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Quality of Life for Patients with Type 1 Diabetes Mellitus

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Abstract	Original Research Article

Glycemic control is necessary to reduce morbidity and mortality and improving QoL of T1DMM through the prevention and/or delay of these complications. Despite the high susceptibility of Jordanian patients to diabetes and its complications there is scarcity of data in Jordan on the impact of T1DMM on QoL. There is a particular need for research on patients' perception about QoL and self-care management for T1DMM. *Objectives:* The aim for this study is to assess QoL in patients' with TIDM and to find out the associations between demographical and QoL among the patients with TIDM. *Methods*: The study was conducted using a descriptive cross-sectional design, correlation cross-section. The target population for this study was all Jordanian patients who are suffering from T1DMM, while the accessible population will be all adult Jordanian patients who are suffering from T1DMM attending Queen Alia Military Hospital (QAMH). The study instrument included two parts first one the demographical data section. "Audit of Diabetes Dependent Quality of Life (ADDQoL)" was the second element of the instrument used to assess QoL. The SPSS statistics package's programs were used to conduct the statistical analysis (SPSS 24). *Results:* About 37.3% of survey participants reported that having type 1 diabetes had a negative influence on their quality of life, while 32.9 percent said that their lives would have been better off without the disease. Patients with T1DM showed that the disease had a poor impact on all ADDQoL dimensions. Important associations were perceived between the average weighted impact of ADDQoL values and diabetes complications in T1DM. Diabetes has a noteworthy influence on the quality of life (QoL) of diabetes patients in Jordan, particularly with relation to the liberty to eat and drink. *Conclusion:* According to the findings of the current study, T1DMM itself has a detrimental impact on patients' quality of life, particularly on their working lives, health status, familial and sexual relationships, future perspectives, and eating habits. The only factors affecting QoL were age and marital status.
Keywords: T1DMM, Quality of life, Glycemic control.

INTRODUCTION

Diabetes, properly termed diabetes mellitus (DM), is one of main diseases of the current century, which has enlarged in incidence by 50% over the past 10 years [1]. "Diabetes mellitus (DM) is a group of metabolic diseases with various etiologies that are characterized by chronic hyperglycemia brought on by disturbances in carbohydrate, fat, and protein metabolism brought on by defects in insulin secretion, insulin action, or both", according to the American Diabetic Association (ADA) [1].

One of the biggest global health problems is diabetes mellitus (DM), which impacted roughly 177 million people in 2003, 200 million in 2010, and is expected to affect 366 million people by 2030 [2]. The International Diabetes Federation (IDF) predicts that by 2030, there will be 59.9 million people living with diabetes in the Middle East and North Africa (MENA) region [3]. According to the 69,071 death records where diabetes was listed as the primary cause of death in 2015, it was the seventh largest cause of death in the USA [4]. Diabetes is presently amongst the top five reasons of death in the developed countries and resulted in 6.1 million deaths worldwide in 2016 [5].

In Jordan, the prevalence of diabetes increased from 6.3% in 2002 to 7.4% in 2004 in Jordan's population [6]. A study published in 2008 had shown a 31.5% rise in the prevalence of DM among Jordanians aged 25 years or older compared with a similar survey conducted in 1994 [7]. A study performed by Rabiu *et al*., (2015), suggested that at the end of 2050, approximately 1 to 3 million people in Jordan will have DM, hypertension, or increased blood cholesterol based

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on the changes in disease prevalence and the growth of the population [8].

According to the pathogenic process that causes hyperglycemia, diabetes mellitus is categorized. Type 1 and type 2 of DM are two widely recognized classes [9]. Prior to the onset of type 1 and type 2 DM, a period of disturbed glucose homeostasis results from the development of pathogenic mechanisms [10]. The result of either an absolute or relative insulin shortage is type 1 diabetes [11]. A variety of illnesses known as type 2 diabetes (DM) are characterized by varying degrees of insulin resistance, insufficient insulin secretion, and excessive glucose production [12].

Type 1 diabetes mellitus (T1DM) represents only around 10% of the diabetes cases worldwide, but occurs with increasing incidence much earlier in life. In T1DM, the pathogenesis includes abnormalities in insulin action and secretion which leads to insulin resistance [13]. The American Diabetes Association (ADA) recommends a glycemic goal at glycosylated hemoglobin (HbA1C) level of <7%, while the International Diabetes Federation (IDF) advocate a recent glycemic goal at HbA1C level of <6.5% [14].

