

# Health-related quality of life among Palestinians with diabetes

Mu'taz M. Dreidi, Imad Tawfiq Asmar, Maram K Jaghama, Khlood Tawil

**This cross-sectional study assessed the levels and impact of diabetes on quality of life (QoL) among people with type 2 diabetes, and compared QoL between male and female participants. A convenience sample of 200 people was recruited from diabetes clinics in Palestine. The Audit of Diabetes-Dependent Quality of Life (ADDQoL) questionnaire was used to assess overall and domain-specific QoL. The results showed, despite having a lower HbA<sub>1c</sub>, women had lower (more negative) ADDQoL scores than men. There were significant differences between men and women across QoL domains when controlling for diabetes duration, BMI and HbA<sub>1c</sub>.**

Type 2 diabetes affects many people and their families in Palestine. Quality of life (QoL) is the feeling of overall life satisfaction, as determined by the individual whose life is being evaluated. QoL is composed of four components: physical, mental–cognitive, psychological and social (Keyes, 2005). QoL has become an important factor when evaluating medical care since there is an increasing number of people developing chronic diseases. Generally speaking, chronic conditions (such as type 2 diabetes) have slow progression, are long in duration and require lifelong medical treatment. Most chronic conditions have the potential to worsen the overall health of people by restricting their ability to live in the same way as they did before the onset of their symptoms and diagnosis.

## Problem statement

Type 2 diabetes is one of the most common endocrine disorders affecting patients' QoL in Palestine. In the year 2017, there were 6313 new reported cases of type 2 diabetes in the West Bank, Palestine (Palestinian Health Information Center data). These new cases were distributed as 2792 cases among males (an incidence of 213.0

per 100 000 population) and 3521 among females (an incidence of 279.6 per 100 000 population). In 2017, the annual mortality rate in Palestine for people with type 2 diabetes was 2.6 deaths per 1000 people. It is obvious that type 2 diabetes has a major impact on health and health-related QoL.

Over the past decade, diabetes prevalence has risen faster in low- and middle-income countries than in high-income countries (World Health Organization, 2014). To improve QoL for people with type 2 diabetes, one must identify certain determinants that affect it. This may help those people to live healthy and independent lives.

People with diabetes are challenged on a daily basis in managing their physical, social, cognitive and psychological needs. They have constant concerns regarding managing their blood glucose in order to avoid the complications of diabetes. Diabetes and QoL have a bidirectional relationship, in that the better QoL the person has the better their diabetes management will be, and vice versa.

A study conducted in India compared the QoL of people with diabetes to that of the general population. It was found that the physical domain of QoL, which consisted of questions regarding

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## Article points

1. Understanding the determinants of quality of life (QoL) for people with type 2 diabetes may them to live healthy and independent lives.
2. In this cross-sectional study conducted in Palestine, participants rated all of the 19 QoL domains analysed as being negatively impacted by living with diabetes.
3. In this study, despite having better control of their diabetes, women rated their QoL less highly than the men.

## Key words

- Palestine
- Quality of life
- Type 2 diabetes

## Authors

Mu'taz M. Dreidi, Director of Master of Oncology Nursing; Imad Tawfiq Asmar, Faculty Member; Maram K Jaghama, Faculty Member; all in the Faculty of Nursing, Birzeit University, Ramallah, Palestine; Khlood Tawil, Research Coordinator, AllMed Medical Center, Palestine.

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pain, sleep, energy, work and activities, was significantly worse in those with diabetes (Kumar et al, 2016a). Another study, also conducted in India, focused on the importance of gender and mode of treatment in predicting health-related QoL for people with type 2 diabetes. It was found that female patients had a poor health-related QoL in comparison to males (Bhate and Abhyankar, 2014). Papadopoulos et al (2007) had similar results, stating that women had a poorer QoL in comparison to men because they experience more complications in relation to their health and daily living. The authors also found that age and other health problems increase the burden and diabetes-related symptoms and consequences.

Researchers in India measured the QoL of people with type 2 diabetes and the various factors affecting it. Those who were taking oral diabetes drugs alone were found to have a better QoL than those taking oral drugs and insulin injections, since the injection of insulin may cause fear, pain and adverse effects, such as hypoglycaemia. It was also found that people who were taking only oral medications had better concordance with drug therapy than those who were injecting insulin (Kumar et al, 2016b).

