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Quality of Life in Patients with Type 2 Diabetes: Application of WHOQoL-BREF Scale

Ali Gholami [1, 2]*, Mohammad Azini [3], Abasalt Borji [1], Faramarz Shirazi [3], Zahra Sharafi [3], Esmail Zarei [4]

[1] Nursing Department, Neyshabur University of Medical Sciences, Neyshabur, IR Iran
[2] Students' Research Committee, Neyshabur University of Medical Sciences, Neyshabur, IR Iran
[3] Disease Prevention Group, Neyshabur University of Medical Sciences, Neyshabur, IR Iran
[4] Occupational Health Department, Neyshabur University of Medical Sciences, Neyshabur, IR Iran

* Corresponding Author: Ali Gholami, Neyshabur University of Medical Sciences, Razi Avenue, Istgah Street, Neyshabur, IR Iran, Tel: +98-5513336610, Fax: +98-5513333964, E-mail: aagholami80@yahoo.com

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Abstract

Background: Diabetes is one of the most important chronic diseases which may have a negative effect on the quality of life (QoL) of diabetic patients. The objective of this study was to evaluate QoL in patients with type 2 diabetes living in rural regions of Neyshabur (a city in the northeast of Iran) as well as determine some factors associated with it, by using the WHOQoL-BREFE scale.

Methods and Materials: In this cross-sectional study, a total of 1847 patients with type 2 diabetes were studied in Neyshabur from April to July 2012. The Iranian version of the WHOQoL-BREF questionnaire was used to measure QoL. Linear Regression Model was conducted to determine the relation between QoL of study population and various variables. The level of significance was set at $p < 0.05$ for all analyses. Data were analyzed using SPSS software ver16.

Results: The mean age of the study population was 59.65 ± 12.3 yr (Range: 30-97 yr). The majority of participants were female (69.8%). The overall observed Cronbach's alpha coefficient for WHOQoL-BREF was 0.93 and for each domain of it ranged from 0.69 to 0.86. The total mean score of WHOQoL-BREF was 12.18. The lowest and the highest mean scores were observed in Psychological health domain (11.73) and Social relationship domain (12.66), respectively. Backward multiple linear re-

gression model revealed that Education levels, Marital Status and Household Income were significantly associated with all domains of WHOQoL-BREF ($P < 0.05$).
Conclusions: The findings from this study appear that surveyed diabetic patients have WHOQoL-BREF scores that might be considered to indicate a moderate to low QoL, so it seems that providing international programs is necessary to improve QoL of them

Keywords: Type 2 Diabetes; Quality of Life; WHOQoL-BREF; Neyshabur

Introduction

Diabetes is one of the most important chronic diseases in population that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. Type 1 diabetes known as insulin-dependent, juvenile or childhood-onset and Type 2 diabetes known as non-insulin-dependent or adult-onset**.** Type 2 diabetes comprises 90% of people with diabetes around the world, and is largely the result of excess body weight and physical inactivity (1). Diabetes and its complications may have negative effect on QoL of patients, but relatively little is known about it. QoL is defined by World Health Organization (WHO) as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (2). In order to study QoL, we must be able to measure it. In the world, many general instruments have been used to measure QoL. The World Health Organization QoL-BREF (WHOQoL-BREF) questionnaire is one of the instruments that is used to measure QoL in different patients groups (3-7). The WHOQoL-BREF questionnaire is available in many languages (8) and also it has been translated into Persian and then validated in Iran by Nedjat (9). Information on the QoL of diabetic patients is important for health policy makers and physicians in order to identify and implement interventional programs for improving the QoL of them. Some studies assessed QoL in diabetic patients and they suggest a decrease in their QoL (10-13). This study conducted in order to assess QoL of diabetic patients that they live in rural regions of Neyshabur as well as determine some factors associated with it with use of WHOQoL-BREF scale.