The management of DM consists of different pharmacologic and non-pharmacologic treatment approaches [15]. Both approaches with optimal adherence should be strictly followed by the patient to achieve the desired targets of treatment [16]. Apparently, individualization glycemic targets and the drugs used to reach them are needed for each patient in order to maximize benefits and minimize risks [17]. For instance, the American College of Cardiology (ACC), American Diabetes Association (ADA), and American Heart Association (AHA) indicated that older patients with longer DM duration may benefit from a higher level of HbA1C [18]. On the other hand, others have found that where glycemic level next to normal, or in the optimal level, is easily achieved, the treatment approach needed to attain it should be provided to the patient concerned [19].

People with T1DM have to cope with many factors that affect everyday disease management. Studying or assessing the quality of life (QoL) for these patients is somewhat different from other populations [20]. The definition of quality of life (QoL) is "an individual's view of their place in life in relation to their goals, expectations, standards, and concerns in the context of the culture and value systems in which they live" [21]. This definition takes into account a person's physical and psychological well-being, level of independence, social connections, and religious or philosophical convictions, as well as how they interact with key elements of their immediate environment [22]. T1DM necessitates frequent decision-making and substantial patient involvement [23].

However, there is a critical need to examine T1DM patients' perceptions of their quality of life and self-care management due to the rising incidence of DM in Jordan [24]. In addition to having proper glucose control, diabetic patients also require rehabilitation, disability limitation, and prevention of consequences. Regular blood glucose monitoring, controlling carbohydrate intake, frequent insulin injections, adjusting insulin dosage to match diet and activity patterns, engaging in moderate-intensity physical activity for at least (150) minutes per week, and checking urine for ketones as needed are all necessary for evaluating the self-care management.

Despite the high susceptibility of Jordanian patients to diabetes and its complications [25], there is scarcity of data in Jordan on the impact of T1DM on QoL. Only a few studies have examined the patient self-care or self-management as their chief aim in Jordan. There is a particular need for research on patients' perception about QoL and self-care management for T1DM.

This research will focus on a topic that hasn't been sufficiently covered before and should help to close the knowledge gap. The results of this study will add to the body of knowledge by describing the quality of life (QoL) of T1DM patients in Jordan.

METHODOLOGY

Between September and December 2021, the study's descriptive correlation design was used to evaluate patients' quality of life (QoL) for T1DM using the ADDQOL questionnaire. The target population for this study is all Jordanian patients who are suffering from T1DM, while the accessible population will be all adult Jordanian patients who are suffering from T1DM attending Queen Alia Military Hospital (QAMH). **Inclusion criteria**: Diabetic patients with T1DMM at the selected center were included in the study if they are18 years and above, able to give consent, and able to read and write in Arabic while **exclusion criteria:** Patients diagnosed with mental illness were excluded from the study because they may be incompetent a decision which may affect the results of this study.

Data collection Instruments

The study instrument included two parts. First one the demographical and clinical data section developed by researcher to meet the purpose of the study. It involves data related to background information including age, gender, marital status, level of education ….etc.

The second section of the instrument will be Audit of Diabetes Dependent Quality of Life (ADDQoL) to measure the QoL. The ADDQOL was designed by Bradley et al. (1999). The ADDQOL includes of two overview items, one of which measures the overall quality of life, and an additional 19 items

that address the effects of diabetes on certain facets of daily life. The respondents are asked to assess how their life would be if they did not have diabetes in these 19 domains. The scales range from 0 to +3 in attributed importance and from 3 to +1 for 19 life domains (impact rating) (importance rating). Each domain receives a weighted score that is determined by multiplying its effect rating by its importance rating (which ranges from -9 to +3). Those with lower scores have lower QoL. The mean weighted impact score (ADDQOL score) for the complete scale across all relevant domains is then computed. The study will make use of the Arabic translation. The SPSS statistics package's programs will be used to carry out the statistical analysis (SPSS 24). It was done using a descriptive statistic like mean standard deviation (SD). While the ANOVA test will be utilized for categorical data, an independent t test was performed to evaluate differences in continuous variables. By employing the ADDQOL, correlation was employed to evaluate the impact of research participants' sociodemographic and diabetes features on their QoL. The impact of research participants' sociodemographic and diabetes features on their QoL as measured by the ADDQOL was evaluated using logistic regression analysis.

RESULTS

Table 1 lists the demographic and clinical characteristics of the study population. Less than half of the 285 responders (122, 42.8%) were female, with a mean age of 62.3 13.2 years. The majority of respondents (78.1%) reported being married, while the mean body mass index (kg/m2) ranged from 19.1 to 61.0. HbA1c was 8.4 + 2.1%, and the duration of diabetes was 37 + 17.8 years. 89.1% of study participants were receiving insulin treatment.

