

Quality of life in patients with diabetic foot ulcers in Tunisia

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This study aims to describe the impact of diabetic foot ulcers (DFUs) on the quality of life (QoL) of individuals with diabetes. This descriptive multicentre study was conducted in 2013 in three Tunisian hospitals and included 60 patients with DFUs. Data were collected via the DFU Scale questionnaire. Respondents' QoL deteriorated after developing a DFU, with 53.3% having low scores in almost all domains considered by the DFU Scale. The domains most affected related to emotion, finance, entertainment and daily activities. In addition to having functional consequences, DFUs significantly impair QoL and may impact family interactions and social function. Comprehensive care is needed to prevent DFUs and, when present, minimise their impact on QoL.

Diabetic foot ulcers (DFUs) are a common health problem worldwide (Al-Wahbi, 2006). Their frequency is increasing in parallel with the evolution of diabetes (Vileikyte, 2008). DFUs affect 15% of all people with diabetes during their lives (Anselmo et al, 2010; Aalaa et al, 2012). A study conducted at Rabta Hospital in Tunis found that, among 286 patients with diabetes, foot damage accounted for 7.35% of hospitalisations, with the most frequent issues being gangrene (39.9%), ulcers and DFUs (34.5%) (Ftouhi et al, 1997). Approximately eight in every ten non-traumatic amputations are performed on people with diabetes, and 85% are preceded by a DFU (Wild et al, 2004). Patients with a DFU are two to four times more likely to die than those with diabetes and no ulceration (Yekta et al, 2011).

Besides their association with high morbidity, mortality, hospital length of stay and healthcare costs (Driver et al, 2010), DFUs have a significant impact on quality of life (QoL), especially psychological (feelings of frustration, anxiety, depression, anger and sadness), physical (pain, physical dysfunction), social (isolation) and economic (the costs of hospitalisation, care and suitable footwear, and the loss of employment) wellbeing (Brod, 1998).

Very few studies have been conducted to elucidate the impact of DFUs on patients' QoL in Tunisia. This study aimed to describe the impact

that the development of a DFU had on the QoL of patients presenting for treatment at three hospitals in Tunisia.

Methods

We conducted a descriptive multicentre study in Tunisia during August and September 2013. The study was carried out in three departments:

- Endocrinology and cardiovascular surgery, Rabta Hospital, Tunis
- General surgery, Kasserine Hospital, Kasserine
- General surgery, Charles Nicolle Hospital, Tunis.

The researcher, using patients' medical files and working in collaboration with nurses from the relevant medical departments, identified potential participants based on the inclusion and exclusion criteria. Those aged over 18 years with a DFU who were able to express themselves in Arabic or French were eligible to participate. Individuals with a foot ulcer not linked to diabetes, who had undergone an amputation, were under 18 years old or did not have the cognitive skills to participate were excluded.

The researcher explained the purpose of the research, the voluntary and unpaid nature of participation, patient confidentiality and the right to withdraw at any time without prejudice to all potential participants. Each participant accepted that his or her data would be used for

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Table 1. Demographics of participants (n=60).

Demographic	Number (%)
Age, years:	
<40	4 (6.7%)
40–59	23 (38.3%)
≥60	33 (55.0%)
Gender:	
Male	48 (80.0%)
Female	12 (20.0%)
Marital status:	
Married	48 (80.0%)
Single	4 (6.7%)
Divorced	3 (5.0%)
Widower	5 (8.3%)
Educational level:	
No schooling	29 (48.3%)
Primary	18 (30.0%)
Secondary	9 (15.0%)
University	4 (6.7%)
Socioeconomic level:	
Low	22 (36.7%)
Average	36 (60.0%)
High	2 (3.3%)
Cohabitation:	
On own	7 (11.7%)
With family	53 (88.3%)

scientific research and signed a consent form. Participant confidentiality was ensured by the use of encrypted codes. This study was approved by the Research Ethics Committee of University Hospital Rabta and permission to contact patients granted by each participating service.

For descriptive studies that aim to develop knowledge, small sample sizes are sufficient to obtain necessary information on the phenomenon being studied (Fortin and Gagnon, 2006). A convenience sample of 60 patients with diabetes was, therefore, asked to fill out the DFU Scale. This is a specific instrument for the evaluation of QoL. Its validity and reliability have been confirmed in several studies in numerous countries (Abetz et al, 2002). Its use has been validated in the Tunisian context. Authorisation to use the tool was obtained from its creator.