Materials & Methods

This cross-sectional study was conducted in 1847 patients with type 2 diabetes. The data were collected between April and July 2012, at the all rural regions of Neyshabur. Of all diabetic patients (n = 2224), three hundred and seventy seven persons were excluded from the study because of their

avoidance to participate in the study (response rate: 83.05%). Individuals with diabetes were identified based on the lists available in the Neyshabur rural health centers. In this study for all study population provided informed consent after being acquainted with the purpose of study. Questionnaires have been filled by participants (except illiterate persons and some special situations) and all of them were informed that their responses would remain confidential. In this study, we made use of the WHOQoL-BREF questionnaire that was validated by Nedjat in Iran (9). The WHOQoL-BREF questionnaire contains 26 questions: two questions from the Overall QoL and General Health and 24 questions of satisfaction divided into four domains: 1. Physical Health, 2. Psychological Health, 3. Social Relationships, and 4. Environmental Health. The responses of each question are rated on a 5-point Likert scale and scored from 1 to 5. Raw scores in each domain were transformed to a 4–20 score according to guideline (8). The mean score of questions in each domain is used to calculate the domain score and finally they transformed linearly to a 0–100-scale (14, 15). Higher scores are associated with a higher QoL. Inclusion criteria applied in the study included: (a) having diabetes type 2, (b) residence in Neyshabur rurals regions (c) agreement to participate in the study. Data were analyzed with the use of SPSS16 software. Descriptive analyses were conducted including frequencies, percentages, ranges, means, and standard deviations (SD). The reliability of the WHOQoL- BREF domains was assessed using Cronbach's Alpha (0.70 and over were deemed acceptable) (16). We also assessed the reliability of the overall QoL. We examined the level of agreement between four domains of the WHOQoL- BREF with the use of Pearson's correlation coefficient. t-independent test and multiple linear regression model (with backward method) were used to investigate the relation between participants' QoL and their characteristics including sex, age, BMI, education level, marital status, household income and distance from the city. In this study transformed scores were used for statistical analyses in all domains and P values less than 0.05 were regarded as significant.

Results

Overall, 1847 diabetic patients were studied. Table 1 presents the characteristics of study population. The mean age of participants was 59.65 ± 12.3 yr (Rang: 30-97 yr). In this study majority of study population were female (sex ratio: 2.31). Cronbach's alpha coefficient was applied to evaluate the internal consistency of WHOQoL-BREF scale and the four domains of it. The

observed Cronbach's alpha coefficient for all questions of WHOQoL-BREF was 0.93 and for each domain the values are: Physical health domain = 0.86, Psychological health domain = 0.78, Social relationship domain = 0.69 and Environmental health domain = 0.76. Table 2 displays correlations between four domains of WHOQoL-BREF; as observed; there were significant correlations between all domains ($P < 0.05$). As Table 3 displays, the total mean score of WHOQoL-BREF was 12.18 and among the different domains of it, the lowest and the highest mean and percentage (Fig1) of satisfaction were observed in Psychological health domain (Mean = 11.73; percentage: 48.39) and Social relationship domain (Mean = 12.66; percentage: 54.16) respectively. As Table 3 shows, the mean scores in three domains of QoL (Physical Health, Psychological Health and Social relationship) were significantly higher in men in comparison to women. Also, the mean scores of four domains and total of WHOQoL- BREF according to other independent variables (age, BMI, educational level, marital status, household income and distance from city) are presented in table 3. As Table 3 displays, after the use of Univariate test observed that there was significant relation between different states of some variables in four domains and total of WHOQoL-BREF ($P < 0.05$). Table 4 shows the results of Backward Multiple Linear Regression; it shows that sex, age, education level, marital status and household income are significantly associated with total WHOQoL. Education level, marital status and household income are associated with four domains of WHOQoL. Age is associated with Physical Health and Psychological Health domains.

Discussion

This study was conducted in order to access information about QoL and associated factors among patients with type 2 diabetes in rural regions of Neyshabur. In this study it is observed that the overall mean score of QoL in diabetic patients is 12.18 (51.2%), indicating a moderate to low QoL in them. In Imayama' study, which was conducted to investigate the determinants of QoL in adults with type 1 and type 2 diabetes it was observed that the mean of QoL scores was 54.8 in type 1 diabetes group and 54.7 in type 2 diabetic group (17). Among the four domains of WHOQoL- BREF, the highest mean score was observed in SR domain (social relationships, 12.66), implying that study population had relatively more satisfaction of their personal relationships and sexual activity and also social support. Moreover, the lowest mean score was observed in PSH domain (Psychological health, 11.73),

indicating not very good bodily image, positive feelings, self-esteem, personal beliefs and concentration and also having more negative feelings.

