Health-related Quality of Life and Self-Esteem in Patients with Diabetic Foot Ulcers: Results of a Cross-sectional Comparative Study

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Abstract

To evaluate health-related quality of life (HRQoL) and self-esteem in patients with diabetic foot ulcers (DFUs), a cross-sectional, comparative study was conducted among 35 consecutive patients with diabetes mellitus (DM) attending outpatient clinics in Pouso Alegre, Brazil. Fifteen (15) patients with and 20 without a DFU participated in the study. Demographic variables were obtained and HRQoL and self-esteem were assessed using the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) and Rosenberg Self-Esteem Scale. In both groups, 80% of patients were women. Average age did not differ significantly between the DFU and control groups (average 56 [SD 8.42] and 52 years [SD 6.68], respectively) but disease duration was significantly longer \( (P < 0.001) \) in the DFU (mean 12 years, range 3–24 years) than in the control group (mean 8 years, range 1–21 years). Mean HRQoL scores in all domains were lower in the DFU than in the control group with significant differences in the following domains: physical functioning \( (P = 0.043) \), role physical \( (P = 0.003) \), social functioning \( (P = 0.022) \), and role emotional \( (P = 0.001) \). Self-esteem scores were similar in both groups. The results of this study confirm that patient HRQoL is negatively affected by the presence of a DFU. Wound prevention programs for patients with DM may help reduce the scope of this problem while DFU treatment programs that include psychological support may improve patient QoL.

Key Words: cross-sectional comparative study, diabetes mellitus, diabetic foot ulcer, quality of life, self-esteem

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Potential Conflicts of Interest: none disclosed

Diabetes mellitus (DM) is a major public health problem with increasing incidence, prevalence, and associated costs. DM is associated with complications that affect productivity, quality of life (QoL), and longevity. Estimates show that 15% of the patients with DM will develop at least one foot ulcer in their lifetime.1,2

Foot ulcers are among the most common complications of type 2 DM, often preceded by various disorders that affect the skin, nerves, joints, muscles, and arteries of the foot, causing the development of the so-called “diabetic foot”1,2; ie, a complex clinicopathological condition that increases the risk of ulceration, impairment, disability, early retirement, lower limb amputation, and mortality.3 In the US, diabetic foot ulcers are responsible for more than half of all nontraumatic amputations of the lower limbs, corresponding to 56% to 83% of the estimated 125,000 lower extremity amputations performed annually.4,5

The presence or history of a foot ulcer has a large impact on physical functioning and mobility and affects patient QoL.4,6 Interest in QoL as a clinical assessment and economic model variable has increased substantially.5,9 Patient QoL plays an important role in the development of health services; QoL studies in patients with DM and foot ulcers may help improve prevention and treatment protocols of care.5,9,12

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The purpose of this study was to assess and compare health-related quality of life (HRQoL) and self-esteem of patients with DM with and without foot ulcers.

Methods and Procedures

This cross-sectional comparative study was approved by the Research Ethics Committee at the Sapucaí Valley University (UNIVÁS), MG, Brazil. After a full explanation of the study was provided, written informed consent was obtained from all participants.

Participants. DM patients with a diabetic foot ulcer (DFU) (study group) and patients with DM without ulcers (control group), all 30 to 70 years of age, were consecutively selected for study participation at the outpatient clinics of Samuel Libânio University Hospital (HCSSL) and the City Center for Diabetes Education (CEMED), MG, Brazil. Excluded from study participation were patients who were hospitalized, had a history of or were recommended to undergo a lower limb amputation, or had uncontrolled systemic diseases (eg, systemic arterial hypertension, cardiopathies, and collagen and rheumatic diseases).

All patients underwent a clinical and physical examination performed by a physician before being assessed by the research nurses. Patients with DM and controlled comorbidities were eligible to participate after receiving appropriate treatment(s).

Variables. Demographic variables and clinical characteristics (name, gender, age, race, educational level, diabetes duration) were assessed and recorded after informed consent was obtained at the start of the study.