The DFU Scale consists of three sections: demographics, clinical information (gathered from patients' medical records) and an assessment of QoL. The QoL assessment includes 58 questions divided into 11 domains:

- Recreation (five items)
- Physical status (six items)
- Daily activities (six items)
- Emotions (17 items)

- Noncompliance (two items)
- Family (five items)
- Friends (five items)
- Treatment (four items)
- Satisfaction (one item)
- Positive attitude (five items)
- Finance (one item).

It uses a Likert scale with scores ranging from 1 (not at all) to 5 (a great deal). Scores for the different domains are added together to give an overall score, which can range from 0 to 100. The presence of the researcher was often necessary to explain the variables being studied to participants.

Statistical analysis

Data analysis was performed using SPSS 18.0. Descriptive analysis was used to describe the sociodemographic and clinical data and information relating to QoL. Qualitative variables were analysed using absolute frequencies and percentages. Quantitative variables were summarised by measures of central tendency (mean) and dispersion (standard deviation).

Global QoL score was calculated using a formula from the literature (Bann et al, 2012). To obtain this score, it was necessary to reverse the Likert scale, so 1 became 5 and 5 became 1, in all areas except for satisfaction and positive attitude. A global score of 0 indicated the worst and 100 the best QoL (Rasouli et al, 2011). If a patient scored below 33, his or her QoL was considered poor; between 34 and 66 moderate; and above 66, good.

The results were also reported separately for each domain and the scores recategorised as:

- Positive: scores of 1 or 2 on the Likert scale, representing a good QoL
- Average: a score of 3 on the Likert scale, representing a standard QoL
- Negative: scores of 4 or 5, representing a poor QoL.

In the satisfaction and positive attitude domains this scoring was reversed, with 1 or 2 being negative and 4 or 5 being positive. The family domain was expressed as positive or negative. Patients who were unmarried or living alone did not complete the questions in this domain. An average score was calculated for each domain by summing the positive responses and dividing the total by the number of items explored in each domain.

Results

Participants' characteristics are summarised in [Table 1]. The median age of the population was 61.2 years (range: 24–82 years). Participants were

Table 2. Clinical characteristics of participants.

Characteristic	Number (%)
Type of diabetes (n=60):	
<40	21 (35.0%)
40–59	39 (65.0%)
Duration of diabetes, months (n=60):	
<10	23 (38.3%)
≥10	37 (61.7%)
History of diabetic foot ulcer (n=60):	
Yes	37 (61.7%)
No	23 (38.3%)
Duration of diabetic foot ulcer, months (n=60):	
0–6	38 (63.3%)
6–12	12 (20.0%)
>12	10 (16.7%)
HbA_{1c} (n=53):	
<53 mmol/mol (<7%)	20 (37.7%)
≥53 mmol/mol (≥7%)	33 (62.3%)
Body mass index (n=57):	
<25	29 (50.9%)
25–30	20 (35.1%)
≥30	8 (14.0%)
Complications of diabetes (n=60):	
Yes	36 (60.0%)
No	24 (40.0%)

predominantly male, with a ratio of 4:1 male to female patients. The clinical characteristics of participants are shown in [Table 2](#). Twenty one patients had type 1 diabetes. The mean duration of diabetes was 13.2±8.34 years. More than half (63.3%) of respondents had been diagnosed with a DFU less than 6 months before the start of the study.

The proportions of participants with good, average or poor QoL are shown in [Table 3](#). Over half of participants scored below 33, meaning that they had a poor QoL. The average QoL scores for each domain in the DFU Scale are displayed in [Table 4](#). The areas most adversely affected by the development of a DFU were emotion, finance, leisure and daily activities. Participants' responses to each item within the 11 domains are shown in [Table 5](#). Overall, the majority of participants felt anxious about the risk of amputation (96.7%), felt unable to heal their ulcers (90%), were worried that their ulcers would never heal (90%) and feared they might recur (90%). In addition to this, participants felt that they had to spent a lot of money on health care (83.3%). They considered

that their daily (75%) and recreational (61.7%) activities were limited because of their DFU [[Table 5](#)].