Table1. Characteristics of Study Population (n = 1847)

Characteristics	**n**	**%**
Sex		
Male	558	30.2
Female	1289	69.8
Age*		
< 50 yr	382	20.7
≥ 50 yr	1461	79.3
BMI*		
< 25	583	33.2
≥ 25	1171	66.8
Education Level[a]		
Illiterate	1203	66.2
≥ Elementary	613	33.8
Marital Status		
Single/ Divorced	367	19.9
Married	1480	80.1
Household Income (per month)*		
< 4000000 Rial	993	67.8
≥ 4000000 Rial	471	32.2
Distance from the city		
< 30 km	970	52.5
≥ 30 km	877	47.5

[a] Some data were missing

Table 2. Correlation coefficients in four domains and two overall questions of WHOQoL-BREF

		PH	**PSH**	**SR**	**EH**	**Q1**	**Q2**
PH	Correlation Coefficient	1	0.699	0.49	0.561	0.494	0.634
	Sig. (2-tailed)		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
PSH	Correlation Coefficient		1	0.532	0.665	0.553	0.566
	Sig. (2-tailed)			< 0.001	< 0.001	< 0.001	< 0.001
SR	Correlation Coefficient			1	0.53	0.436	0.4
	Sig. (2-tailed)				< 0.001	< 0.001	< 0.001
EH	Correlation Coefficient				1	0.495	0.426
	Sig. (2-tailed)					< 0.001	< 0.001
Q1	Correlation Coefficient					1	0.553
	Sig. (2-tailed)						< 0.001
Q2	Correlation Coefficient						1
	Sig. (2-tailed)						

Abbreviations: PH, Physical Health. PSH, Psychological Health. SR, Social Relationships. EH, Environmental Health

Table 3. Comparison of the WHOQoL- BREF Mean Scores in four Domains According to Independent Variables

Abbreviations: PH, Physical Health. PSH, Psychological Health. SR, Social Relationships. EH, Environmental Health

	Domains				
	PH	**PSH**	**SR**	**EH**	**Total**
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Total	11.87±2.69	11.73±2.50	12.66±2.94	12.44±2.19	12.18±2.13
Sex					
Male	12.09 ± 2.90	12.00 ± 2.72	13.04 ± 2.85	12.42 ± 2.38	12.39±2.30
Female	11.78 ± 2.60	11.62 ± 2.38	12.50 ± 2.97	12.45 ± 2.11	12.09±2.05
P-value	0.031	0.004	< 0.001	0.784	0.008
Age					
< 50 yr	12.75 ± 2.74	12.40 ± 2.52	13.38 ± 2.83	12.82 ± 2.17	12.84 ± 2.10
≥ 50 yr	11.65 ± 2.63	11.56 ± 2.46	12.48 ± 2.94	12.35 ± 2.19	12.01 ± 2.11
P-value	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
BMI					
< 25	11.66 ± 2.69	11.56 ± 2.57	12.35 ± 3.04	12.41 ± 2.21	11.99 ± 2.18
≥ 25	12.03 ± 2.66	11.86 ± 2.42	12.88 ± 2.87	12.52 ± 2.13	12.32 ± 2.07
P-value	0.005	0.018	< 0.001	0.308	0.002
Education Level					
Illiterate	11.56 ± 2.55	11.46 ± 2.36	12.31 ± 2.94	12.22 ± 2.08	11.89 ± 2.00
≥ Elementary	12.54 ± 2.80	12.33 ± 2.57	13.42 ± 2.78	12.95 ± 2.43	12.81 ± 2.18
P-value	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Marital Status					
Single/Divorced	11.15 ± 2.54	10.86 ± 2.43	10.58 ± 2.84	11.83 ± 2.19	11.10 ± 1.99
Married	12.05 ± 2.69	11.95 ± 2.47	13.18 ± 2.72	12.60 ± 2.16	12.44 ± 2.08
P-value	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Household Income (per month)					
< 4000000 Rial	11.57 ± 2.60	11.51 ± 2.43	12.30 ± 2.98	12.23 ± 2.16	11.90 ± 2.06
≥ 4000000 Rial	12.81 ± 2.60	12.41 ± 2.40	13.55 ± 2.74	13.14 ± 2.05	12.98 ± 2.05
P-value	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Distance from the city					
< 30 km	11.90 ± 2.62	11.77 ± 2.46	12.65 ± 2.92	12.52 ± 2.17	12.21±2.09
≥ 30 km	11.95 ± 2.69	11.72 ± 2.51	12.72 ± 2.95	12.44 ± 2.20	12.21±2.15
P-value	0.671	0.704	0.604	0.451	0.994

