

The Association between Self-Esteem Level and Quality of Life in Patients with Diabetic Foot: A Cross-Sectional Study

Nina Hadžić¹, Vilma Kolarić^{1,2}, Viktorija Hefer¹, Marin Čargo²

¹Vuk Vrhovac University Clinic
Merkur University Hospital
Zagreb, Croatia

Nina Hadžić,
nina.hadzic00@gmail.com

Vilma Kolarić
vilma.kolaric@kb-merkur.hr;
ORCID: 0000-0002-9085-1938

Viktorija Hefer
viktorija.hefer@gmail.com

²Catholic University of Croatia
Zagreb, Croatia

Marin Čargo
marin.cargo@unicath.hr
ORCID: 0000-0003-0189-4168

Corresponding author:

Marin Čargo, MN, MM, PhD candidate
Center for Evidence-Based Medicine
and Health Care
Catholic University of Croatia
Ilica 242, 10 000 Zagreb, Croatia
marin.cargo@unicath.hr

Abstract

Introduction: Diabetes is a global problem of modern times, and diabetic foot is an unpleasant complication of diabetes, which requires long-term, expensive and exhaustive treatment. Diabetes as a chronic disease can affect many aspects of an individual's quality of life, and patients suffering from diabetes are usually at risk of developing low self-esteem.

Aim: This study aimed to determine whether there is a relationship between the level of self-esteem and the estimated quality of life in patients with diabetes and diabetic foot.

Methods: This study was conducted at the Institute for Diabetes and the Diabetic Foot Clinic of the Vuk Vrhovac University Clinic, Merkur University Hospital, Zagreb, Croatia, from February 2020 to October 2021. The participants were patients who suffered from diabetes and had diabetic foot as a complication. Data were collected using the Rosenberg Self-Esteem Scale (RSE) and the World Health Organization Quality of Life Questionnaire (WHOQOL-BREF).

Results: A total of 68 participants participated in the study. The quality of life of those included in the study worsened as the degree of diabetic foot worsened, and was the worst in the physical domain ($F(2/65)=22.160$; $P<.01$). Likewise, significant positive correlations were obtained among all measures of quality of life and self-esteem. The higher the quality of life, the higher the level of self-esteem, and vice versa. The highest correlation was between the mental health domain and self-esteem ($r=0.860^{**}$).

Conclusion: This study showed that quality of life is impaired in patients with diabetic foot and worsens as the diabetic foot worsens. Furthermore, it showed that the quality of life in these patients is also related to the level of self-esteem. Therefore, it is important to take all preventive measures and include all available resources in order to prevent the development of diabetes complications.

Keywords: diabetes, diabetic foot, self-esteem, quality of life

Introduction

The number of people suffering from diabetes is increasing day by day. Research shows that more than half a billion people in the world live with diabetes, that is, 10.5% of the world's adult population (1). It is estimated that the number of people suffering from diabetes will reach 643 million by 2030, and 783 million by 2045 (2).

Diabetes is associated with the development of micro- and macrovascular complications. Hyperglycemia, in addition to obesity, smoking, hypertension and dyslipidemia, increases the risk of peripheral arterial disease, coronary disease and cerebrovascular disease (3).

The majority of patients with diabetes have developed some microvascular complications (4). As many as 45% of all diabetes patients have developed diabetic nephropathy, which is also the most common cause of chronic kidney disease (5). Diabetic retinopathy is the main cause of visual impairment among the working-age population, and about a third of those with diabetes have developed retinopathy (6). Diabetes is also the most common cause of neuropathy. Neuropathy develops in 40–50% of patients, and a quarter of them feel neuropathic pain (7, 8).

Diabetic peripheral neuropathy leads to a series of impairments and functional limitations. People with diabetic peripheral neuropathy are exposed to a high risk of ulceration and tissue destruction in the foot and subsequent amputation of the lower extremities (9). Diabetic foot as a complication occurs in about 25% of patients with diabetes, and about 40% of ulcers recur within a year of healing, while about 65% of patients are at risk of recurrence within three years of healing (10–12). Furthermore, as many as 85% of the amputations in diabetes patients are the result of foot ulceration combined with infection. Also, diabetic foot prolongs hospitalization by 2.5 times (13–15).

