

# Evaluation of the quality of life of 50 type 2 diabetic patients followed in a Medical Center for Non-Communicable Diseases in Rabat: Hay Ennahda II

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DOI: [10.36348/sjm.2023.v08i04.008](https://doi.org/10.36348/sjm.2023.v08i04.008)

| Received: 01.03.2023 | Accepted: 13.04.2023 | Published: 20.04.2023

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## Abstract

Diabetes is a progressive and severe chronic metabolic disease. It is a major public health problem, responsible for a high morbidity and mortality rate in the world and in Morocco. Our study involves 50 patients with type 2 diabetes recruited at the Hay Ennahda II Extension III Non-Communicable Disease Medical Center in Rabat. This is a descriptive and analytical observational study, the purpose of which is to assess the quality of life of Moroccan type 2 diabetic patients by means of a generic questionnaire "SF-12" and a specific questionnaire for diabetes "Diabetes-39". The results showed that diabetes negatively affects the quality of life of diabetic patients and established that the factors associated with their quality of life are multiple: factors related to socio-demographic characteristics (gender, ethnicity and marital status), comorbidities (hypertension and dyslipidemia), related to the pathology itself (obesity) and its chronic degenerative complications (diabetic neuropathy and obliterative arteriopathy of the lower limbs). Unlike the literature, some socio-economic characteristics (age, level of education, professional activity), others related to diabetes (age of diabetes and glycemic control) and therapeutic management do not affect quality of life in our study, this can be explained by the size of our sample. This preliminary study is a pilot study that introduces the issue of the quality of life of people with diabetes in Rabat. It will be continued to obtain a larger sample, in order to better study the peculiarities of the Moroccan patients in this field.

**Keywords:** Diabetes, questionnaires, quality of life.

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## INTRODUCTION

T2D is a major public health problem; it is responsible for a great morbidity and mortality in the world. According to WHO estimates, in Morocco in 2016, 12% of total deaths of all ages are due to diabetes [2]. Morocco is a high prevalence country; the latest estimates from the STEP WISE study published in 2019 and carried out by the Ministry of Health reveal that 10.6% of Moroccans over the age of 20 are diabetic [39]. Thus screening is essential to detect and treat this disease early in order to prevent possible complications, in particular the degenerative ones, which are part of the natural history of type 2 diabetes, however a permanent glycemic imbalance can accelerate their occurrence.

The quality of life of diabetic patients is closely linked to complications, and to the level of acceptance of the disease and its treatment.

This quality of life was defined by the WHO in 1994 as being: "an individual's perception of his place in life, in the context of the culture and value system in which he lives, in relation with its goals, expectations, standards and concerns. It is a broad conceptual field, encompassing in a complex way the physical health of the person, his psychological state, his level of independence, his social relations, his personal beliefs and his relationship with the specificities of his environment [4].

However, health-related quality of life remains a difficult entity to assess. Many measurement tools have been developed. These are self-administered questionnaires or completed during an interview by an evaluator. There are two types of questionnaires: generic and specific.

The generic questionnaires are applicable to the general population and to patients with different pathologies, thus making it possible to globally assess the health-related quality of life and to make comparisons. The most used is the MOS "Medical Outcomes Study" Short Form General Health Survey, in its different forms: SF-36, SF-20, SF-12 [6].

The specific questionnaires are adapted to patients presenting a given pathology, which allows a more precise evaluation of the impact of this one on the quality of life.

The quality of life of type 2 diabetic patients is a little studied subject in Africa. This justifies our observational study on 50 T2D patients recruited at the medical center for non-communicable diseases Hay Ennahda II Extension III in Rabat; And whose objective was to evaluate the quality of life of Moroccan type 2 diabetic patients, thanks to a generic questionnaire "the "SF-12" and a questionnaire specific to diabetes "D-39".

## METHODS

### Study context:

This is a descriptive and analytical observational study, which aims to assess the quality of life of Moroccan type 2 diabetic patients, using a generic questionnaire "the "SF-12" and a questionnaire specific to the diabetes "D-39".