In present study, after the use of multiple linear regression (as shows in table 4) it was observed that education level, marital status and household income were significantly associated with total and four domains of WHOQoL ($P < 0.05$). In study conducted by Monjamed, the results showed that QoL was significantly associated with education level of study population (diabetic persons) but no significance association was observed between QoL and marital status (18). In Baghiyani' study conducted on 120 type 2 diabetic persons in Yazd, no significance association was observed between education level and QoL (19). In Glasgow' study it was observed that less education and lower income are related to lower QoL in diabetic patients (20). In

Jacobson' study a pattern of relationships was observed between marital status and QoL, which indicated that divorced or separated persons experienced worse QoL than those who were married or single (21). In this study, we found that QoL is better among diabetic men than among diabetic women. Some factors may be associated with lower QoL in women as well as diabetes (e.g., having more depression or anxiety in comparison to men, pregnancy, delivery, milking and so on) that need to do more investigation. As the findings of Baghiyani Moghadam, Glasgow and Dias' studies showed men had a better perception of QoL than women (19, 20, 22). In Russell and Akinci studies, it was observed that males had significantly higher QoL than females (20, 23). Also, in some studies it was observed that females had higher QoL than males (18, 24, 25).

Table 4. Backward Multiple Linear Regression Analyses of Significant Factors Associated With Qol

QoL Domains	**Variables**	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	***P*-value**
		B	SE	Beta		
PH	Age	- 0.84	0.19	- 0.124	- 4.51	< 0.001
	Education level	0.37	0.16	0.07	2.30	0.022
	Marital Status	- 0.45	0.18	- 0.07	- 2.56	0.011
	Household Income	1.05	0.15	0.18	6.83	0.001
PSH	Age	- 0.56	0.17	- 0.09	- 3.23	0.002
	Education level	0.38	0.15	0.07	2.53	0.012
	Marital Status	- 0.76	0.16	- 0.13	- 4.69	< 0.001
	Household Income	0.63	0.14	0.12	4.43	< 0.001
SR	Education level	0.5	0.18	0.08	2.87	0.004
	Marital Status	- 2.45	0.19	- 0.34	- 12.96	< 0.001
	Household Income	0.705	0.17	0.11	4.28	< 0.001
EH	Education level	0.39	0.12	0.085	3.14	0.002
	Marital Status	- 0.54	0.14	- 0.10	- 3.83	< 0.001
	Household Income	0.705	0.12	0.15	5.67	< 0.001
Total	Age	- 0.48	0.15	- 0.09	- 3.31	0.001
	Sex	0.25	0.13	0.05	1.97	0.049
	Education level	0.44	0.13	0.098	3.42	0.001
	Marital Status	-1.07	0.14	- 0.21	- 7.73	< 0.001
	Household Income	0.81	0.12	0.18	6.72	< 0.001

Abbreviations: PH, Physical Health. PSH, Psychological Health. SR, Social Relationships. EH, Environmental Health

