ORIGINAL ARTICLE

ASSESSMENT OF HEALTH RELATED LIFE QUALITY IN TYPE 2 DIABETIC PATIENTS IN ZAGAZIG UNIVERSITY HOSPITALS

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ABSTRACT

Background: The fourth leading cause of death is type 2 Diabetes Mellitus (DM). Attention to the QOL of the patient is increasing today rather than the longevity of the patient. Therefore, to prevent aggravation of metabolic disorders, the quality of life of diabetic patients should be maintained. There is a growing awareness that patient QOL and satisfaction with treatment have been improved after good glycemic control. The aim of this study was to assess health related quality of life in patients with type 2 diabetes attending Zagazig University hospital plus associations between HRQOL scores and some variables playing role in scenario of DM were also studied.

Methods: A cross sectional study included 100 type 2 diabetic patients, They were subdivided according to glycemic control into 2 groups and 50 non-diabetic participants as control. This study was conducted in Internal Medicine department and diabetes outpatient clinic in Zagazig University hospital in period from July 2016 to July 2018. The QOL was measured using SF-36 questionnaire. **Results:** Our results revealed that there was highly significant difference regarding physical health component among groups of study ($p < 0.001$). There was also highly significant difference regarding mental health component among groups of study ($p < 0.001$). There was highly significant negative correlation between QOL components and age & BMI & duration of DM & HBA1c and fasting blood sugar in diabetic patients ($p < 0.001$). **Conclusions:** Type 2 diabetes mellitus in both the physical health and mental health domains is associated with a lower quality of life. Advanced age, obesity and poor glycemic control were factors related to lower quality of life in this study; therefore glycemic control is highly needed to improve the quality of life of diabetic patients.

Keywords: Quality of life; Glycemic control; HBA1c.

INTRODUCTION

The improvement in the quality of healthcare and the technological achievements in medicine alongside with the overall improvement of living conditions during the past decades increased the predominance of chronic disorders. Chronic diseases require medical treatment, progress slowly and can worsen the health of the patients and, thus, impair the overall health quality of life [1].

Over the past decades, the prevalence of DM in adults has increased. It should be noted

that the number of people with DM will increase from 415 million in 2015 to 642 million in 2040, according to the International Diabetes Federation (IDF). IDF has recognized Egypt as the ninth leading country in the world for the number of type 2 diabetes patients and its prevalence was nearly tripled over the last 2 decades. Scientists now urge the global community to recognize DM as perhaps the single most important health challenge of the twenty first century [2].

The fourth leading cause of death is type 2 Diabetes Mellitus (DM). Attention to the

QOL of the patient is increasing today rather than the longevity of the patient. Therefore, to prevent aggravation of metabolic disorders, the quality of life of diabetic patients should be maintained. There is a growing awareness that patient QOL and satisfaction with treatment have been improved after good glycemics [3].

It is well established that in the developed and developing countries, the prevalence of diabetes has increased over the past four decades. This is due to the abundance of food, the resulting change in dietary habits and the lack of exercise [4].

Due to the natural aging process, the elderly are prone to various physical and mental problems and multiple diabetes - related problems make the aging process even more difficult and complicated [5].

QoL can be defined as a sense of well-being embracing the physical, psychological, social, and spiritual state. When we refer to QoL in patients with chronic diseases, we can define it as the overall assessment of the subject's life, which depends on both the subject's characteristics and external factors [6].

DM is known to be associated globally with increased morbidity and mortality. However, its impact on functional health status and well - being is still not well addressed, especially in developing countries where prevalence is rapidly increasing [7].

Although numerous articles and reviews on diabetes are written on an annual basis concerning epidemiology, complications, therapies, treatment comparisons and health strategies, literature on the quality of life of diabetes patients and how complications, comorbidities or different treatments actually affect them is limited [8].

QoL is often measured by self-reported instruments, including SF-36, which has two main physical and mental dimensions, each consisting of four sub-scales. Four subscales of physical function, limitation of physical activity, physical and general health comprise the physical dimension of quality of life. The psychological dimension includes vitality

subscales, social function, mental role retardation and mental health [9].