These studies show the importance of recognising QoL by assessing the mental, cognitive, psychological and social components of an individual. This is important since the area of diabetes-related QoL is generally understudied and not well addressed in Palestine.

The purpose of the current study was to assess the levels of QoL for Palestinian people with type 2 diabetes. The specific aims were: 1) to assess the relationship between BMI, diabetes duration and HbA<sub>1c</sub> with QoL domains, and 2) to assess if there are significant differences between males and females across QoL domains.

### **Methods**

A cross-sectional correlation research design was used for this study. The QoL of people with a medically confirmed diagnosis of type 2 diabetes was assessed using The Audit of Diabetes-Dependent Quality of Life (ADDQoL) questionnaire and by collecting demographic and clinical data.

### **Ethical approval**

Ethical approval was attained from the Ethical Committee of Birzeit University and from the recruiting institutions. All participants were given a detailed explanation about the study, its purposes and the confidentiality of their responses. All collected data remained anonymous and participants had the right to leave the study at any time.

### **Sampling and setting**

A convenience sample of 200 eligible people with type 2 diabetes participated in this study to gather information about the specific QoL issues. The sample size was calculated using the G\*Power 3.1 software with a power of 0.80 and an alpha of 0.05; 50% was added to the recruitment number to compensate for attrition and candidates declining to participate. Patients with a confirmed medical diagnosis of type 2 diabetes more than two years previously, aged 18 years and above, and with the ability to read and write Arabic were eligible for inclusion. Candidates were excluded if they had a psychiatric disorder, malignant tumour, or gestational or type 1 diabetes.

Data were collected from three different Palestinian diabetes clinics in Ramallah and Jerusalem. Potential participants were approached and recruited to the study if they met the eligibility criteria. After their approval, the purpose, aims, required information and ethical considerations of the study were explained to them, and they were given the questionnaires detailed below. The data collectors were ready to answer any questions raised.

### **Instruments**

All participants filled in a demographic and clinical data questionnaire, in addition to the ADDQoL questionnaire.

### **Demographic and clinical data questionnaire**

A self-reported questionnaire was developed by the researchers to assess the following data: age, gender, place of residence, marital status, smoking status, level of education, type of treatment and occupation. Other variables, such as presence of comorbidities, duration of diagnosis, HbA<sub>1c</sub> and BMI, were extracted from the participants' files after their approval.

### Audit of Diabetes-Dependent Quality of Life (ADDQoL) questionnaire

The ADDQoL assessed 19 different domain-specific items in addition to two overview items; the first assessed present QoL and the second assessed diabetes-dependent QoL. The following items ask the respondents to rate how specific aspects of their life would be if they did not have diabetes. For each of these items, respondents provide both impact (range: -3 [greatest] to +1 [least]) and importance (range: 0 [least] to 3 [most]) scores. The two ratings are multiplied and the items summed to produce the average weighted impact (AWI) scores, which are reflective of the impact of diabetes on QoL (Bradley et al, 1999).

The life domains of the ADDQoL include leisure activities, working life, local or long-distance journeys, holidays, physical health, family life, social life, close personal relationships, sex life, physical appearance, self-confidence, motivation, peoples' reactions, feelings about the future, financial situations, living conditions, dependence on others, freedom to eat and freedom to drink.

The Arabic version of the ADDQoL has been confirmed to be a reliable and valid instrument (Bradley, 2021).

### Data analysis

SPSS Version 19 (IBM Corp., Armonk, NY, USA) was used to analyse all data collected. Descriptive statistics were applied revealing the mean, range, standard deviation, frequency and percentages. Inferential statistics were used to assess the relationships between demographic and clinical data with the ADDQoL domains. Pearson's *r* correlation was used to assess the relationship between BMI, diabetes duration and HbA<sub>1c</sub> with the QoL domains. T-tests were used to assess the differences between male and female participants regarding the QoL domains and HbA<sub>1c</sub>. ANCOVA was used to assess the differences between males and females across all QoL domains controlling for BMI, HbA<sub>1c</sub> and diabetes duration.

