Evaluation of Relationship between Glycemic Control and Quality of Life in Type 2 Diabetics Attending Abu-Khalifa Family Practice Center, Ismailia Governorate, Egypt

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Abstract:

Introduction: Diabetes is one of the most common chronic diseases that impact quality of life and its management must go beyond glycemic control to include quality of life. **Objectives:** The aim of this study is to evaluate the relationship between quality of life and glycemic control in type 2 diabetic patients attending Abu Khalifa family medicine center in Ismailia.

Methods: A cross sectional study was conducted to assess quality of life in 151 adult patients with type 2 diabetes attending Abu-Khalifa family medicine center. SES (socioeconomic status) scale and SF-36 questionnaire were interviewed to all patients who were also tested for HbA1c. Data analysis was applied to identify the relationship between quality of life and glycemic control ,presented by HbA1c, and other significant predictors of quality of life with significant limit of P<0.05.

Results: Total sample include 151 patients of whom mean age was 50.01 ± 8.6, 80.1% females, 19.9% males. The mean HbA1c level was 8 ± 1.5, mean duration of diabetes was 7.92 ± 5.6, and mean quality of life 48.7 ± 24.2%. HbA1c was significantly associated with quality of life. Males had significantly higher scores than females. Older age, prolonged duration of diabetes and complications were significantly associated with less quality of life scores. **Conclusion:** Poor glycemic control, older age and women appear to be the most incremental correlate for poor quality of life so special consideration to future research on gender specific attributes to improve quality of care to this vulnerable group.

Keywords: Abu Khalifa, Glycemic control, Ismailia, Predictors, Quality of life, Type 2 diabetic patients.

Introduction:

In 1948 the World Health Organization defined health from a new perspective, stating that health was defined not only by the absence of disease and infirmity, but also by the presence of physical, mental and social well-being.[1] In recent years, there has been a major interest in quality of life issues, and especially in health-related quality of life, fueled by several factors, including a growing body of evidence concerning the potent effect of psychosocial factors on physical health outcomes, and dramatic changes in the organization and delivery of health care.[2] The psychosocial toll of living with diabetes is often a heavy one, and this toll can often, in turn, affect self-care behavior and, ultimately, long-term glycemic control, the risk of developing long-term complications, and quality of life.[3] Psychosocial factors often determine self-management behaviors, and psychosocial variables (such as depression) are often stronger predictors of medical outcomes such as hospitalization and mortality than are physiologic and metabolic measures (such as the presence of complications, BMI and HbA1c.[4,5]

Several studies have demonstrated that diabetes has a strong negative impact on the health-related quality of life (HRQOL),

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especially in the presence of complications.[6] However, most of the studies on diabetes and HRQOL have been conducted in developed countries and studies of the HRQOL in diabetic patients in developing countries are rare.[7]

Measuring health-related quality of life (HRQOL) in Type II DM is important for several reasons such as dietary restrictions, medication and the actual symptoms of this disease as well as concomitant diseases, all of which may lead to deteriorations in HRQOL.[8] This implies that HRQOL is increasingly used as an outcome measure to monitor the burden of DM on the population and the results of previous studies show that HRQOL is associated with duration of diabetes, age, female gender, diabetic complications, concomitant diseases and disease severity.[9,10]

The aim of this study is to investigate the effect of glycemic control in type 2 diabetes mellitus patients on their quality of life and results of this study can be used as database for further researchers and in planning for improving HRQOL in diabetic patients.

Methods:

This study is a cross- sectional study among type 2 diabetic patients attending Family Medicine outpatient clinic in Abu- Khalifa family practice center. It was conducted from September, 2015 to September, 2016, in Abu Khalifa family practice center, Ismailia, Egypt. The study included all adult diabetic patients who fulfill the inclusion criteria: males and females with type 2 diabetes who are 18 years old or more and agreed to participate in the study.

Excluding diabetic patients with other chronic illnesses that may influence health related quality of life (heart failure, chronic pulmonary diseases, chronic liver disease, severe malnutrition, terminal malignancy, and mental or psychological disorders). **Sampling:** Sample size was calculated according to the following formula:

$$SS = \frac{Z\alpha^{2}*(P)*(1-P)}{C^{2}}$$

Where SS= sample size

Z_{α}= 1.96 (The critical value that divides the central 95% of the Z distribution from the 5 in the tail). p = the prevalence of type 2 diabetes in Egypt= 10 % [11]

C = the margin of error (=width of confidence interval) = 0.05

So, by calculation, the sample size was 138, and add 10% dropout rate so it became ≥151. There are 300 family records of type 2 diabetic patients in Abu-Khalifa family practice center. From these records our sample was designed as following: Type 2 diabetic

patients were enlisted alphabetically in a frame from the records, and then the sample size "151" was selected by simple random sampling.