Contrary to some quality of life tools that are limited to a specific group and are always criticized for such a limitation, the SF-36 is a general tool that can measure all important aspects of patient health. This tool can compare patients or patients with different conditions and diseases [10].

The aim of this study was to assess health related quality of life in patients with type 2 diabetes attending Zagazig University hospital plus associations between HRQOL scores and some variables playing role in scenario of DM were also studied.

METHODS

This study included 100 type 2 diabetic patients, they were subdivided according to glycemic control into 2 groups, 50 non-diabetic participants also included as a control.

Inclusion criteria: All patients were included comprehensively by Age > 30 years and type 2 diabetes mellitus diagnosis with at least six months prior to the study. This study was a comparative cross sectional and conducted in Internal Medicine department and diabetes outpatient clinic in Zagazig University hospital in period from July 2016 to July 2018. A systematic random sample was done.

Exclusion criteria: Diabetic patients with overt complications (impaired vision, stage IV & V CKD, loss superficial or deep sensation, charcot's joint, diabetic foot ulcer, limb amputation, stroke, MI), Type 1 diabetic patients, Pregnant women, Age < 30 years

The HRQOL was assessed using the Arabic version of the Short-Form 36-item survey (SF-36). The SF-36 includes eight concepts of health: physical functioning, limitations of role due to physical health problems, limitations of role due to personal or emotional problems, body pain, emotional well-being, social functioning, energy / fatigue and general perceptions of health. Scores range from 0 to 100, with higher values reflecting better quality of life associated with health.

Blood samples were obtained from all patients after 8 hours fasting. The poor

glycemic control was characterized when $HbA1c \geq 7.5\%$. On the other hand, good glycemic control is characterized when $HbA1c < 7.5\%$. The non-diabetic group has had random blood glucose tests to confirm that they do not suffer from diabetes mellitus to be included in the study.

Ethical Considerations:

The work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans. Written informed consents were obtained from all patients. Approval by IRB research committee of Zagazig Faculty of Medicine was included

Statistical analysis

All data were coded, checked, entered and analyzed using the Windows Social Science Statistical Package (version 24.0; SPSS Inc., Chicago, IL, USA). Data were expressed and analyzed using descriptive statistics (mean $\pm$ standard deviation). One-way variance analysis (ANOVA) test was performed to compare various parameters between more than two groups. Pearson correlation coefficient was used to assess the association between quality of life component and other studied parameters. P-values were considered significant if <0.05

RESULTS

Our results showed matched data regarding frequency of age, gender, education and sociodemographic status among studied groups (Table 1). There was different data regarding complications, comorbidities, type of treatment and compliance among diabetic groups (Table 2)

Our results revealed that there was highly significant difference regarding physical health component (physical functioning, role limitation due to physical health, pain and general health) among groups of study ($p < 0.001$) (Table 3). There was statistically high significant difference in values of physical health component in non-diabetic group compared to diabetic group (controlled &

uncontrolled) ($p < 0.001$) and also statistically high significant difference among diabetic group (controlled & uncontrolled) ($p < 0.001$).

There was also highly significant difference regarding mental health component (energy, role limitation due to emotional problem, emotional well-being and social functioning) among groups of study ($p < 0.001$) (Table 4). There was statistically high significant difference in values of mental health component in non-diabetic group compared to diabetic group (controlled & uncontrolled) ($p < 0.001$) and also statistically high significant difference among diabetic group (controlled & uncontrolled) ($p < 0.001$).

Our results revealed that there was highly significant difference regarding BMI and waist circumference among groups of study ($p < 0.001$) in which there was statistically significant difference in values of body mass index in non-diabetic group compared to diabetic group (controlled & uncontrolled) while no statistically significant difference among diabetic group (controlled & uncontrolled).

Our results revealed that there was highly significant negative correlation between physical health component (physical functioning, role limitation due to physical health, pain and general health) and age & BMI & duration of DM & HbA1c and fasting blood sugar in diabetic patients ($p < 0.001$) (Table 5) & (Figure 1).

There was also highly significant negative correlation between mental health component (energy, role limitation due to emotional problem, emotional well-being and social functioning) and age & BMI & duration of DM & HbA1c and fasting blood sugar in diabetic patients ($p < 0.001$) (Table 6).