HRQoL. HRQoL was assessed using the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) questionnaire, which had been translated into Portuguese, culturally adapted, and validated for Brazil. There is no single overall score for the SF-36 questionnaire; instead, it contains one comparative item assessing changes in health over the past year and 35 items grouped into eight domains (physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health) assessing the patient’s perception of health over the last 4 weeks. Scores on each dimension range from 0 to 100, with 0 corresponding to the worst health status and 100 to the best health status. Each domain is evaluated and analyzed separately.

Self-esteem. Self-esteem was assessed using the Rosenberg self-esteem scale (UNIFESP-EPM), which was translated and validated for use in Brazil by Dini et al. This is a 10-item measure in which the total score ranges from 0 to 30, with lower scores indicating higher self-esteem. The Brazilian version of the Rosenberg self-esteem scale has been shown to be a valid, reliable, and reproducible measure of self-esteem.

The first author of the present study administered the paper-pencil questionnaires. Because of the low educational level of the study population, an interview approach was used. Each multiple-choice question and respective alternative answers were read aloud exactly as written, as many times as needed, and the investigator recorded the responses. Care was taken not to introduce any bias and not to answer any question on the behalf of the patient.

Data. Data were entered into Excel® spreadsheets and statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) release 17.0 for Windows (SPSS Inc., Chicago, IL).

Pearson’s chi-square test was used to compare the frequency distribution of categorical variables between groups. Fisher’s exact test was used for expected values <5. Comparison of age distribution between groups was performed using the Student’s t-test.

Because gender distribution differed between groups, the non-parametric Mann-Whitney test was used at a significance level of 0.05 to determine if this variable had any effect on HRQoL and self-esteem scores. The Mann-Whitney test also was used for the comparison of SF-36 domain scores, self-esteem scores, and disease duration. Statistical significance was set at $P \leq 0.05$.

Results

The control group consisted of 20 patients with DM without ulcers (80% women, 20% men, $P <0.001$) with a mean age of 52 years (SD 6.68) and mean disease duration of 8 years (range 1 to 21 years).

The study group comprised 15 patients with DM and foot ulcers (80% men, 20% women, $P <0.001$) with a mean age of 56 years (SD 8.42). Only disease duration was significantly different between the two groups. Patients with foot ulcers had a significantly longer history of DM than patients without ulcers (mean 12 years [range 3 to 24 years] and 8 years [range 1 to 21 years], respectively; $P = 0.05$).

Caucasian patients predominated in both the study (86.7%) and control (90%) groups; no significant differences in race were found between groups ($P >0.999$). Also, no significant differences...
were noted in educational level between groups ($P = 0.483$); 8.6% of the total sample was illiterate and 65.7% had completed an elementary school education only.

Significant differences between groups were found in the mean scores of the following SF-36 domains: physical functioning, role physical, social functioning, and role emotional, indicating that patients with foot ulcers had a lower HRQoL than patients without ulcers. In all SF-36 domains, the mean scores for patients with foot ulcers were lower than those for patients without ulcers (see Table 1).

No differences in self-esteem between groups were observed (see Table 2).

No significant differences between genders were found in the following SF-36 domains: role physical (RP), social functioning (SF), and role emotional (RE). On average, women had higher HRQoL scores than men. Self-esteem scores were similar for both groups (see Table 3).

**Discussion**

Diabetic foot ulcers cause pain and changes in lifestyle and QoL that may render the patient unable to perform normal activities. These ulcers are associated with high socioeconomic costs due to amputations, early retirement, loss of work capacity in the working-age group, work absenteeism, and hospital and medical costs.17-20

In Brazil, approximately 5 million people have DM; of those, 50% are unaware that they have the disease.19 Type 1 DM affects about 10% of this population. Among persons who know they have the disease, 90% have type 2 DM and 2% of type 2 DM patients have associated complications.19 No estimates of the number of individuals with diabetes-related wounds are available in Brazil.21-23