Tools of the study:

- Structured questionnaire for socioeconomic status scale. A valid questionnaire of Fahmy and El-Sherbini socioeconomic status scale was used.[12]

- Semi-structured questionnaire for medical history and clinical examination.

- Appropriate kits for assessment of HbA1C, automated analyzer (COBAS, 311, Roche, German) were used.

- The valid and reliable SF-36 questionnaire for assessment of quality of life: This was used for interviewing with the patients by the researcher.[13]

Data management:

- Gathered data had been processed using SPSS version 16 (SPSS Inc., Chicago, IL, USA).Quantitative data were expressed as means ± SD while qualitative data were expressed as numbers and percentages.

- Student *t* test was used to test significance of difference for quantitative variables and Chi Square was used to test significance of difference for qualitative variables.

- A probability value of p-value < 0.05 was considered statistically significant.

- Multiple logistic regression analysis was used for detecting factors influencing quality of life of type 2 diabetic

Ethical consideration:

The field work started after obtaining approval of the Local Ethics Committee. Participation in the study was completely voluntary, the investigators explained purpose of research and every patient was able to withdraw at any time, confidentiality was maintained.

Results:

Table-1 shows that the majority of the study group were females (80%), housewives with mean age of 50 years. Table -2 shows the medical history of the cases, the mean duration of diabetes mellitus was 7.9(±5.6) years, the most common complications among the study group,84.1% of them have diabetic neuropathy, 33.1% have dental problems and 15.9% have retinopathy and regarding the co-morbidities,39.7% have hypertension and 34.4 have dyslipidemia.Table-3 shows the pattern of received therapy of the study group, 47.7% receive oral hypoglycemic drugs, 31.8% receive insulin and 20.5% receive combination therapy.it also shows the compliance of patients regarding their treatment , only 16.2% of the study group are not compliant. Table 4 illustrates that the socioeconomic status of the studied group ranges between very low to

middle status as their scores ranging between 18– 60 years.

Table-5 showed the quality of life scores of the study group, the physical domain scores were 62.6 ± 25.9, the role-physical scores were 48.3 ± 50.1, the pain domain scores 58.3 ± 17.5, the vitality domain scores were 42.9 ± 24.2, the social domain scores were 54.5 ± 25.1, the role-emotional domain scores were 36.6 ± 47.5, the mental domain scores were 45.1 ± 21.8 and the general domain scores were 41.2 ± 18. Table-6 showed that gender is statistically significant in quality of life regarding the physical, pain, general, vitality, social and mental domains, males have higher quality of life scores, while it is of no statistical significance regarding the role-physical and role-emotional domains of quality of life.

Discussion:

The mean age of the sample was 50 years, females predominates males (80.1% to 19.9% respectively), the majority of the cases had secondary education and the majority are not working. The present study showed that age was a significant predictor of quality of life, but of no statistical significance regarding the role–emotional domain (P>.01), lower quality of life scores was reported in older patients, these results agreed with those reported by

Saleh et al**,** also those reported by Glasgow et al. This correlation can be explained by more complications and co-morbidities that patients may have by progression in age that can directly affect his quality of life.[2,14]

Gender is also a significant predictor of quality of life as reported in the current study as it was statistically significant regarding the physical, pain, general, vitality, social and mental domains, males have higher quality of life scores, while it was of no statistical significance regarding the role-physical and role-emotional domains of quality of life. This result was similar to those reported by Glasgow et al**,** Saleh et al and Rubin et al.[2,14,15]

The current study showed that the relationship between socioeconomic status scores and quality of life was not statistically significant. This finding is against what reported by Verma et al which showed a positive correlation between socioeconomic scores and quality of life. This difference can be due to that the present study was conducted in Abu-khalifa village which is a rural area and the socioeconomic status scores of all participating patients ranged between very low to middle status in contrast to the study of Verma et al which was conducted in Singapore over a wide range of patients with different cultures and socioeconomic classes.[16]

With regard to disease character and its relation to quality of life domains it was found that duration of diabetes was significantly associated with less scores in different quality of life domains, the prolonged duration of diabetes is usually associated with complications which may explain its relation to poor quality of life, this result is consistent with those of Glasgow et al**,** Saleh et al. and Klein et al.[2,15,17] The present study reported a negative correlation between quality of life and glycemic control represented by HbA1c in type 2 diabetic patients and this result is consistent with the results of a study conducted in Australia, 2006 Nov., aiming at examining the association of quality of life with glucose tolerance status in the Australian population to determine the stage in the development of diabetes that quality of life is impaired.[18]