Most chronic diseases, including diabetes, can worsen patients' overall health by limiting their ability to live well, limiting functional status, productivity, and worsening the

quality of life (16). The World Health Organization defines quality of life as "an individual's perception of their life situation in the context of the culture and value system in which they live and in relation to their goals, expectations, standards and concerns. The quality of life is the feeling of overall satisfaction with life as determined by a mentally alert person whose life is being evaluated" (16). Diabetes as a chronic condition accompanied by the development of numerous severe complications affects most aspects of the quality of life. Complications can cause physical discomfort, limit mobility and reduce physical activity. Patients also have a fear of hypoglycemia and concern about the outcomes of the disease, which has a negative impact on the quality of life assessment (17). Also, in the treatment of chronic diseases, the patient's lifelong engagement and effort are crucial. Patients who are dealing with diabetes can very often experience negative emotions such as worry, fear, guilt, helplessness and hopelessness. In addition to the fact that negative moods adversely affect self-care and quality of life, elevated levels of neuroticism in individuals contribute to an increased risk of developing psychiatric diseases, and diabetics suffer from depression two to three times more often than people without diabetes (18, 19). Furthermore, due to the need for continuous patient involvement in the process of treating a chronic disease, patients often experience psychological stress, and a reduced level of self-esteem can occur (20). In addition to the above, people with diabetic foot have lower self-esteem because such lesions change the lives of these individuals. Desires and plans are usually unfulfilled, and individuals may feel rejected and live in isolation because of their smell and appearance. Therefore, it is important to examine such patients psychologically (21). This study aimed to examine whether there is a connection between the level of self-esteem and the estimated quality of life in people suffering from diabetes with diabetic foot.

Materials and methods

Study design

This was a cross-sectional study.

Ethics

The Ethics Committee of the Merkur Clinical Hospital approved the implementation of this study in patients at the Institute for Diabetes and Diabetic Foot Clinic (Order number: 03/1-832). All the study participants signed an informed consent document.

Place and time of study implementation

The study was conducted at the Vuk Vrhovac University Clinic, Merkur University Hospital, Zagreb, Croatia, the Institute for Diabetes and the Diabetic Foot Clinic. The study lasted from February 2020 to October 2021.

Participants

Patients with a complication of the underlying disease, diabetic foot, who visited the Diabetic Foot Clinic between February 2020 and October 2021, and who voluntarily agreed to participate in the study were included. Patients at high risk for diabetic foot were not invited. The assessment of the foot condition and determination of the degree of ulceration were conducted by the attending physician and nurse at the clinic. The patients were invited to participate in the study by a nurse from the Diabetic Foot Clinic, who is also a researcher in this study.

The participants were divided into three groups, depending on the stage of the development of the diabetic foot. The first group included participants who had a mild form of diabetic foot—superficial wounds that did not affect tendons and/or bone (which is the equivalent of grade I according to the Wagner classification). The second group was mixed, including participants with a more severe degree of diabetic foot—deep wounds involving tendons and/or bone, gangrene or phlegmona (which is the equivalent of grades II–V according to the Wagner classification). The third group consisted of participants who had undergone

amputation of a part of an extremity as a result of diabetic foot.

Procedures

Data were collected on paper based on structured questionnaires. The questionnaires used to assess self-esteem were the Rosenberg Self Esteem (RSE) (22) and the World Health Organization Quality of Life (WHOQOL-BREF) (23). The RSE questionnaire consists of 10 statements related to self-esteem, while the WHOQOL-BREF questionnaire consists of 26 statements related to different domains of quality of life (physical health, psychological health, environment and social relations). Participants rated their agreement with the statements in both questionnaires on a 5-point Likert scale with the following possible answers: 1—not at all, 2—somewhat, 3—moderately, 4—to a significant extent and 5—to the greatest extent. In addition, the participants also answered questions related to gender, age, professional education, employment and with whom they live. In order to be able to compare the data obtained on the WHOQOL-BREF questionnaire, the results were transformed into a scale on a range of 0–100. The results of the domains and overall life satisfaction are expressed in a positive direction, with a higher score indicating a higher quality of life.