**Study framework:** The recruitment of patients was done in consultation by doctors from the Endocrinology Diabetology department from June to December 2018. After obtaining the patient's signed consent, the two questionnaires are self-administered in literate patients, or administered by a member of his family or a paramedical staff or a doctor in illiterate patients. The sociodemographic, clinical and paraclinical data are obtained from the observation notebook and the questionnaires used, then entered on the SPSS software version 23 with descriptive study and analytical.

### Participants:

**Inclusion criteria:** All adult patients, from the age of 18, with type 2 diabetes, followed at the Hay Ennahda II Extension III center in Rabat, and having consulted during the duration of our study.

**Exclusion criteria:** Type 1 diabetes, secondary diabetes, gestational diabetes, patients with acute metabolic decompensation, patients with mental illness, patients whose medical condition prevents them from participating (communication difficulties), and patients refusing to participate.

**Number of patients:** 50 patients

**Variables:** The parameters collected included age, gender, ethnicity, marital status, number of children,

education, occupation, social security coverage, household income, history of diabetes and its management, medical history and recent metabolic and degenerative assessment.

**Data source:** The collection was made from the participants.

**Data collection and analysis:** the collection and analysis of data was made from two questionnaires:

#### \* Generic self-questionnaire: the SF-12

This generic quality of life self-report scale is a shortened version of the SF -36, and demonstrates high validity. It turned out to be an adequate substitute for the longer original form.

The reliability of the Arabic version of the questionnaire has been documented in previous studies.

#### \*Specific self-questionnaire : D-39 : Diabetes-39

The D-39 (Appendix 3) is a scale used in type 1 and 2 diabetic patients regardless of the treatment administered in order to assess the level of their quality of life.

It is recognized as valid and reliable, and it is among the most widely used diabetes-specific HRQoL measurement instruments in the world.

**Bias:** Information bias in illiterate patients.

**Size of study population:** The sample size was determined by the number of patients who met the inclusion criteria without having an element of the exclusion criteria.

### Statistical analysis

- Descriptive statistical analyzes were carried out using:
  - Calculation of counts and percentages, for qualitative variables.
  - Calculation of measures of central tendencies (means and medians) and measures of dispersion (standard deviation and interquartile) for quantitative variables.
- All statistical analyzes were performed using SPSS version 23.0 software.
- The significance level for all comparisons was set at 0.05.

## RESULTS

The size of our sample is 50 subjects, made up of 39 women (78%) and 11 men (22%). The average age is  $62.54 \pm 7.55$  years, with extremes ranging from 44 to 82 years. 30 (60%) of our patients are married. The average number of children is  $3.82 \pm 2.55$  with extremes ranging from 0 to 10 children.

Illiterate patients constitute 64% (32) and 46 (92%) of patients are unemployed. For social coverage, 41 (82%) of our patients benefit from it, of which 38 (76%) are affiliated to RAMED and 3 patients (6%) to the Compulsory Health Insurance (AMO) while 9 (18%) do not are not covered. All our patients live in urban areas (100%).

The duration of diabetes in our patients is on average  $13.8 \pm 8.15$  years with a maximum of 36 years and a minimum of 2 years; 26 of our patients (52%) experience no hypoglycemia, 13 patients experience less than one hypoglycemia per week (26%) and 11 patients (22%) more than one hypoglycemia per week.

For the medical history, arterial hypertension is present in 30 (60%) of our patients while 32 (64%) suffer from dyslipidemia. 8 (16%) of our patients are smokers including 6 (12%) weaned, all male. Alcoholism concerns 0% of patients and cannabisism 2 male patients (4%) including a 2% weaned patient.

Of our 50 patients, 34 (69.4%) had a family history of diabetes (parents, brothers and/or sisters), while 15 (30.6%) patients had no family history of diabetes.

The glycated hemoglobin of our participants is on average  $8.68 \pm 1.8\%$  with 11 of the participants (22%) having a rate lower than 7%.

The total cholesterol of our participants is on average  $2.17 \pm 0.35$  g/l, LDL cholesterol  $1.36 \pm 0.30$  g/l, and HDL cholesterol  $0.52 \pm 0.09$  g/l. The triglyceride level is on average  $1.58 \pm 0.55$  g/l.

