	
Compliance of			
Dietary control			0.003
poor	20/69	29.0	
good	50/95	52.6	
Exercise			0.367
poor	36/91	39.5	
good	34/73	46.6	
Drug intake			<0.001
poor	12/60	20.0	
good	58/104	55.8	
Foot care			0.754
poor	33/75	44.0	
good	37/89	41.6	

[a]QOL = quality of life
[b]Good QOL = the number of patients with good QOL
[c]p-value of the Pearson chi-square test

DICUSSION

The majority of study subjects were females (50%) age ≥ 50 years. The proportion of subjects with DM in the older age group was higher than in the younger and middle aged groups. A number of studies reported that diabetes mellitus is more common in females than males (Wild *et al*, 2004; Akinci *et al*, 2008). Females were reported as more interested in their health than males. DM patients here were classified by their QOL. Even

though the monthly family income was not significantly associated with QOL, it was found that a higher QOL was positively associated with a higher monthly family income, which is in agreement with some reports that indicated that poverty was an important indicator for health status (Chrvala and Bulger, 1999; Guillausseau, 2005). Those with a duration of DM > 5 years, FPG > 160 mg/dl, systolic BP > 140 mg/dl or diastolic BP > 90 mg/dl were less likely to have a QOL than those with normal levels, but the difference was not significant.

Good compliance was associated with a higher QOL which is in agreement with a number of other authors (Honish *et al*, 2006; Huang and Hung, 2007; Wattana *et al*, 2007). In particular, compliance with dietary control, exercise, and medication use were positively associated with QOL, while foot-care was not associated with QOL. A possible reason for this finding is that the majority of participants were new patients having DM less than 5 years and with no complications. The results of logistic regression indicate that good compliance in various aspects results in a higher QOL than poor compliance, however exercise and foot-care had no statistically significant association with QOL. It has been suggested that type 2 diabetic patients who correctly control sugars in their daily meal plan improve their perceived quality of life (Nadeau *et al*, 2001). Efforts focused on DM patients are needed to encourage greater compliance. Regular education of patients with DM is an important strategy which may lead to improved compliance and better quality of life (Glasgow *et al*, 2006).

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