This result is also in agreement with those reported by Goddijn et al., by Imran et al., Testa, Wikblad and Jacobson[19-23] In contradictory to the present study were; the study conducted by Weineberger and coworkers**,** (using the SF-36 questionnaire), in a Cohort study of patients from four community clinics in California, USA aiming at assessing the relationship between glycemic control and quality of life in diabetic patients and those reported by Saleh et al where the

connection between the degree of glycemic control and quality of life in patients with diabetes was not found.[14]

The strength of our study is the use of SF-36 questionnaire to assess the quality of life measures. It is a multi-purpose, short-form health survey. It yields an 8-scale profile of functional health and well-being scores as well as psychometrically-based physical and mental health summary measures and a preference-based health utility index. Only few studies have used this effective form in the evaluation of diabetic patient's quality of life.

Study Limitation:

At first, this study was a cross-sectional one which could detect only associations not causation. Case-control and cohort studies should be further conducted in this topic to resolve this limitation. All data were self-reported, so the medical conditions of the patients, comorbidities and complications could be under or over estimated. Finally, we do not have enough data on the severity and control of these conditions.

Conclusion:

Poorly controlled diabetic patients had lower mean SF-36 scores in general health, physical functioning, social functioning and mental health. The quality of life in type 2 diabetic patients seems to be dependent on multiple

factors. As glycemic control based on HbA1c values is considered one of the main changeable factors and it has high significant correlation with all domains of the quality of life assessment. So its improvement can show obvious improvement in the quality of life in type 2 diabetic patients.

References:

1. Conference I. Constitution of the World Health Organization. 1946. Bull World Health Organ. 2002;80(12):983.

2. Glasgow R, Ruggiero L, Eakin E et al. Quality of life and associated characteristics in a large national sample of adults with diabetes. Diabetes Care. 1997;20(4):562–7.

3. Rubin R, Peyrot M. Quality of life and diabetes. Diabetes Metab Res Rev. 1999;15(3):205–18.

4. Rosenthal M, Fajardo M, Gilmore S et al. Hospitalization and mortality of diabetes in older adults: a 3-year prospective study. Diabetes Care. 1998;21(2):231–5.

5. Bos M, Agyemang C. Prevalence and complications of diabetes mellitus in Northern Africa, a systematic review. BMC Public Health. 2013;13(1):387.

6. Zimmet P. The burden of type 2 diabetes: are we doing enough? Diabetes Metab. 2003;29(4):6S9-6S18.

7. Ghanbari A, Yekta Z, Roushan Z et al. Assessment of factors affecting quality of life in diabetic patients in Iran. Public Health Nurs. 2005;22(4):311–22.

8. Saito I, Inami F, Ikebe T et al. Impact of diabetes on health-related quality of life in a population study in Japan. Diabetes Res Clin Pract. 2006;73(1):51–7.

9. Wee H, Cheung Y, Li S et al. The impact of diabetes mellitus and other chronic medical conditions on health-related Quality of Life: Is the whole greater than the sum of its parts? Health Qual Life Outcomes. 2005;3(1):2.

10. Maddigan S, Majumdar S, Toth E et al. Health-related quality of life deficits associated with varying degrees of disease severity in type 2 diabetes. Health Qual Life Outcomes. 2003;1(1):78.

11. Federation I. IDF diabetes atlas. Brussels Int Diabetes Fed. 2013;

12. El-Gilany A, El-Wehady A, El-Wasify M. Updating and validation of the

socioeconomic status scale for health research in Egypt. East Mediterr Heal J. 2012;18(9).

13. Garratt A, Ruta D, Abdalla M et al. The SF36 health survey questionnaire: an outcome measure suitable for routine use within the NHS? Bmj. 1993;306(6890):1440–4.

14. Saleh M, Alwahedi Z, Taher M et al. Quality of Life Predictors and Glycemic Control among Type 2 Diabetic Patients Attending Primary Health Care Centers in Qatar. Prim Heal Care. 2016;6(222):1079–2167.

15. Rubin R, Peyrot M. Men and diabetes: psychosocial and behavioral issues. Diabetes Spectr. 1998;11(2):81.

16. Verma S, Luo N, Subramaniam M et al. Impact of depression on health related quality of life in patients with diabetes. 2017;

17. Klein B, Klein R, Moss S. Self-rated health and diabetes of long duration: the Wisconsin Epidemiologic Study of Diabetic Retinopathy. Diabetes Care. 1998;21(2):236–40.