Table 1: Demographic and clinical characteristics of the study population

Variables	N (%)	
Gender	Male 183 (57.2)	Female 122 (42.8)
Age ± SD (years)	62.3 ± 13.2	
Diabetes duration ± SD (years)	37 ± 17.8	
HbA1c ± SD (%)	8.4 ± 2.1 %	
Body mass index (range) ± SD	31.1±5.0	
Educational level		
Primary education	92 (32.2)	
Secondary education	102 (35.7)	
College or higher	91 (31.9)	
Marital status		
Never married	35 (12.3)	
Married	200 (70)	
Divorced	50 (17.5)	
Smoking status		
Non or ex smoker	158 (55.4)	
Monthly income in JD		
≤400	65 (22.8)	
401-800	143 (50)	
801–1500	55 (19.2)	
≥1501 or above	22 (7.7)	

About 37.3% of the survey participants reported that having type 1 diabetes had a negative influence on their quality of life, while 32.9% thought that their lives would have been better off without the condition. A predetermined range from -9 to +3 was used to calculate the ADDQOL score, which ranged from -9.0 to 0. The computed median ADDQOL score was 2.7. After determining the lower quartile cut-off at 3.0, 149 (57.7%) T1DM patients reported having an ADDQOL score of 3.0 or higher, whereas 109 (42.3%) patients had an ADDQOL score of 3.0 or less (lower QoL). It is interesting to note that five patients (1.9%) reported an ADDQOL score of 0, indicating that diabetes had no impact at all on their quality of life. The

Table 2 displays the response distribution as well as the impact ratings' weights. Diabetes had the largest influence on "freedom to eat" (mean impact rating: −1.7 ± 1.0) and the least impact on "physical appearance," "motivation," "people's reaction," "financial condition," and "dependency on others," each with a mean impact rating of (−1.0 ± 1.1). For the study participants, "family life" was regarded as the most important QoL dimension ((mean 2.6 ± 0.8) and "freedom to drink" as the least important (mean 1.5 ± 1.1). After weighting was taken into account, the QoL domains "freedom to eat" (mean −4.2 ± 3.2) and "people's reaction" (mean −1.6 ± 2.4) were shown to be most and least affected, respectively (Table 2).

Table 2: Distribution of response by impact and importance rating together with weighted impact score

Domain	Impact rating	Mean ± SD importance rating	Weighted impact score
Leisure activities	−1.1 ± 1.0	1.9 ± 0.8	−2.3 ± 2.4
Working life	−1.3 ± 1.0	2.2 ± 0.9	−2.9 ± 2.6
Journeys	−1.1 ± 0.2	1.8 ± 0.9	−2.4 ± 2.5
Holidays	−1.2 ± 1.1	1.8 ± 0.9	−2.4 ± 2.9
Physical health	−1.3 ± 1.0	2.0 ± 0.8	−2.8 ± 2.6
Family life	−1.3 ± 1.0	2.6 ± 0.8	−3.2 ± 3.4
Friendship and social life	−1.1 ± 1.1	2.3 ± 0.8	−2.4 ± 2.8
Personal relationship	−1.2 ± 1.2	2.2 ± 0.9	−2.6 ± 3.1
Sex life	−1.3 ± 1.1	2.1 ± 0.9	−2.8 ± 3.5
Physical appearance	−1.0 ± 1.1	1.9 ± 0.8	−2.0 ± 2.7
Self-confidence	−1.2 ± 1.1	2.3 ± 0.8	−2.9 ± 3.4
Motivation	−1.0 ± 1.1	2.3 ± 0.8	−2.7 ± 3.4
People's reaction	−1.0 ± 1.0	2.1 ± 0.8	−1.6 ± 2.7
Feelings about future	−1.3 ± 1.3	2.3 ± 0.7	−3.2 ± 4.3
Financial situation	−1.0 ± 1.3	2.2 ± 0.8	−2.2 ± 3.7
Living conditions	−1.3 ± 1.1	2.3 ± 0.7	−3.0 ± 3.4
Dependence on others	−1.0 ± 1.0	2.4 ± 0.8	−2.5 ± 3.1
Freedom to eat	−1.7 ± 1.0	2.1 ± 0.9	−4.2 ± 3.6
Freedom to drink	−1.3 ± 1.9	1.5 ± 1.1	−2.5 ± 2.7

Table 3 displays the findings of the logistic regression analysis. The analysis's findings showed that only age and married status were connected to QoL (odds ratio (OR) 0.94, 95% confidence intervals (CIs) 0.91-0.98, P = 0.008 and 0.43, 0.221-0.90, P = 0.03 respectively). There were no statistically significant correlations between QoL and sex, diabetes duration, BMI, HbA1c, smoking, education level, anti-diabetic medication, or diabetic complications.