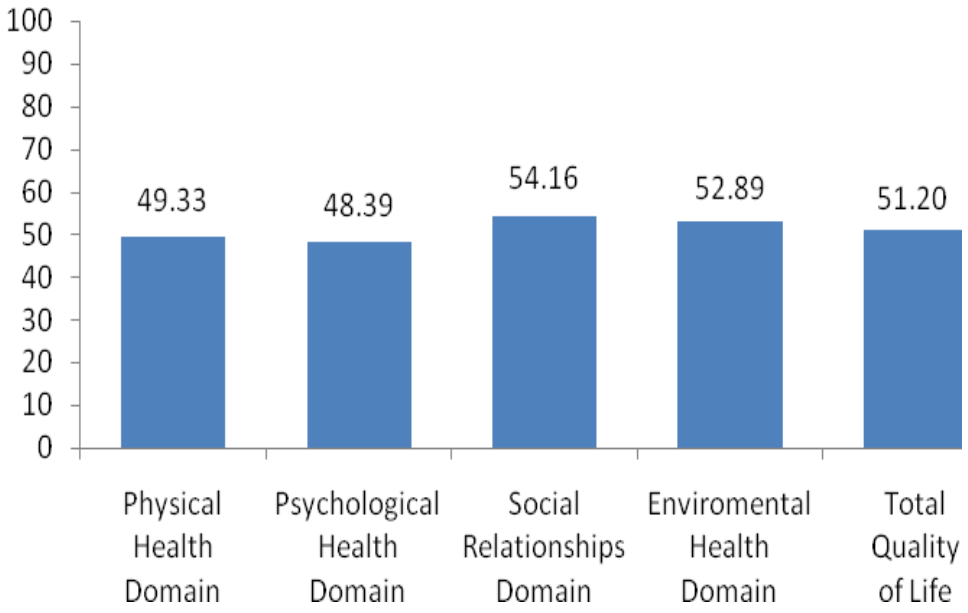

Fig 1. Comparison Transformed Scores of the WHOQoL- BREF in Total and its Four Domains

In this study observed that younger persons had significantly higher QoL than older persons. In Monjamed and Baghiyani Moghadam' studies didn't observed significance association between age of diabetic persons and QoL of them (18, 19). In Glasgow' study observed that older diabetic people had lower QoL (20). As showed in some studies, increasing age of diabetic patients has been associated with reduced physical functioning, better mental health, increased resignation to chronic illness, and less tolerance for ambiguities of the disease (20, 26-29).

Conclusion

Overall, Neyshabur type 2 diabetic patients reported low to moderate QoL, which appears to be related to some factors, especially education levels, marital status and household income. The findings of the present study indicates that there is a special need in order to identify and implement appropriate interventions by Neyshabur health leaderships for achieving better management of diabetes and finally improving the relatively low level of QoL of diabetic patients that they live in rural regions of Neyshabur.

Conflict of interest statement

The authors have no conflicts of interest.

Authors' contributions

A.GH carried out the design and coordinated the study and prepared the manuscript. A.B and E.Z participated in data analysis and prepared the manuscript. Other authors participated in data collection. All authors read and

approved the content of the manuscript.