### Results

A total of 200 people with type 2 diabetes participated in the study, of whom 92 (46%) were male and 108 (54%) were female (Table 1). With regard to age distribution, the greatest proportion

**Table 1. Demographic and clinical characteristics of the participants (n=200).**

Variable	n	%	Mean	SD	Min	Max	Range
<b>Gender</b>							
Male	92	46	–	–	–	–	–
Female	108	54					
<b>Level of education</b>							
School	78	39					
Associate's degree	40	20	–	–	–	–	–
Bachelor's degree	61	30.5					
Postgraduate education	21	10.5					
<b>Residence</b>							
City	147	73.5	–	–	–	–	–
Village	45	22.5					
Camp	8	4					
<b>Marital status</b>							
Single	20	10					
Married	146	73	–	–	–	–	–
Divorced	6	3					
Widowed	28	14					
<b>Employment</b>							
Full-time	67	33.5					
Part-time	33	16.5	–	–	–	–	–
Retired	37	18.5					
Unemployed	63	31.5					
<b>Treatment</b>							
OHA	104	52	–	–	–	–	–
Insulin	26	13					
OHA+insulin	70	35					
<b>Age (years)</b>	–	–	57.1	12.7	18	87	69
<b>BMI</b>	–	–	27.7	4.4	20.1	49.9	29.7
<b>HbA<sub>1c</sub></b>	–	–	71	21	37	141	104
<b>Diabetes duration</b>	–	–	12.6	8.7	2	41	39

OHA=oral hypoglycaemic agent(s); SD=standard deviation.

of participants was in the age group of 55–60 years and the lowest was in the age group of 18–32 years. Mean age was 57.1±12.7 years. In our study, 39% of participants had been educated up to a high school level and 61% had received a college education.

With regard to place of residence, 73.5% of participants were living in cities. Most of the participants (73%) were married. The majority (33.5%) were employed full-time. A large portion (59%) were non-smokers; among the smokers, the

**Table 2. Distribution of responses of quality-of-life domains by impact and importance rating ( $n=200$ ).**

Domain	Impact rating (mean [SD] scores)	Importance rating (mean [SD] scores)	Average weighted impact (mean [SD] scores)
Leisure activities	-1.7 (0.98)	2.4 (0.67)	-4.3 (3.02)
Work (employment)	-1.4 (0.99)	2.7 (0.56)	-3.8 (2.75)
Local or long-distance journeys	-1.5 (1.04)	2.5 (0.64)	-3.8 (3.08)
Holiday	-1.2 (0.99)	2.4 (0.69)	-3.0 (2.79)
Physical health	-1.7 (0.97)	2.6 (0.61)	-4.6 (3.04)
Family life	-1.3 (1.03)	2.9 (0.38)	-3.8 (3.09)
Friendships and social life	-1.6 (1.07)	2.6 (0.61)	-4.1 (3.21)
Close personal relationship	-1.1 (0.97)	2.3 (0.67)	-2.9 (2.78)
Sex life	-1.0 (1.10)	2.3 (0.67)	-2.5 (3.03)
Physical appearance	-1.6 (1.03)	2.6 (0.64)	-4.3 (3.16)
Self-confidence	-1.6 (1.08)	2.6 (0.61)	-4.3 (3.29)
Motivation	-1.4 (0.97)	2.5 (0.62)	-3.7 (2.99)
People's reaction	-1.1 (0.95)	1.9 (1.05)	-2.3 (2.77)
Feelings about the future	-1.9 (0.99)	2.7 (0.54)	-5.3 (3.12)
Financial situation	-1.4 (0.94)	2.6 (0.54)	-3.8 (2.88)
Living conditions	-1.6 (0.97)	2.7 (0.45)	-4.4 (2.88)
Dependence on others	-1.6 (1.04)	2.5 (0.69)	-4.3 (3.23)
Freedom to eat	-2.5 (0.80)	2.7 (0.55)	-7.0 (2.78)
Freedom to drink	-2.4 (0.87)	2.7 (0.63)	-6.8 (2.98)

Weighted impact score is calculated as the mean of the product of impact and importance scores.

mean duration of smoking was  $22\pm 14$  years. Mean duration of diabetes was found to be  $13\pm 9$  years (Table 1); among males it was 13.2 years and among females 12.1 years.