18. Tapp R, Dunstan D, Phillips P et al. Association between impaired glucose metabolism and quality of life: results from the Australian diabetes obesity and lifestyle study. Diabetes Res Clin Pract. 2006;74(2):154–61.

19. Goddijn P, Bilo H, Feskens E et al. Longitudinal study on glycaemic control and quality of life in patients with Type 2 diabetes mellitus referred for intensified control. Diabet Med. 1999;16(1):23–30.

20. Kamarul I, Ismail A, Naing L et al. Type 2 diabetes mellitus patients with poor glycaemic control have lower quality of life scores as measured by the Short Form-36. Singapore Med J. 2010;51(2):157.

21. Testa M, Simonson D. Health economic benefits and quality of life during improved glycemic control in patients with type 2 diabetes mellitus: a randomized, controlled, double-blind trial. Jama. 1998;280(17):1490–6.

22. Wikblad K, Leksell J, Wibell L. Health-related quality of life in relation to metabolic control and late complications in patients with insulin dependent diabetes mellitus. Qual Life Res. 1996;5(1):123–30.

23. Jacobson A, De Groot M, Samson J. Quality of life research in patients with diabetes mellitus. Qual life Behav Med Res Hillsdale, NJ Lawrence Erlbaum Assoc. 1995;241–62.

Table (1): Frequency distribution of the study group according to their personal data (N=151)

Variable		No.	%
Age	▪ Mean ± SD	50.01 ± 8.6	
	▪ Min – Max	17 – 65	
Gender	▪ Male	30	19.9%
	▪ Female	121	80.1%
Education	▪ Illiterate	23	15.2%
	▪ Read & write	31	20.5%
	▪ Primary	9	6%
	▪ Preparatory	18	11.9%
	▪ Secondary	49	32.5%
	▪ Institute	11	7.3%
	▪ University	10	6.6%
Occupation	▪ Not working	101	66.9%
	▪ Unskilled manual	4	2.6%
	▪ Skilled manual	26	17.2%
	▪ Trades	9	6%
	▪ Clerk	11	7.3%

Table (2): Frequency distribution of the study group according to their medical history (N=151)

Variable		No.	%
Duration of DM	▪ Mean ± SD		7.92 ± 5.6
	▪ Min – Max		1 – 20
Complications of DM	▪ Diabetic retinopathy	24	15.9%
	▪ Neuropathy	127	84.1%
	▪ Dental problems	50	33.1%
Co- morbidities	▪ HTN	60	39.7%
	▪ Dyslipidemia	52	34.4%

*DM (diabetes mellitus), HTN (hypertension).

Table (3): Frequency distribution of the study group according to their pattern of therapy

Variable		No.	%
Treatment of DM	▪ Oral hypoglycemic	72	47.7%
	▪ Insulin	45	31.8%
	▪ Oral hypoglycemic + insulin	31	20.5%
Compliance on diabetic medications	▪ Compliant	131	86.6%
	▪ Not compliant	20	16.2%

*DM (diabetes mellitus).

Table (4): Frequency distribution of the study group according to their socioeconomic status score (N=151).

Variable		
Educational domain	▪ Mean ± SD	13.15 ± 6.1
	▪ Min – Max	0 – 26
Occupational domain	▪ Mean ± SD	2.8 ± 2.1
	▪ Min – Max	0 – 8
Family domain	▪ Mean ± SD	4.5 ± 0.8
	▪ Min – Max	3 – 6
Family possessions domain	▪ Mean ± SD	7.1 ± 1
	▪ Min – Max	4 – 8
Home sanitation domain	▪ Mean ± SD	5.8 ± 1.2
	▪ Min – Max	3 – 8
Economic domain	▪ Mean ± SD	1.6 ± 0.9
	▪ Min – Max	0 – 4
Health care domain	▪ Mean ± SD	2.9 ± 0.7
	▪ Min – Max	1 – 5
Total	▪ Mean ± SD	37.9 ± 8.6
	▪ Min – Max	18 – 60

Table (5): Frequency distribution of the study group according to their quality of life score (N=151).