The GFR is greater than 60 ml/min/1.73m<sup>2</sup> in 43 patients (86%) versus 6 patients (12%) who have renal insufficiency.

The most frequent microangiopathic complication is retinopathy with 15 participants (30%), 9 having nephropathy (18%), and 10 (20%) suffering from neuropathy with a DN4 score greater than or equal to 4.

Stroke was not found in any of the participants while myocardial infarction was found in 4 (8%) of the participants. Regarding obliterating arteriopathy of the lower limbs, it is assessed by the walking distance, with 12 (24%) of the participants not being able to walk beyond 200m without stopping, and 38 (76%) of the participants having a walk over 200m. Self-monitoring of blood glucose is done by 2 of our patients (4%).

Taking intocare of our patients is multidisciplinary. Diabetes treatment is based on the adoption of a healthy lifestyle with medical treatment; 14 (28%) of patients are treated with oral antidiabetics (OAD) alone, 5 are treated with an OAD and basal insulin, and 32 (64%) by insulin with or without metformin.

The majority of study participants (86%) spend less than 300 DH per month for their treatments, compared to 6 patients (12%) whose treatment cost amounts to more than 300 DH monthly.

There is a significant association between quality of life and gender ( $p=0.007$ , and  $p=0.012$ ), ethnicity ( $p=0.04$  and  $p=0.01$ ), marital status ( $p=0.006$ ), comorbidities ( $p= 0.01$  and  $p=0.01$ ), other medical history ( $p=0.04$  and  $p=0.07$ ), body mass index (BMI) ( $p=0.004$  and  $p= 0.02$ ), diabetic neuropathy ( $p=0.02$  and  $p=0.04$ ) and PAD ( $p=0.02$  and  $p=0.009$ ). There is also a significant association between quality of life and taking antihypertensives ( $p=0.02$ ), statin ( $p=0.01$ ), aspirin ( $p=0.02$  and  $p= 0.04$ ), as well as taking other treatments ( $p=0.005$  and  $p=0.003$ ).

**Table 1: Summary table: influence on the quality of life of T2DM patients**

In P:	SF-12		Diabetes- 39				
	CSM	PCS	Energy and mobility	Diabetes control	Anxiety and worry	Social boundaries	sexual activity
Sex	0.51	0.61	0.15	0.69	0.57	0.75	0.00
Age	0.23	0.99	0.90	0.10	0.27	0.14	0.64
Ethnic group	0.20	0.25	0.20	0.04	0.01	0.26	0.78
marital status	0.72	0.27	0.22	0.31	0.28	0.45	0.006
Number of children	0.84	0.88	0.36	0.85	0.06	0.93	0.42
Education	0.76	0.052	0.36	0.12	0.051	0.19	0.36
Occupation	0.26	0.40	0.94	0.30	0.12	0.62	0.47
Social Security	0.42	0.92	0.51	0.43	0.09	0.27	0.24
Seniority (years)	0.23	0.61	0.30	0.26	0.19	0.15	0.25
Number of hypoglycaemia per week	0.53	0.36	0.35	0.30	0.81	0.47	0.30
Comorbidity: hypertension	0.52	0.01	0.08	0.30	0.42	0.50	0.48
Comorbidity: dyslipidemia	0.43	0.01	0.17	0.58	0.30	0.92	0.57
Type 2 diabetic inheritance	0.01	0.53	0.72	0.67	0.63	0.42	0.01
Other medical history	0.14	0.17	0.04	0.46	0.41	0.07	0.16