The mean HbA<sub>1c</sub> level of all the participants was  $70.5\pm 20.8$  mmol/mol ( $8.6\%\pm 1.9\%$ ). Around 52% of the participants were taking oral hypoglycaemic agents (OHAs), 35% were taking both OHAs and insulin, and 13% were taking just insulin injections (Table 1). ANCOVA tests revealed significant

differences in freedom to eat ( $P=0.038$ ) and freedom to drink ( $P=0.005$ ) between the OHA, OHA+insulin and insulin injection groups, with the worst scores in the insulin injection group.

ADDQoL scores were lower (more negative) in females than males, both overall and in 14 of the 19 domains (Table 2). The majority of participants stated that diabetes had the greatest impact on freedom to drink (rating,  $-2.4\pm 0.9$ ) and freedom to eat (rating,  $-2.5\pm 0.8$ ), while the lowest impact was on sex life (rating,  $-1.0\pm 1.1$ ), close personal relationships (rating,  $-1.1\pm 1.0$ ) and people's reaction (rating,  $-1.1\pm 1.0$ ). When rating by importance, participants rated family life as the most important (rating,  $2.9\pm 0.4$ ), while people's reaction was rated as the least (rating,  $1.9\pm 1.05$ ).

Participants who took OHAs scored their QoL three points higher than those taking insulin injections. A significant number (81.8%) of participants taking insulin injections, alone or with OHAs, gave a rating of -2 (very bad) for their present QoL. These individuals, 63.3% of whom were female, agreed that their QoL would be "very much better" if they did not have diabetes. Only 10 participants agreed that their QoL with or without diabetes would remain the same; 60% of these participants were male. All 19 domains were negatively impacted by the presence of diabetes (Table 2). The questionnaire showed high reliability, with a Cronbach's alpha range of 0.74–0.84.

Pearson's  $r$  correlation was used to analyse the association of age, HbA<sub>1c</sub> and duration of diabetes across all dimensions of QoL. There were significant correlations between the QoL domain "dependence on others" with duration of diabetes ( $r=-0.14$ ;  $P=0.04$ ) and BMI ( $r=0.17$ ;  $P=0.018$ ).

Significant differences were observed between males and females when controlling for diabetes duration, BMI and HbA<sub>1c</sub>. Generally, male participants had better scores in physical health ( $F=16.26$ ;  $P<0.001$ ), leisure activities ( $F=9.66$ ;  $P=0.003$ ), journeys ( $F=6.14$ ;  $P=0.015$ ), physical appearance ( $F=10.58$ ;  $P=0.002$ ), self-confidence ( $F=9.27$ ;  $P=0.003$ ) and motivation ( $F=16.20$ ;  $P<0.001$ ) than females. The proportion of variance for all these variables was around 10%, except for motivation, which was found to account for 17% (Table 3).

## Discussion

The present cross-sectional study included a total of 200 people with type 2 diabetes recruited from three healthcare centres in Palestine. The results show that the experience of diabetes is gender-differentiated: there are many areas of life that affect females more than males and vice versa. HbA<sub>1c</sub> levels were higher in males than in females, yet the self-perceived impact of diabetes was significantly lower in the former.

Previous studies indicate that women with diabetes have poorer QoL, on average, in comparison to men with diabetes (Gebel, 2011; Siddiqui et al; 2013). Studies also show that women with diabetes are more likely than men to have more complications associated with diabetes, such as poor blood glucose control, high BMI and high blood pressure (Gebel, 2011). Depression is about twice as common in women as it is in men (Albert, 2015). A study focused just on women suggested that depression increases the risk of diabetes and vice versa (Pan et al, 2011).

Taking local or long-distance journeys seemed to affect females more than males; however, both genders were affected negatively by their diabetes. Participants taking insulin injections to control their diabetes had a worse QoL; the reason behind this finding is that insulin injections can be inconvenient, painful and burdensome, both physically and financially, as a considerable proportion of Palestinian patients with type 2 diabetes do not have health insurance or have limitations in their health insurance coverage. Using insulin injections can also restrict patients' daily activities. Furthermore, insulin treatment sometimes induces hypoglycaemic episodes, resulting in poorer QoL.