The direct cost of DM ranges between 2.5% and 15% of the country’s annual healthcare expenditures, depending on prevalence rates and level of services provided. Annual
compared with women.3,17 In the male population that usually takes less care of their health possible following diagnosis of the disease, especially in the ratio of implementing prophylactic measures as soon as

instrument derived from a questionnaire for health evaluation and spiritual concerns.28-33

of independence, social relationships, environmental features, expectations, standards, and concerns.” This definition in-

value systems in which they live and in relation to their goals, person's position in life in the context of the culture and

clusion, six domains: physical health, psychological state, levels of independence, social relationships, environmental features, and spiritual concerns.28-33

The SF-36 questionnaire used in this study is a generic instrument derived from a questionnaire for health evaluation (Medical Outcomes Study, MOS).7,34,35 and is the most commonly used generic instrument for measuring HRQoL around the world.16,37

According to D’Amorim,40 low patient educational level reduces the quality of information obtained with self-administered questionnaires. In the present study, 8.6% of the patients were illiterate and 65.7% had only elementary education. Patients with low sociocultural level and only elementary education are better assessed through interviews. The interview approach also increases study participa-

tion rates36; in the current study, 100% of participants completed the interview.

SF-36 scores were significantly lower in the study group than in the control group in the following domains: physical functioning ($P = 0.043$), role physical ($P = 0.003$), social functioning ($P = 0.022$), and role emotional ($P = 0.001$). Mean scores on all SF-36 domains were lower in the study group than in the control group.

Several studies have investigated the QoL of patients with foot ulcers.5,52,23,24 Current study results are similar to the findings of other studies using the RAND 36-Item Health Survey (RAND-36) and Walking Stairs Questionnaire (WSQ) that reported low QoL in patients with DFUs, especially concerning mobility and physical and social functioning.5,15,16 Tenvall and Apelqvist31 reported that the extensive impact of mobility limitations led to a cascade effect in every QoL domain.

Goodridge et al41 compared QoL parameters in 104 patients with healed and unhealed DFUs (defined as having a history of diabetic foot ulcers ≥6 months) who received care in a tertiary foot care clinic. Results using the Short Form 12 questionnaire showed that the unhealed DFU group had a greater reduction than the healed DFU group in overall physical health compared to patients with DM and no history of an ulcer, patients with hypertension, and persons in the general population. Additionally, significantly reduced QoL scores were found in the unhealed DFU group compared with the healed DFU group in several measures of physical health ($P < 0.002$ to $P < 0.04$). Patients with unhealed DFUs experienced significantly greater physical limitations and pain that affected their daily activities and interfered with their social lives. The authors concluded that individuals with DFUs experience a profoundly compromised physical QoL, effects heightened in persons with unhealed ulcers.41

In another cross-sectional study, Ribu et al42 evaluated the HRQoL in patients with DFUs ($n = 127$) by comparing their HRQoL with that of a sample from the general population without diabetes ($n = 5,903$) and a subgroup with diabetes and no DFU ($n = 221$) to examine differences between groups by sociodemographic characteristics and lifestyle factors. Data on sociodemographic characteristics, lifestyle, and HRQoL (SF-36) were obtained. In all the SF-36 domains and in the two SF-36 summary scales, patients

**Table 2. Rosenberg self-esteem scores for patients with diabetes mellitus (DM) with and without foot ulcers**

<table>
<thead>
<tr>
<th>Groups</th>
<th>No.</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
<th>$P$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM</td>
<td>20</td>
<td>7.65</td>
<td>8.5</td>
<td>5.31</td>
<td>0</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>DM + foot ulcer</td>
<td>15</td>
<td>9.93</td>
<td>8</td>
<td>5.84</td>
<td>2</td>
<td>20</td>
<td>0.300a</td>
</tr>
<tr>
<td>All</td>
<td>35</td>
<td>8.63</td>
<td>8</td>
<td>5.58</td>
<td>0</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

The total score ranges from 0 to 30, with higher scores indicating lower self-esteem.