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References

1. Organization WH. Diabetes. Available from: http://www.who.int/mediacentre/factsheets/fs312/en/.
2. What quality of life? The WHOQOL Group. World Health Organization Quality of Life Assessment. World health forum. 1996;17(4):354-6. Epub 1996/01/01.
3. Rovere H, Rossini S, Reimão R. Quality of life in patients with narcolepsy: a WHOQOL-bref study. Arquivos de neuro-psiquiatria. 2008;66(2A):163-7.
4. Asnani MR, Lipps GE, Reid ME. Utility of WHOQOL-BREF in measuring quality of life in Sickle Cell. Health and quality of life outcomes. 2009;7:75.
5. Najafi M, ShEIKhVATAN M, Montazeri A. Cardiovascular topics. Cardiovascular Journal of Africa. 2009;20(5):284-9.
6. Aguiar MIFd, Farias DR, Pinheiro ML, Chaves ES, Rolim ILTP, Almeida PCd. Quality of life of patients that had a heart transplant: application of Whoqol-Bref scale. Arquivos brasileiros de cardiologia. 2011;96(1):60-8.
7. Theofilou P. Quality of life in patients undergoing hemodialysis or peritoneal dialysis treatment. Journal of clinical medicine research. 2011;3(3):132.
8. Organization WH. WHOQOL- BREF Introduction, Administration and Scoring, Field Trial version. Geneva: World Health Organization. 1996.
9. Nejat S, Montazeri A, Mohammad K, Majdzadeh S. The World Health Organization quality of Life (WHOQOL-BREF) questionnaire: Translation and validation study of the Iranian version. Journal of School of Public Health and Institute of Public Health Research. 2006;4(4).
10. Stewart AL, Berry SD. Functional Status and Well-being. Jama. 1989;262:907-13.
11. Mayou R, Bryant B, Turner R. Quality of life in non-insulin-dependent diabetes and a comparison with insulin-dependent diabetes. Journal of psychosomatic research. 1990;34(1):1-11.
12. Lloyd CE, Matthews KA, Wing RR, Orchard TJ. Psychosocial factors and complications of IDDM. The Pittsburgh epidemiology of diabetes complications study. VIII. Diabetes Care. 1992;15(2):166-72.
13. Nerenz DR, Repasky DP, Whitehouse FW, Kahkonen DM. Ongoing assessment of health status in patients with diabetes mellitus. Medical care. 1992:MS112-MS24.
14. Harper A, Power M. WHOQOL User manual. World Health Organization Edinburgh. 1999.
15. Skevington SM, Tucker C. Designing response scales for cross-cultural use in health care: Data from the development of the UK WHOQOL. British journal of medical psychology. 1999;72(1):51-61.
16. Altman D, JM B. Cronbach's alpha. BMJ. 1997;314:572.
17. Imayama I, Plotnikoff RC, Courneya KS, Johnson JA. Determinants of quality of life in adults with type 1 and type 2 diabetes. Health Qual Life Outcomes. 2011;19(9):115.
18. Monjamed Z, Mehran A, Peimani T. The quality of life in diabetic patients with chronic complications. Hayat. 2006;12(1).
19. Baghiani Moghadam M, Afkhami Ardakani M, Mazloumi S, Saaidizadeh M. Quality of life in diabetes type II patients in Yazd. Journal of Shahid Sadoughi University of Medical Sciences and Health Services. 2007;14(4):49-54.
20. Glasgow RE, Ruggiero L, Eakin EG, Dryfoos J, Chobanian L. Quality of life and associated characteristics in a large national sample of adults with diabetes. Diabetes Care. 1997;20(4):562-7.
21. Jacobson AM, De Groot M, Samson JA. The evaluation of two measures of quality of life in patients with type I and type II diabetes. Diabetes Care. 1994;17(4):267-74.
22. Dias C, Mateus P, Santos L, Mateus C, Sampaio F, Adão L, et al. Acute coronary syndrome and predictors of quality of life. Revista portuguesa de cardiologia: orgão oficial da Sociedade Portuguesa de Cardiologia= Portuguese journal of cardiology: an official journal of the Portuguese Society of Cardiology. 2005;24(6):819.

23. Akinci F, Yildirim A, Gözü H, Sargın H, Orbay E, Sargın M. Assessment of health-related quality of life (HRQoL) of patients with type 2 diabetes in Turkey. Diabetes research and clinical practice. 2008;79(1):117-23.
24. Ragonesi P, Ragonesi G, Merati L, Taddei M. The impact of diabetes mellitus on quality of life in elderly patients. Archives of Gerontology and Geriatrics. 1998;26:417-22.
25. Lloyd A, Sawyer W, Hopkinson P. Impact of long-term complications on quality of life in patients with type 2 diabetes not using insulin. Value in Health. 2001;4(5):392-400.
26. Dunn S, Smartt H, Beeney L, Turtle J. Measurement of emotional adjustment in diabetic patients: validity and reliability of ATT39. Diabetes Care. 1986;9(5):480-9.
27. Ahroni JH, Boyko EJ, Davignon DR, Pecoraro RE. The health and functional status of veterans with diabetes. Diabetes Care. 1994;17(4):318-21.
28. Keinänen-Kiukaanniemi S, Ohinmaa A, Pajunpää H, Koivukangas P. Health related quality of life in diabetic patients measured by the Nottingham Health Profile. Diabetic Medicine. 1996;13(4):382-8.
29. Rubin RR, Peyrot M. Quality of life and diabetes. Diabetes/metabolism research and reviews. 1999;15(3):205-18.