Table 3: Logistic regression analysis: predictors of lower QOL according to the ADDQOL score

Variables	Odds ratio	95 % confidence intervals	P value
Gender (males)	1.09	0.49–2.46	0.74
Age (years)	*0.94*	*0.91–0.98*	*0.09*
Diabetes duration (years)	0.96	0.92–0.98	0.45
HbA1c (%)	0.91	0.74–1.31	0.85
Body mass index (kg/m^2)	0.98	0.93–1.04	0.60
Monthly income (Euros)	2.61	0.86–7.89	0.08
Educational level	1.42	0.65–3.14	0.41
Marital status	*0.43*	*0.21–0.90*	*0.02*
Smoking status	0.53	0.22–1.24	0.31
Oral antidiabetic therapy (yes)	0.86	0.28–2.65	0.75
Insulin therapy (yes)	0.26	0.22–1.49	0.36
Coronary artery disease (yes)	0.73	0.24–2.24	0.62
Cerebrovascular disease (yes)	0.08	0.22–1.98	0.61
Peripheral arterial disease (yes)	0.32	0.45–1.81	0.23
Retinopathy (yes)	0.14	0.01–1.36	0.07
Neuropathy (yes)	0.26	0.02–2.26	0.21
Chronic kidney disease (yes)	0.12	0.12–1.23	0.10

DISCUSSION

In recent years, the therapy of diabetes patients has centered on quality of life (QoL). Other than achieving glycemic control and minimizing diabetes complications, managing T1DM patients places a high priority on diabetic patient quality of life because it has a significant impact on therapy targets [26]. Accordingly, the American Diabetes Association's most current guidelines place a strong emphasis on the necessity of managing T1DM patients in a "patient centered" manner in order to maximize quality of life, prevent complications from diabetes, and meet glycemic goals [26]. According to our findings, numerous studies from various nations have indicated that T2D has a detrimental effect on QoL [27-30]. When compared to patients with other chronic disease types, QoL in T1DM patients is a little lower [31]. According to other studies [11, 12], "freedom to eat" was the area where T1DM had the biggest unfavourable effect. Patients' eating habits are influenced by their

fears of gaining weight, having high blood sugar levels, and having hypoglycemia [32, 33]. A recent multicenter study showed a relationship between food habits and diabetes-specific QoL [30]. An additional study with similar findings [34] revealed that diabetes had the greatest effect on "enjoyment of meals" and the least effect on "others fussing." The fact that individuals with diabetes have lower QoL, particularly in the "freedom to eat" domain, suggests that boosting dietary freedom through an intervention could help diabetics' QoL [35]. In the current study, we found that living alone and being older were associated with worse QoL. According to our findings, numerous researches have demonstrated that QoL is higher among younger individuals than among the elderly [33-36]. This disparity could be explained by the fact that younger diabetics are more concerned about their future and the effects of T2d on their lives than older diabetics. Last but not least, living alone was substantially connected with lower quality of life, as demonstrated by earlier studies. It is commonly known that married people have higher quality of life. It is interesting that the findings of this study revealed no association between diabetes complications and quality of life.

The low prevalence of diabetes complications that we saw in the current research can help to partially explain this conclusion. Numerous studies have shown that co-morbidities, such as microvascular issues, had a significantly reduced quality of life while those who did not exhibit symptoms did not experience a decline in their quality of life [34]. Two further studies from other nations revealed a substantial link between lower QoL and insulin use as well as consequences from diabetes [23, 25]. Despite the findings of a number of earlier research, no correlation between QoL and antidiabetic therapy, particularly insulin therapy, or diabetes duration was discovered. The study sample had good glycemic control, which may have had an impact on how various factors affected QoL at this stage.

However, similar findings to ours have been found in the literature as well [33, 34, 36]. Finally, we discovered no relationship between glycemic control (measured as HbA1c) and quality of life, which is in contrast to findings made by Testa *et al.*, who found that increased glycemic control was related with significant gains in QoL.

CONCLUSION

Diabetes has a detrimental impact on T1DM patients' quality of life in Jordan. The following areas are where this adverse effect is most pronounced: freedom to eat, freedom to drink, and sex life for both sexes in T1DM; freedom to eat, freedom to drink, and feelings about the future for both sexes; and working life and sex life for men with T1DM. The development of diabetes complications in individuals with T1DM, as well as male gender and depression in patients with T1DM, are risk factors for a lower quality of life.

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