Discussion:

This study of 60 people with a DFU in Tunisia confirms the negative impact that these ulcers have on patient QoL. More than half (53.3%) of participants had a poor QoL. Similar results have been reported in other cohorts of patients with diabetes (Mazlina et al, 2011; Oyibo et al, 2011). Based on the SF-36 scale used in these two studies, the authors concluded that the occurrence of ulceration negatively affected QoL in all aspects of physical and mental health. Other studies have shown that activities of daily living, family and social capacities and leisure activities were affected by the presence of DFU (Brod, 1998; Rubu and Wahl, 2004). Valensi et al (2005) compared QoL in people with diabetes with and without ulcers and concluded that it was significantly lower in the former group in all areas measured by the SF-36. We found that the areas most negatively affected by the development of DFU were those relating to emotion, finance, entertainment and activities of daily living.

Participants' emotional state negatively impacted their physiological, cognitive, expressive and subjective wellbeing, as measured by the emotions domain. Almost all patients were concerned about the risk of amputation and expressed a feeling of helplessness when it came to the likelihood of their ulcers healing and remaining healed in the future. These results confirm other data in the literature (Sutton et al, 2000; Salomé et al, 2011). More than four out of five respondents felt depressed. A study using the Beck Depression Inventory Assessment showed that 41 out of 50 DFU patients evaluated had some degree of depressive symptoms (Salomé et al, 2011).

Moreover, Vedhara et al (2010) showed that patients with DFUs were more depressed and had a poorer QoL than patients with diabetes who did not have this complication. According to the results of the current study, 36.7% of participants despaired about their condition. However, several studies have shown that DFUs engender a feeling of hopelessness in the majority of cases (Polonsky, 2002; Devine, 2007; Bradbury and Price, 2011). This result could be explained by the fact that Tunisians give spirituality and religion greater importance than other countries in which studies have been performed.

Meeting the needs of the sick person costs money. This study notes that the majority of

participants (83.3%) had experienced financial difficulties following the development of a DFU. Goodridge et al (2005) reported that financial difficulties were a major issue for many DFU patients. Vileikyte (2008) identified various different types of financial costs associated with ulcers, including the cost of travelling to the hospital for appointments. A phenomenological study indicated that most patients spend a great deal of money on medical footwear (Brod, 1998).

Over half of the study participants (61.7%) had been forced to change their leisure activities to ones better suited to their condition. A Swedish study found activities such as walking, dancing and riding to be restricted by DFUs (Hjelm et al, 2002). Other qualitative studies have reported various limitations in leisure activities (Brod, 1998; Firth et al, 2011). In fact, it has been found that DFU patients often have to abandon or severely restrict activities they enjoyed participating in before developing an ulcer (Brod, 1998); many change their hobbies or adopt new activities.

As measured by the daily activities domain, three-quarters of participants felt that their daily lives were limited by their DFU. Brod (1998) showed that those who suffered from foot ulcers were unable to perform physical or personal activities. This finding is also mentioned by other authors (Kinmond et al, 2003; Price, 2004; Gilpin and Lagan, 2008; Firth et al, 2011).

The way care is provided can have an impact on patient QoL and should be considered. Since DFUs have such a negative impact on patients' QoL, it is essential that we change how we manage these individuals. Clinicians should aim to improve patients' QoL by taking into account the physical, psychological, social and spiritual aspects of their health. Watson-Miller (2006) emphasised the importance of the nursing role in the treatment of people with DFUs.

Nurses should be encouraged not only to be there, but to 'be with' the patient suffering from DFU, to take time with each one, to talk with them, listen to their concerns and help them to express their emotions, fears and suffering. Vileikyte (2001) indicated that adopting a multidisciplinary approach and using intensive interventions, including education, may prevent DFUs from developing and, thus, improve the QoL. The authors propose implementing a complete diabetic foot screening programme in practice to prevent DFUs and to diagnose foot

Table 3. Participant quality of life (n=60).

Quality of life	Number (%)
Poor: score of 0–33	32 (53.3%)
Average: score of 33–66	13 (21.7%)
Good: score of 66–100	15 (25.0%)

Table 4. Average scores for DFU Scale domains.

Domain	Average score
Leisure	20.9
Physical health	25.3
Daily activities	21.4
Emotions	10.8
Noncompliance	22.5
Family	39.0
Friends	38.4
Treatment	23.8
Satisfaction	38.7
Positive attitude	34.0
Finance	14.2

complications as early as possible. Educating and teaching preventive measures to patients with diabetes is essential to improve their QoL.