*Mann-Whitney test
with DFUs reported significantly lower HRQoL than the DM population without DFU. The most striking differences observed were in the role physical (32.1 versus 62.2, \(P < 0.001\)), physical functioning (57.5 versus 77.3, \(P < 0.001\)), and role emotional (57.4 versus 72.0, \(P < 0.001\)) domains. Patients with a DFU had significantly lower HRQoL than the general population on all scales, and in particular on role physical (32.1 versus 74.3, \(P < 0.001\)), physical functioning (57.5 versus 85.2, \(P < 0.001\)), and general health (50.1 versus 74.3, \(P < 0.001\)). The most important sociodemographic characteristic that differed between the DFU patients and the DM population was that significantly more DFU patients were men living alone. Compared to the general population, more DFU patients were older, less educated men who were living alone and not working. Obesity was a problem in both the DFU and the DM populations. The authors concluded that patients with DFUs had much lower HRQoL scores, especially with respect to physical health, than persons with DM or the general population.42

In a multicenter prospective study, Nabuurs-Franssen et al43 evaluated HRQoL in 294 patients (ulcer duration \(\geq\)4 weeks) and 153 caregivers at three time points: baseline (T0), when the ulcer was healed or after 20 weeks (T1), and 3 months later (T2). The mean age of the patients was 60 years, 72% were male, and time since diagnosis of diabetes was 17 years. Patients reported a low HRQoL on all SF-36 domains. At T1, HRQoL scores in physical and social functioning were higher for patients with a healed versus a nonhealed ulcer (\(P < 0.05\)). At T2, these differences were larger, with higher scores for physical and social functioning, role physical, and the physical summary score in persons with healed compared to nonhealed DFUs (all \(P < 0.05\)). Within-group analysis revealed that HRQoL improved in different
domains in patients with a healed ulcer and worsened in patients with a persistent ulcer from T0 to T2 (all P <0.05). The authors concluded that patients with a healed DFU had a higher HRQoL than patients with a persisting ulcer. Healing of a foot ulcer resulted in a marked improvement of several SF-36 domains 3 months after healing (from T0 to T2). HRQoL declined progressively when the ulcer did not heal.43 Price16 and Wild26 also reported a significant reduction in the QoL in patients with DFUs especially in role physical, social functioning, and mobility. The current study results suggest that DFUs reduce HRQoL, regardless of patient nationality.

Self-esteem. Generic instruments such as the SF-36 have the advantage of allowing QoL comparisons between patients with different diseases and between different socio-demographic groups. However, they do not allow evaluation of specific aspects of health, such as self-esteem. Therefore, it was important to complement the results from the SF-36 with the use of a specific instrument, such as the Rosenberg self-esteem scale (UNIFESP-EPM),7,13,14 to evaluate an important aspect of the human life — ie, self-esteem.5,14 In this study, the mean self-esteem score was higher in persons with a DFU than in the control group but the difference was not statistically significant.

Limitations and Implications

Limitations of the current study include the small sample size of both the study and control group. Additional studies in different regions of Brazil and using larger and more homogeneous samples are needed. In addition, future studies could include assessments of specific quality of life aspects, such as depression, life satisfaction, and self-image.

A longer life expectancy has led to an increasing number of older adults with chronic diseases such as DM that may limit physical functioning above-and-beyond general limitations observed with increasing age. As a result, there is an increasing need to develop strategies for improving QoL in persons with and without wounds by implementing wound care programs, as well as programs to enhance muscle strength and joint flexibility and to improve social integration of the elderly inside and outside the family.20

Conclusion

The results of this cross-sectional comparative study confirm that patients with DFUs have lower HRQoL scores than patients with DM without ulcers. HRQoL scores were lower in all SF-36 domains, and significantly lower in the physical functioning, role physical, social functioning, and role emotional domains. Rosenberg self-esteem scores were similar for both groups.

These studies may stimulate the establishment of wound prevention programs for patients with DM and improve treatment of patients with DFUs by including psychological support to help reduce emotional distress.

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