Variable		
Physical	▪ Mean ± SD	62.6 ± 25.9
	▪ Min – Max	15 – 100
Role physical	▪ Mean ± SD	48.3 ± 50.1
	▪ Min – Max	0 – 100
Pain	▪ Mean ± SD	58.3 ± 17.5
	▪ Min – Max	12 – 100
Vitality	▪ Mean ± SD	42.9 ± 24.2
	▪ Min – Max	5 – 95
Social	▪ Mean ± SD	54.5 ± 25.1
	▪ Min – Max	12.5 – 100
Role emotional	▪ Mean ± SD	36.6 ± 47.5
	▪ Min – Max	0 – 100
Mental	▪ Mean ± SD	45.1 ± 21.8
	▪ Min – Max	4 – 88
	▪ Min – Max	17 – 65
General	▪ Mean ± SD	41.2 ± 18
	▪ Min – Max	5 – 77

Table (6): Multiple linear regression (analysis of variances, ANOVA) predictors of the physical domain of quality of life

	Unstandardized coefficients		Standardized coefficient	T	P
	B	**St. Error**	**Beta**		
▪ **Age**	-0.095	0.167	-0.031	-0.567	0.571
▪ **Gender**	15.911	3.119	2.246	5.101	0.000
▪ **Duration of diabetes**	-2.345	0.251	-0.510	-9.355	0.000
▪ **Compliance on diabetic Medications**	-28.58	8.006	-0.154	-3.57	0.000
▪ **HbA1c**	-50.09	.919	-0.297	-5.544	0.000
▪ **BMI**	-0.579	0.283	-0.311	-2.044	0.043
▪ **Diabetic foot problems**	1.428	3.189	0.020	0.488	0.655
▪ **Eye problems**	-3.039	3.510	-0.043	-0.866	0.388
▪ **Dental problems**	-7.455	2.835	-1.36	-2.62	0.010
▪ **HTN**	-6.88	2.47	-0.130	-2.77	0.006

*HbA1c (Glycosylated hemoglobin),   BMI (body mass index),   HTN (hypertension)

الملخص العربي

تقييم العلاقة بين التحكم في سكر الدم وجودة الحياة لدي المصابين بمرض البول السكري النوع الثاني في مركز طب الأسرة أبو خليفة ـ محافظة الاسماعيلية ـ مصر

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المقدمة : يعتبر مرض البول السكري من الأمراض المزمنة الأكثر شيوعا والذي يؤثر على جودة الحياة لدى المرضى ويؤدي لحدوث مضاعفات بدنية ونفسية .

الهداف : تقييم العلاقة بين نسبة السكر في الدم وجودة الحياة لدى مرضى البول السكرى لتحسين جودة الحياة لديهم.

طرق البحث : أجريت دراسة تحليلية مقطعية على ١٥١ مريض بمرض البول السكري النوع الثاني من المترددين على عيادة مركز طب الأسرة أبو خليفة بمحافظة الاسماعيلية حيث خضعوا لاستبيان منظم لجمع البيانات المتعلقة بتأثير مرض البول السكري على جودة الحياة لديهم ولتقييم الحالة الاجتماعية والاقتصادية كما تم عمل تحليل الهيموجلوبين السكرى لهم.

النتائج : تراوحت أعمار المرضى مابين ١٧ـ ٦٥ عاما ، ٨٠٪ منهم من الاناث ، وتراوحت نسبة الهيموجلوبين السكرى للمرضى بين ٦,١ـ ١٢,٢ وأوضح تقييم الحالة الاجتماعية والاقتصادية لهم انها بين منخفضة ومتوسطة حيث تراوحت درجات التقييم بين ١٨ ـ ٦٠ . أشارت الدراسة الى وجود علاقة بين نسبة الهيموجلوبين السكرى بالدم و جودة الحياة حيث يؤثر ارتفاعه سلبا على مدى جودة الحياة وان الرجال يحظون بحياة اكثر جودة من النساء بينما لا تؤثر الحياة الاجتماعية والاقتصادية على جودة الحياة . كما أظهرت الدراسة وجود علاقة بين تقدم العمر و زيادة فترة الاصابة بالمرض وعدم الانتظام بالعلاج ووجود مضاعفات لمرض البول السكري ومدى جودة حياة مرضى السكر من النوع الثانى حيث ان لهم تأثير سلبى على جودة حياتهم.

الخلاصة: أوضحت الدراسة ان ارتفاع نسبة السكر في الدم يؤثرسلبا على مدى جودة الحياة لدى المصابين بمرض البول السكري لذلك يوصى بوضع خطة علاج مكثفة لهم لتحقيق نسبة الهيموجلوبين السكرى المرجوة في الدم بما يتلائم مع كل مريض ، والاهتمام بالتثقيف الصحى للمرضى عن أهمية التحكم في نسبة السكر في الدم لتحسين جودة حياتهم ومنع المضاعفات على المدى البعيد.