Statistical methods

Statistical data processing was performed using the Statistical Package for the Social Sciences, SPSS Inc., Chicago, IL, USA version 20 for Windows (SPSS). Descriptive statistics were used in the data processing. The Pearson's correlation coefficient was used to determine the relationship among the variables, and simple analysis of variance and Scheffe's post-hoc test were used to determine differences among the groups. Calculated p-values were considered statistically significant if $P < 0.05$.

Results

A total of 68 participants took part in the study. Out of the total sample, 21 of them had superficial wounds on their feet, 23 had

deeper wounds on their feet, and 24 had had part of their lower extremities amputated as a result of diabetic foot. Also, the majority of the participants were 61–75 years of age, had a high school education (65%), pensioner status (60%) and lived in a household with their families. The participants were mostly male (68%).

In order to answer the first study problem regarding the connection between the level of self-esteem and the quality of life domain, the Pearson's correlation coefficients among

these measures were calculated. Significant positive correlations were obtained among all the measures of quality of life and self-esteem. The higher the quality of life, the higher the level of self-esteem, and vice versa. The strongest correlation was between the mental health domain and self-esteem ($r=0.860^{**}$). If we look at the sample as a whole, satisfaction with the environment was the highest compared to the other domains of the quality of life. On the other hand, satisfaction with physical health was the lowest compared to the other variables mentioned (Table 1).

Table 1. Contingency table of the LH levels of the control and PCOS groups

Domain	1	2	3	4	5	M	SD
The domain of physical health	-					50.8	16.41
The domain of mental health	.747**	-				64.6	17.98
Environment domain	.697**	.797**	-			69.8	17.37
The domain of social relations	.611**	.695**	.754**	-		67.7	17.56
Self-esteem	.749**	.860**	.831**	.795**	-	25.1	7.29

$P<.01$

In response to the second study problem, regarding whether the participants with a more severe form of diabetic foot differ from those with a milder form in terms of quality of life and self-esteem, the results show that there was a significant difference between the foot condition groups in self-esteem ($F(2/65)=27.214$; $P<.01$). The participants with severe foot wounds and amputees did not differ in their level of self-esteem. There is a significant difference among the groups of foot conditions in the physical domain of the quality of life ($F(2, 65)=22.160$; $P<.01$). A post-hoc test determined that there was a statistically significant difference between participants with superficial foot ulcers and participants with deeper foot wounds or amputees. Participants who had deeper wounds on their feet and participants with leg amputation did not differ in their reported quality of life in the physical domain. Also, there was a significant difference among the groups of foot conditions in the psychological domain of the quality of life ($F(2/65)=11.004$; $P<.01$). A post-hoc test showed that there was a statistically significant difference between

participants with superficial foot ulcers and participants with deeper foot wounds. Participants who had deeper wounds on their feet and participants with leg amputation did not differ in the reported quality of life in the psychological domain. The results further show that there was a significant difference between the foot condition groups in the environmental domain of quality of life ($F(2/65)=14.230$; $P<.01$). A post-hoc test showed that the participants with superficial foot ulcers differed significantly from the participants from the other two groups. Participants who had deeper wounds on their feet and participants with leg amputation did not differ in their reported quality of life in the environmental domain. A significant difference was also found between the groups of foot conditions in the domain of social relations ($F(2/65)=8.862$; $P<.01$). The participants with superficial foot ulcers differed significantly from the participants from the other two groups. Participants who had deeper wounds on their feet and participants with leg amputation did not differ in their reported quality of life in the domain of social relationships (Table 2).

Table 2. Domains of the quality of life and self-esteem in relation to the condition of the diabetic foot

	Superficial ulcer M (SD)	Deep ulcer M (SD)	Amputated M (SD)	F (df)	Post - hoc
Self-esteem	32 (3,29)	24 (4,56)	20 (7,41)	27.214** (2, 65)	1-2** 1-3**
Physical domain of quality of life	65.3 (13,66)	48.7 (12,10)	50.8 (12,81)	22.160** (2, 65)	1-2** 1-3**
Mental domain KŽ	77.8 (11,69)	60.6 (15,04)	56.8 (19,20)	11.004** (2, 65)	1-2** 1-3**
Environment	84.5 (9,61)	69.4 (12,8)	59.0 (19,35)	14.230** (2, 65)	1-2** 1-3**
Social relations	78.9 (11,61)	66.3 (16,34)	59.2 (18,27)	8.862** (2, 65)	1-2* 1-3**

$P < .01$

Discussion

In this study, the male gender predominates, just as in the study on the quality of life in patients with chronic diabetes complications conducted at the Vuk Vrhovac University Clinic, Merkur University Hospital, Zagreb, Croatia (24), whose results also show male dominance among individuals with diabetes who have developed diabetic foot as a complication (24). The dominance of the male gender is also shown in the results of studies conducted elsewhere in the world (25, 26).