Also by univariate linear analysis, the statistical significant independent negative predictors to physical and mental health component were age, body mass index, duration of DM, HbA1c and fasting blood ($p < 0.001$).

Table (1): Frequency of distribution of socio-demographic and anthropometric data of all studied participants.

Variables	Uncontrolled diabetics (n=50) n (%)	Controlled diabetics (n=50) n (%)	Non-diabetics (n=50) n (%)
Age (years)			
30-40	13 (26%)	13 (26%)	14 (28%)
41-50	16 (32%)	15 (30%)	14 (28%)
51-60	16 (32%)	17 (34%)	15 (30%)
≥ 61	5 (10%)	5 (10%)	7 (14%)
Gender			
Male	27 (54%)	29 (58%)	23 (46%)
Female	23 (46%)	21 (42%)	27 (54%)
Marital status			
Married	45 (90%)	46 (92%)	46 (92%)
Not married	5 (10%)	4 (8%)	4 (8%)
Residence			
Urban	19 (38%)	23 (46%)	21 (42%)
Rural	31 (62%)	27 (54%)	29 (58%)
Education			
Yes	41 (82%)	46 (92%)	40 (80%)
No	9 (18%)	4 (8%)	10 (20%)
Smoking			
Yes	20 (40%)	17 (34%)	10 (20%)
No	30 (60%)	33 (66%)	40 (80%)
BMI (Kg/m ²)			
18.5: 24.9	6 (12%)	10 (20%)	17 (34%)
25: 29.9	31 (62%)	31 (62%)	33 (66%)
≥ 30	13 (26%)	9 (18%)	0 (0%)
Waist circumference(cm)			
≤ 80	1 (2%)	3 (6%)	3 (6%)
81: 89	14 (28%)	13 (26%)	27 (54%)
≥ 90	35 (70%)	34 (68%)	20 (40%)

Table (2): Frequency of distribution of clinical data of diabetic patients

Variable	Uncontrolled diabetics (n=50) n (%)	Controlled diabetics (n=50) n (%)
Duration of DM (years)		
≤5	12 (24%)	9 (18%)
6-10	11 (22%)	15 (30%)
11-15	11 (22%)	15 (30%)
16-19	9 (18%)	5 (10%)
≥20	7 (14%)	6 (12%)
Comorbidities		
No	14 (28%)	26 (52%)
Hypertension	36 (72%)	23 (46%)
Liver diseases	7 (14%)	4 (8%)
Chest diseases	1 (2%)	1 (2%)
Complications		
No	7 (14%)	27 (54%)
Neuropathy	43 (86%)	23 (46%)
Retinopathy	12 (24%)	7 (14%)
Nephropathy	19 (38%)	5 (10%)
Treatment		
Oral	28 (56%)	46 (92%)
Insulin	20 (40%)	1 (2%)
Both	2 (4%)	3 (6%)
Compliance to treatment		
Yes	29 (58%)	50 (100%)
No	21 (42%)	0 (0%)
Blood glucose home monitoring		
Yes	8 (16%)	40 (80%)
No	42 (84%)	10 (20%)
Blood glucose checking		
Feeling ill	47 (94%)	6 (12%)
Every 3 months	3 (6%)	36 (72%)
Weekly	0 (0%)	8 (16%)

Table (3): Comparison of physical health component of SF-36 of all studied participants.

Variable	Uncontrolled diabetics (n = 50)	Controlled diabetics (n = 50)	Non- diabetics (n = 50)	F	P
Physical functioning	53.5 ± 8.16	77.6 ± 5.27	93.2 ± 5.02	501.54	0.001*
Role limitation due to physical health	47 ± 13.01	76 ± 13.32	93 ± 11.3	170.6	0.001*
Pain	64.65 ± 8.6	73.25 ± 6.85	80.85 ± 3.9	72.08	0.001*
General health	51.2 ± 7.32	76.6 ± 8.11	78.4 ± 5.92	224.59	0.001*

Table (4): Comparison of mental health component of SF-36 of all studied participants.