The largest negative impact of type 2 diabetes observed in the present study was on "freedom to eat", which is in line with previous studies. People with diabetes encounter several difficulties in complying with dietary regimens. They exhibit restrictive eating behaviours and express feelings of dietary deprivation. The overall act of eating not only includes nutrient and food intake, but also eating behaviour in relation to preference, selection and consumption of food.

The domain of "peoples' reactions" had the least average weighted impact for participants, the reason

**Table 3. Gender differences in quality of life, controlling for diabetes duration, BMI and HbA<sub>1c</sub> (n=200).**

Domain	Males	Females	ANCOVA (F)	Probability (P)	Effect size ( $\eta^2$ )
Leisure activities	-2.73	-4.90	9.66	0.003**	0.110
Work (employment)	-3.58	-4.58	0.99	0.323	0.018
Local or long-distance journeys	-2.84	-4.73	6.14	0.015*	0.073
Holiday	-2.56	-2.77	0.07	0.793	0.001
Physical health	-3.26	-6.36	16.26	0.000**	0.172
Family life	-3.06	-4.50	3.20	0.077	0.039
Friendships and social life	-3.31	-4.84	4.09	0.046	0.050
Close personal relationship	-3.50	-2.18	2.08	0.154	0.031
Sex life	-3.10	-1.45	2.88	0.095	0.043
Physical appearance	-3.12	-5.60	10.58	0.002**	0.119
Self-confidence	-3.13	-5.57	9.27	0.003**	0.106
Motivation	-2.40	-5.18	16.20	0.000**	0.172
People's reaction	-1.89	-2.68	1.29	0.259	0.016
Feelings about the future	-5.12	-5.69	0.44	0.508	0.006
Financial situation	-4.37	-3.99	0.22	0.638	0.003
Living conditions	-4.92	-4.86	0.004	0.947	0.000
Dependence on others	-3.93	-4.80	1.05	0.308	0.013
Freedom to eat	-6.49	-6.90	0.258	0.613	0.003
Freedom to drink	-6.33	-6.74	0.233	0.631	0.003

Weighted impact score is calculated as the mean of the product of impact and importance scores.

for this probably being the high prevalence and incidence of diabetes, such that people are aware of the condition and do not often have negative opinions towards others with diabetes.

There were significant correlations between the domain of "dependence on others" and the duration of diabetes and BMI. As diabetes duration and BMI increase, people with diabetes tend to become more dependent on others. This is possibly because of complications related to diabetes and due to low physical health that may be associated with

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high BMI. This may be also due to a reduction in physical activity and the inability to do daily life activities (Singh, 2016).

#### Study limitations and future research

There are several limitations to this study. Owing to its cross-sectional, descriptive design, further studies in other populations are needed to confirm and generalise the results. In addition, inclusion of participants with comorbidities may have affected the accuracy of the QoL assessment, and it will be beneficial in future studies to compare people with and without comorbidities.

The ADDQoL questionnaire was linguistically validated for Arabic-speaking people in Israel rather than Palestine; however, this is unlikely to have affected the results as there is no language difference between Arabs in Palestine and those in Israel.

#### Conclusion

It is well recognised that the prevalence of type 2 diabetes has increased in both developed and developing countries during the last four decades, as a result of the abundance of food, the consequent change in dietary habits and reductions in daily physical activity. QoL is the standard of health, comfort and happiness experienced by an individual. It is well known that diabetes causes serious deterioration in general QoL.

Nearly all participants in this study agreed that they do not live to their full potential, since they do not have the freedom to eat and drink as they like. This research was consistent with many other studies which showed that women suffer from worse QoL than men, even though they have better control of their diabetes. This may be due to high financial burden, and the fact that Palestinian

women are responsible for many more daily tasks than men.

This study highlights the level of influence diabetes has on a person's QoL, and the relationships between QoL and diabetes duration, comorbidities and BMI. Progression of diabetes, and especially poor glycaemic control, leads to numerous potentially life-threatening complications and deteriorating QoL. ■

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