According to the results obtained in this study, the quality of life among the participants worsened as the severity of diabetic foot increased, which was the worst in the physical domain. Similarly, according to a study conducted at the Vuk Vrhovac University Clinic, Merkur University Hospital, Zagreb, Croatia, the quality of life among individuals with chronic complications is lowest in the physical domain (24). Likewise, the results of a study conducted in Saudi Arabia show the significant impact of diabetic foot on the lower assessment of all aspects of the quality of life in patients, particularly in the physical domain (27). Generally, patients with chronic wounds rate their quality of life as diminished in most domains, with pain, odor, limited mobility and altered self-image being significant contributors (28). Moreover, similar studies confirm that as the condition of diabetic foot worsens, the quality of life decreases (29, 30). A painful diabetic foot

or the presence of pain after amputation significantly influences a diminished quality of life (31, 32).

This study found positive and significant correlations among all measures of quality of life and self-esteem. The higher the quality of life, the higher the level of self-esteem, and vice versa. The strongest correlation was found between the domain of mental health and self-esteem. Similar results have been obtained in other studies. A study conducted in Turkey confirms the existence of a relationship between the level of self-esteem and quality of life. It also shows how amputation affects the reduction of both the physical and mental quality of life (33). A study conducted in Iran also confirms a significant correlation between the level of self-esteem and quality of life (34).

In the literature, reduced self-esteem is associated with chronic diseases, such as diabetes. Additionally, reduced self-esteem caused by the presence of illness can lead to numerous problems, such as anxiety and depression (35, 36). In amputated patients, reduced self-esteem is linked to altered body image, decreased mobility and loss of employment due to physical limitations (37). A study conducted in Indonesia regarding the correlation between self-esteem and self-care abilities in individuals with diabetes indicates a positive correlation between these variables, indicating that any increase in the level of self-esteem has a positive effect on self-care (38).

Many of the limitations of this study are largely associated with the situation of the COVID-19 pandemic. The small sample size of the participants is a consequence of the prolonged ban on hospitalizing patients in hospital wards and the repurposing of diabetes clinics into isolation units, thereby limiting the availability of participants with diabetes.

A recommendation for future study is to include a larger sample size of participants while using a specific questionnaire to assess the quality of life among individuals with diabetes.

Conclusion

The results of the study indicate that the quality of life among the participants deteriorated as the severity of diabetic foot worsened, especially in the physical domain. Additionally, positive and significant correlations were found between all measures of quality of life and self-esteem. The higher the quality of life, the higher the level of self-esteem, and vice versa. The strongest correlation was observed between the domain of mental health and self-esteem. Considering the continuous increase in the number of people affected by diabetes, the severity of complications and their adverse impact on the quality of life, greater efforts should be made to raise public awareness about diabetes, the importance of adopting a healthy lifestyle to prevent diabetes, the importance of good control and delaying the development of chronic complications in individuals with diabetes to maintain a good quality of life.

Declarations

Aknowledgements

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Authors' contributions

NH: study design; NH, VK, and VH: data collection; NH, VK, VH and MČ data analysis and

interpretation; NH and MČ: writing first draft of the manuscript; NH, VK, VH and MČ: revising the manuscript for critical intellectual content; NH, VK, VH and MČ: approval of the final version of the manuscript.

Ethics

The Ethics Committee of the Merkur Clinical Hospital approved the implementation of this study in patients at the Institute for Diabetes and Diabetic Foot Clinic (Order number: 03/1-832). All the study participants signed an informed consent document.

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Competing interests

The authors have no conflicts of interest related to this work.

Data sharing statement

The authors confirm that the data can be obtained by contacting the corresponding author.

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