Variable	Uncontrolled diabetics (n = 50)	Controlled diabetics (n = 50)	Non- diabetics (n = 50)	F	P
Energy	54.1 ± 7.6	73.1 ± 4.6	86.5 ± 5.8	351.5	0.001*
Emotional well being	72 ± 4.35	80.48 ± 4.6	87.84 ± 3.2	185.9	0.001*
Social functioning	63.25 ± 7.74	67 ± 9	76.7 ± 8.37	34.42	0.001*
Role limitation due to emotional problems	61.9 ± 11.67	69.9 ± 10.1	85.97 ± 16.6	43.54	0.001*

Table (5): Pearson correlation coefficient between physical health component (physical functioning, role limitation due to physical health, pain, general health) and some studied variables in diabetic patients.

Variables	Physical functioning		Role limitation due to physical health		pain		General health	
	R	P	r	P	r	P	r	P
Age	-0.376	<0.001*	-0.461	<0.001*	-0.672	<0.001*	-0.442	<0.001*
Body mass index	-0.340	<0.001*	-0.352	<0.001*	-0.411	<0.001*	-0.339	<0.001*
Waist circumference	-0.126	0.106	-0.116	0.250	-0.127	0.207	-0.131	0.194
Duration of DM	-0.422	<0.001*	-0.501	<0.001*	-0.616	<0.001*	-0.439	<0.001*
HBA1c	-0.935	<0.001*	-0.862	<0.001*	-0.751	<0.001*	-0.892	<0.001*
Fasting blood sugar	-0.929	<0.001*	-0.834	<0.001*	-0.675	<0.001*	-0.915	<0.001*

Table (6): Pearson correlation coefficient between mental health component (role limitation due to emotional problems, social functioning, energy, emotional well-being) and some studied variables in diabetic patients.

Variables	Role limitation due to emotional problems		Social functioning		Energy		Emotional well-being	
	r	P	r	P	r	P	r	P
Age	-0.374	<0.001*	-0.721	<0.001*	-0.400	<0.001*	-0.554	<0.001*
Body mass index	-0.335	<0.001*	-0.395	<0.001*	-0.293	<0.003*	-0.354	<0.001*
Waist circumference	-0.098	0.331	-0.105	0.300	-0.104	0.301	-0.141	0.161
Duration of DM	-0.411	<0.001*	-0.638	<0.001*	-0.438	<0.001*	-0.544	<0.001*
HBA1c	-0.586	<0.001*	-0.549	<0.001*	-0.928	<0.001*	-0.845	<0.001*
Fasting blood sugar	-0.519	<0.001*	-0.453	<0.001*	-0.911	<0.001*	-0.818	<0.001*

Figure (1): showed the negative correlation between physical functioning and HbA1c

DISCUSSION

Our results revealed that there was highly significant difference regarding physical health component (physical functioning, role limitation due to physical health, pain and general health) among groups of study ($p < 0.001$). there was statistically high significant difference in values of physical health component in non-diabetic group compared to diabetic group (controlled & uncontrolled) ($p < 0.001$) and also statistically high significant difference among diabetic group (controlled & uncontrolled) ($p < 0.001$).

There was also highly significant difference regarding mental health component (energy, role limitation due to emotional problem, emotional well-being and social functioning) among groups of study ($p < 0.001$). There was statistically high significant difference in values of mental health component in non-diabetic group compared to diabetic group (controlled & uncontrolled) ($p < 0.001$) and also statistically high significant difference among diabetic group (controlled & uncontrolled) ($p < 0.001$).

These results were consistent with Abd El Latif et al. who found patients with type 2

diabetes in Suez Canal University Hospitals in Ismailia city had low QoL in physical health domain, psychological health and environmental domains through World Health Organization Quality of Life Questionnaire [11]. This could be explained as there was a higher rate of complications in type 2 diabetic patients that affected the physical function. Physical function limitations can have a negative impact on quality of life, especially due to vision difficulties, peripheral neuropathy or heart disease.

Sengül et al. investigate the effect of duration of diabetes and glycemic regulation on the quality of life (QOL) in type 2 diabetic turkish patients using the SF-36 and found that the scores for QOL parameters of role limitations-physical, bodily pain, physical functioning, general health, energy and role limitations-emotional were significantly lower than those of the healthy controls ($p < 0.05$ for each) [12].