Strengths, limitations and future research

This objective evaluation of QoL was conducted in a sample of 60 patients recruited from three different departments in Tunisia and, therefore, covers several healthcare settings. The scale used had been translated into Arabic, with a high degree of correlation between English and Arabic (Cronbach alpha = 92). As the tool was adapted to a regional population, the authors can be sure that all patients understood the content of the scale and that their responses were able to reflect the reality of the situation.

The authors recommend this study is performed in other areas of nursing to see whether these findings can be applied to different healthcare arenas, such as community settings. The small number of subjects in this study may not allow a generalisation of the results. The sample size of future studies should, therefore, be larger if clinicians are to better understand this complication, its impact on QoL and raise awareness among healthcare professionals about this underestimated problem. The duration of the data collection (2 months) was relatively short, so the inclusion criteria were not very restrictive, in order to include as many potential participants as

Table 5. Results by domain and Diabetic Foot Ulcer Scale item.

Domains and items	Response, number (%)		
	Negative	Average	Positive
1. Leisure: How much have your foot ulcer problems:			
a) Stopped you from doing the hobbies and recreational activities that you enjoy?	37 (61.7%)	11 (18.3%)	12 (20.0%)
b) Changed the kinds of hobbies and recreational activities that you enjoy?	37 (61.7%)	13 (21.7%)	10 (16.6%)
c) Stopped you from getting away for a holiday or weekend break?	34 (56.7%)	12 (20.0%)	14 (23.3%)
d) Made you choose a different kind of holiday or short break than you would have preferred?	28 (46.8%)	16 (26.6%)	16 (26.6%)
e) Meant that you had to spend more time planning and organising for leisure activities?	36 (60.0%)	13 (21.7%)	11 (18.4%)
2. Physical health: Because of your foot problems, how often have you felt:			
a) Fatigued or tired?	36 (60.0%)	13 (21.7%)	11 (18.3%)
b) Drained?	42 (70.0%)	9 (15.0%)	9 (15.0%)
c) That you had difficulty sleeping?	35 (58.3%)	10 (16.7%)	15 (25.0%)
d) Pain while walking or standing?	40 (66.6%)	12 (20.0%)	8 (13.4%)
e) Pain during the night?	26 (43.3%)	13 (21.7%)	21 (35.0%)
f) Unwell due to taking antibiotics or another medicine for infection?	23 (38.3%)	10 (16.7%)	27 (45.0%)
3. Daily activities: Because of your foot problems, how often have you:			
a) Had to depend on others to help you look after yourself?	37 (61.6%)	8 (13.4%)	15 (25.0%)
b) Had to depend on others to do household chores, such as cooking, cleaning or laundry?	34 (56.7%)	5 (8.3%)	22 (35.0%)
c) Had to depend on others to get out of the house?	30 (50.0%)	12 (20.0%)	18 (30.0%)
d) Had to spend more time planning or organising your daily life?	28 (46.6%)	21 (35.0%)	11 (18.4%)
e) Felt that doing anything took longer than you would have liked?	40 (66.7%)	14 (23.3%)	6 (10.0%)
4. Emotions: Because of your foot problems, have you felt:			
a) Angry because you were not able to do what you wanted to do?	40 (66.6%)	14 (23.3%)	6 (10.0%)
b) Frustrated by others doing things for you when you would rather do them yourself?	47(78.3%)	5 (8.3%)	6 (13.4%)
c) Frustrated because you were not able to do what you wanted to do?	45 (75.0%)	14 (23.3%)	1 (1.7%)
d) Helpless to cure your ulcer(s)?	54 (90.0%)	3 (5.0%)	3 (5.0%)
e) Worried that your ulcer(s) will never heal?	54 (90.0%)	3 (5.0%)	3 (5.0%)
f) Worried that you may have to have an amputation?	58 (96.7%)	1 (1.7%)	1 (1.7%)
g) Worried about injury to your feet?	43 (71.7%)	14 (23.3%)	3 (5.0%)
h) Depressed because you were not able to do what you wanted to do?	45 (75.0%)	12 (20.0%)	3 (5.0%)
i) Worried about getting ulcers in the future?	54 (90.0%)	4 (6.7%)	2 (3.3%)
j) Worried about being a burden on others?	38 (63.3%)	10 (16.7%)	12 (20.0%)
k) That you have no control over your life?	47 (78.3%)	9 (15.0%)	4 (6.7%)
l) Angry that this has happened to you?	50 (83.4%)	6 (10.0%)	4 (6.7%)
m) Alone?	40 (66.7%)	7 (11.7%)	13 (21.6%)
n) Frustrated because you have difficulty in getting about?	46 (76.7%)	10 (16.6%)	4 (6.7%)
o) Frightened about the future?	37 (61.6%)	8 (13.4%)	15 (25.0%)
p) Badly about yourself because you can no longer work or be productive?	46 (76.6%)	8 (13.4%)	6 (10.0%)
q) Hopeless; that things will never get better?	22 (36.7%)	16 (26.7%)	22 (36.6%)
5. Noncompliance: Because of your foot problems, how often:			
a) Have you done things that you knew were not good for you, such as eating, drinking or smoking too much?	31 (51.7%)	13 (21.6%)	16 (26.7%)
b) Did you disregard medical advice about how to care for your ulcer?	37 (61.7%)	12 (20.0%)	11 (18.3%)
6. Family: Because of your foot ulcer problems, how much:			
a) Strain has there been on your relationship with your spouse or partner?	25 (41.7%)	-	23 (38.3%)
b) Strain has there been on your relationship with other family members?	14 (23.3%)	-	43 (71.7%)
c) Do you argue with your spouse or partner?	18 (30.0%)	-	27 (45.0%)
d) Have you felt that you are a burden on your family?	37 (61.7%)	-	20 (33.3%)
e) Have you felt that there has been a decline in your sexual relations?	35 (58.3%)	-	12 (6.7%)