In P:	SF-12		Diabetes- 39				
	CSM	PCS	Energy and mobility	Diabetes control	Anxiety and worry	Social boundaries	sexual activity
BMI (kg/m <sup>2</sup> )	0.75	0.004	0.02	0.36	0.90	0.32	0.46
GAD (g/dl)	0.36	0.59	0.97	0.53	0.68	0.51	0.45
HbA1c (%)	0.67	0.75	0.76	0.35	0.97	0.40	0.21
Hypercholesterolemia (g/l)	0.86	0.45	0.75	0.15	0.53	0.30	0.63
Hypertriglyceridaemia (g/l)	0.26	0.41	0.80	0.03	0.80	0.83	0.07
Glomerular filtration rate (ml/min/1.73m <sup>2</sup> )	BORN	BORN	0.55	0.97	0.64	0.95	0.06
Albuminuria (mg/24h)	BORN	BORN	0.97	0.52	0.99	0.51	0.55
Diabetic retinopathy	0.83	0.80	0.86	0.43	0.76	0.81	0.41
Diabetic nephropathy	0.98	0.06	0.31	0.69	0.71	0.83	0.36
Diabetic neuropathy	0.02	0.11	0.30	0.04	0.25	0.31	0.34
IDM	0.68	0.81	0.57	0.66	0.83	0.56	0.10
AOMI	0.10	0.02	0.009	0.67	0.75	0.64	0.87
Blood glucose self-monitoring per month	0.70	0.45	0.25	0.55	0.42	0.98	0.76
Medical treatment	0.71	0.16	0.19	0.87	0.92	0.65	0.57
Number of tablets and/or sachets per day	0.53	0.69	0.71	0.72	0.13	0.99	0.87
Number of injections per day	0.69	0.23	0.27	0.85	0.98	0.65	0.20
Anti-HTA	0.02	0.21	0.96	0.13	0.06	0.15	0.44
Statin	0.24	0.01	0.18	0.91	0.68	0.68	0.20
Aspirin	0.30	0.46	0.91	0.02	0.06	0.04	0.58
Other treatments	0.20	0.005	0.003	0.27	0.58	0.29	0.07
Average financial cost of treatment per month (DH)	0.13	0.56	0.76	0.48	0.45	0.19	0.15

Physical (PCS) and Mental (MCS) Summary Scores.

NE: not assessed.

## DISCUSSION

Quality of life assessment (QOL) is an important parameter to consider in the management of chronic diseases. It is a concept linked to health, which only developed in medicine in 1980, and which has aroused the interest of practitioners over the past two decades. Diabetes being the most widespread chronic disease worldwide, QDV represents a current research point. In our Moroccan diabetic patients, this concept has been little evaluated, hence the interest of our work.

The methodological difficulty in evaluating quality of life is major since it involves obtaining a quantitative measurement of a purely qualitative, subjective and personal concept.

The quality of life of diabetic patients is generally more impaired than in the general population without chronic disease in all the studies that are made in this direction.

Regarding our work, the results will be discussed according to the parameters studied: The sex of our participants is not significantly associated with quality of life except for the dimension of sexual activity of the D-39 where men have an impaired quality of life compared to women.

Conversely, in studies in the Netherlands, Greece and France [33, 34, 38], we find that men have a better quality of life than women.

Age has no significant link with the quality of life of our participants, this may be due to the fact that a minority of our patients (8%) are aged greater than or equal to 75 years. Most studies show that advanced age significantly affects quality of life [32, 33, 34, 37, 38]. We can link this correlation to the fact that elderly subjects accumulate a number of progressive pathologies related to aging and physiological degeneration (such as cataracts, osteoarthritis, etc.).

As for the marital status in our study, the D-39 highlighted a better quality of life in its sexual dimension for unmarried people (widowed, single and divorced). This contradictory result can be explained by the constraint our patients had to be open during the questionnaire, given that sexuality is still a taboo subject in Moroccan society. This result is also inconsistent with other studies where living alone significantly alters the quality of life in Greece [37] and France [38].

Ethnicity has a significant impact on the quality of life in our participants for the dimensions of

diabetes control and that of anxiety and worry. Patients of Berber origin have a better quality of life than those of Arab origin. This may suggest that the Berber culture is different from the Arab culture in terms of a healthier and less caloric diet and better adherence to treatment.

There is no correlation between the quality of life and the level of education of our participants. The discrepancy is marked in the literature. In the study by B. Senez in France, the level of education seems to have an influence on the quality of life through a better understanding of the disease and the possible complications that can result from it in educated subjects [34, 38].

Our results conclude that there is no significant link between the duration of diabetes and quality of life, which is in line with the results of B. Senez in France [38] and Andrzej M. Fal in Poland [35].