Sengül et al. also found that there was no statistically significant difference ($p > 0.05$) when comparing the QOL scores of cases with HbA1c levels of about 7% and 7-10%. They also found a non-significant difference in the

physical functioning, body pain, general health, vitality and social functioning scores of cases with HbA1c levels of $\leq 7\%$ and those with levels of $\geq 10\%$ ($p > 0.05$). On the other hand, they found a significant difference in role limitations-physical and role limitations-emotional scores between the two groups ($p = 0.016$ and $p = 0.019$, respectively). When comparing the QOL scores of cases with HbA1c levels of 7-10% and $> 10\%$, they detected a significant difference between physical limitations ($p = 0.034$), physical pain ($p = 0.037$), energy ($p = 0.043$) and emotional limitations ($p = 0.033$). However, in these two groups ($p > 0.05$) there was no such significant difference between other QOL parameter scores [12].

Kamarul et al. compared quality of life based on SF-36 between two different groups of type 2 diabetes mellitus patients with glycaemic control: patients with HbA1c at or below 7.5% and patients above 7.5%. and found that patients with poor glycaemic control group (HbA1c level $> 7.5\%$) consistently scored lower than those with a HbA1c level $\leq 7.5\%$. However, none was statistically significant. The SF-36 scores were also lower in these patients than the Malaysian population's SF-36 standards [13].

On other hand, Thommasen and Zhang found that paradoxically, improved blood sugar control was associated with poor physical functioning, physical role, physical pain, emotional and social functioning scores [14].

Nerenz et al also reported that tight glycemic control (as measured by glycosylated hemoglobin) was associated with lower SF-36 dimensional ratings [15]. Lloyd et al also reported that average levels of blood glucose were inversely associated with some of the isolated SF-36 domains, including vitality [16]. Lower HRQOL scores associated with improved blood sugar control may reflect morbidity inherent in this patient population's need to keep blood sugars within normal levels.

Our results revealed that there was highly significant difference regarding BMI and waist circumference among groups of study (p

< 0.001) in which there was statistically significant difference in values of body mass index in non-diabetic group compared to diabetic group (controlled & uncontrolled) while no statistically significant difference among diabetic group (controlled & uncontrolled).

Also this finding agreed with Abd Elaziz et al. who found that the mean body mass index was higher in the patient group 31.5 ± 5.8 compared to 29.3 ± 5.7 in the control group and the difference was statistically highly significant.. The prevalence of overweight among patient group was 33.3% while obesity was 56%. [17].

Our results revealed that there was highly significant negative correlation between quality of health component and age & BMI & duration of DM & HbA1c and fasting blood sugar in diabetic patients ($p < 0.001$).

As regards to the relation between quality of life and HbA1c, Abd El Latif et al found that there was a negative dependence between HbA1c and the physical health domain and that there was no relationship of statistical significance with other domains [11].

This finding contradicted Genga et al. which found that the quality of HbA1c glycemic control did not affect HRQoL and its domains among diabetic patients of type 2 [18].

Abd El Latif et al revealed a significant negative relationship between BMI and physical and psychological health domains with respect to the relationship between quality of life domains and body mass index [11]. These findings disagreed with Kazemi-Galougahi et al., who found that the relationship between BMI and QOL domains was not significant [19].

Regarding the association between age and HRQOL, Mamaghanian et al. found that in young and old patients, the lowest and highest mean HRQOL scores were obtained respectively [20].

As the age increases, it also increases the risk of developing other diseases and diabetes complications. The quality of life of Type 2

diabetes patients is therefore expected to decline as their age increases.

On the other hand, In Riyadh, Saudi Arabia, Ibrahim et al. describe the health - related quality of life in type 2 diabetes patients and found that no statistically significant associations were found between health - related quality of life and age scores [21].

CONCLUSION

Type 2 diabetes mellitus in both the physical health and mental health domains is associated with a lower quality of life. Advanced age, obesity and poor glycemic control were factors related to lower quality of life in this study, therefore glycemic control is highly needed to improve the quality of life of diabetic patients

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Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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