Table 5. Results by domain and Diabetic Foot Ulcer Scale item (continued).

Domains and item	Response, number (%)		
	Negative	Average	Positive
7. Friends: Because of your foot ulcer problems, how much have you felt:			
a) Guilty because your friends have to change plans to fit in with your limitations?	14 (23.3%)	9 (15.0%)	37 (61.7%)
b) That your circle of friends is getting smaller?	24 (40.0%)	17 (28.3%)	19 (31.7%)
c) That there are restrictions on the kinds of things you do with your friends?	28 (46.6%)	16 (26.7%)	16 (26.7%)
d) Hindered in your social life?	44 (73.4%)	9 (15.0%)	7 (11.6%)
e) That you are a burden on your friends?	12 (20.0%)	12 (20.0%)	36 (60.0%)
8. Treatment: Because of your foot ulcer problems, how much are you bothered by:			
a) Having to keep the weight off your foot ulcer?	20 (33.3%)	18 (30.0%)	22 (36.7%)
b) The amount of time involved in caring for your foot ulcer (including dressing changes, waiting for the district nurse and keeping the ulcer clean)?	33 (55.0%)	11 (18.3)	16 (26.7%)
c) The appearance, odour or leaking of your ulcer?	48 (80.0%)	7 (11.6)	5 (8.4%)
d) Having to depend on others to help you care for your foot ulcer?	33 (55.0%)	13 (21.7)	14 (23.3%)
9. Satisfaction			
How satisfied have you been with your medical care for your foot ulcer problems?	28 (46.7%)	10 (16.6%)	22 (36.7%)
10. Positive attitude: Because of your foot ulcer problems:			
a) Have you been taking better care of your feet?	28 (46.7%)	16 (26.7%)	16 (26.6%)
b) Have you been taking better care of yourself in general?	12 (20.0%)	15 (25.0%)	33 (55.0%)
c) Have you felt closer to a spouse or a partner?	34 (56.7%)	6 (10.0%)	20 (33.3%)
d) Have you a greater appreciation of your friends?	23 (38.3%)	15 (25.0%)	22 (36.7%)
e) Have you felt happier?	36 (60.0%)	13 (21.7%)	11 (18.3%)
11. Financial: Because of your foot ulcer problems:			
a) How much money have you spent out of your own pocket on other things such as shoes, taxis, higher phone bills and home modification?	50 (83.4%)	5 (8.3%)	5 (8.3%)
b) How bothered have you been by the money you have spent out of your own pocket on things such as shoes, taxis, higher phone bills and home modification?	42 (70.0%)	6 (10.0%)	12 (20.0%)

possible. Tighter inclusion criteria may be suitable for future studies to determine the impact of DFUs on QoL in different cohorts of patients with diabetes.

Conclusion

DFUs greatly impair various aspects of patients' QoL, as measured by the DFU Scale. Multidisciplinary holistic management that considers the physical, psychological, social and spiritual aspects of a patient's wellbeing is needed. Prevention through the effective management of diabetes and routine screening for signs of DFU is paramount. DFIME

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