Hypoglycemia in our patients is not related to their quality of life; however, we cannot draw solid conclusions from this, because we only identified subjects who had experienced symptoms of hypoglycaemia without having objectified by self-measurement of glycaemia. A study conducted in the United States demonstrated that hypoglycemia has a negative impact on social function, overall quality of life, and work productivity and medication adherence. Quality of life deteriorates in patients with non-recent hypoglycemia, and deteriorates more in those with recent hypoglycemia [38].

The presence of comorbidities (hypertension and dyslipidemia) significantly alters the physical quality of life, according to the SF-12, like other studies that confirm this trend [34-36].

Diabetic heredity also has a significant positive influence on quality of life unlike the presence of other medical antecedents in particular obesity in the dimension of energy and mobility, this finding is objectified in the majority of the studies cited [33-35, 38].

The link with HbA1c is not highlighted in our study. It also gives mixed results in the literature [32, 33, 36-38].

Among the various complications of diabetes, only diabetic neuropathy and obliterating arteriopathy of the lower limbs affect the quality of life of our patients. In the literature, all degenerative complications have a negative effect on quality of life with diabetic retinopathy and myocardial infarction being at the forefront [34, 35, 37, 38].

As in other works, we observed no link between insulin treatment and quality of life [32, 37], it nevertheless seems to have a negative effect on quality

of life in France and the Netherlands [33, 38], while the effect of insulin is positive on the psychological domain in Poland [35].

Self-monitoring in our patients does not seem to have a positive impact on quality of life, as for A. Papadopoulos in Greece [35] and B. Senez in France [38]; this can be explained by the lack of means, in particular of a personal glucometer, enabling patients to measure daily the variations in their blood sugar levels during the day.

As in other studies, taking oral antidiabetics in our patients has no negative effect on quality of life [32, 37, 38], and even has a positive effect on the environmental and somatic domains. quality of life according to Andrzej M. Fal in Poland.

The strong points of our study: the use of a questionnaire specific to diabetes "the Diabetes-39", combined with a generic questionnaire of the quality of life "the SF-12". The selection of outpatients was a reasoned choice so that we could assess the quality of life of patients outside of an acute situation that would have repercussions on our assessment.

The limits of our study are mainly represented by its cross-sectional nature and the small size of our sample.

## CONCLUSION

Type 2 diabetes has a strong impact on the physical and psychological well-being of patients. It is responsible for vascular, renal, ophthalmic and neurological complications that impair quality of life and thus presents a heavy burden for individuals and society in terms of morbidity and economic costs.

Our work made it possible to evaluate the generic "SF-12" and specific "Diabetes-39" quality of life, as well as to highlight the sociodemographic factors and those related to diabetes which had a link with the quality of life of diabetics.

The results of our study firstly showed that diabetes negatively affects the quality of life of diabetic patients and secondly established that the factors associated with their quality of life are multiple: factors related to sociodemographic characteristics ( gender, ethnicity and marital status), comorbidities (hypertension and dyslipidemia), linked to the pathology itself (obesity) and its chronic degenerative complications (diabetic neuropathy and obliterating arteriopathy of the lower limbs).

On the other hand, our study was able to demonstrate that among our participants, there was no statistically significant association of age, education, social security, duration of diabetes, hypoglycaemia, HbA1c, GFR, diabetic retinopathy and nephropathy,

IDM, glycemic self-monitoring, treatment with insulin and/or ADO, quality of life.

The continuation of this study will lead to a more in-depth analysis of the factors influencing the quality of life using a larger sample, in order to limit the degenerative complications which are at stake in this chronic pathology.

**Conflicts of interest:** The authors declare no conflict of interest.

### What is known about this subject

The quality of life of diabetic subjects is less than non-diabetic subjects.

Several parameters are involved in determining the quality of life of diabetic subjects.

### What does your study bring new

Our work made it possible to evaluate the generic "SF-12" and specific "Diabetes-39" quality of life, as well as to highlight the sociodemographic factors and those related to diabetes which had a link with the quality of life of diabetics.

### Author Contributions

All authors contributed to the conduct of this work. All authors have read and approved the final version of this manuscript.

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