



## QUALITY OF LIFE IN PRESURGICAL PATIENTS WITH DIABETIC FOOT ULCERS AT A TERTIARY CARE HOSPITAL IN SOUTH INDIA

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### ABSTRACT

**Background:** Diabetic foot ulcers remain as a significant factor of mortality while having adverse effect on quality of life in patients.

**Methods:** A cross-sectional study was conducted at the Hand and Reconstructive Microsurgery Department in a Tertiary Care Hospital, Chennai. We used a proforma, consisting of socio-demographic variables, Wagner Ulcer Classification and WHOQOL-BERF, for data collection and SPSS Version 20 for analysis.

**Results:** Respondents consisted of 118 DFU patients with type 2 DM of which 72% male and 27% female. About 51% were in Grade 3 of Wagner Ulcer Classification with abscessed deep ulcers, osteomyelitis, or joint sepsis. While a majority of male patients had poor QOL in the physical domain, a majority of female patients had poor QOL in the environment domain. Multiple regression analysis showed that higher grade of ulcer decreased the quality of life in presurgical patients with DFUs ( $p=0.000$ ).

**Conclusion:** QOL in patients with DFUs can be increased by reporting to the surgical department at an early stage of the ulcer.

**KEYWORDS :** Quality of life, Diabetic foot ulcer, Wagner Ulcer Classification, Type 2 diabetes

### INTRODUCTION

Diabetic Mellitus (DM) is a chronic illness that affects individuals all around the world and diabetic foot ulcers (DFUs), caused by the presence of neuropathy, angiopathy and/or foot deformity, is a major complication of DM<sup>1</sup>. DFUs refer to open sores or wounds that usually occur in the bottom of the foot and are known to increase the number of hospitalizations and deaths<sup>2,5</sup>. DFUs are common and they are estimated to affect 15-25% of all individuals with DM during their lifetime<sup>6</sup>. Around 20% of hospital admissions among individuals with DM are for treatment of DFUs as they can lead to infection, amputations and even death if neglected<sup>7</sup>.

DFUs, an important factor of mortality among DM patients, have a massive impact on the quality of life (QOL) of patients and they incur considerable financial cost<sup>8,9</sup>. Several studies indeed showed that patients with DFUs have significantly decreased QOL compared to those without this complication<sup>10,11</sup>. Valensi et al. found that health related quality of life (HRQOL) was significantly lower for all domains in patients with DFUs compared to those without foot ulcers<sup>12</sup>. Yet another study reported significantly poorer HRQOL in DFU patients than the diabetes population in all the SF-36 subscales, and in both summary scales of SF-36<sup>13</sup>. In another study, after 12 months of observation, it was found that subjects with ulcers that did not heal had HRQOL significantly lower than that of subjects with healing ulcers<sup>14</sup>. Further, Winkley et al. found that the QOL declines if the foot ulcers recur or do not heal<sup>15</sup>.

Further studies have shown that patients with DFUs also face physical, psychological and emotional distress that, in turn, leads to their poorer QOL. For instance, a patient who undergoes the surgical removal of lower limb/limbs due to DFUs will have difficulty in performing day to day tasks and engaging in productive and/or pleasurable activities. This in turn may lead to depression which is also prevalent in patients with DFUs when compared to individuals

only with DM. In addition to these, patients with DFUs also face financial distress due to the inability to go to work, expenses incurred for treatment etc which can all adversely impact their QOL<sup>11</sup>.

There is enough evidence to show that the presence of late complications of DM has a grave effect on QOL for both the patients with DFUs and their carers<sup>16,17</sup>. All domains of life such as physical, psychological, social and economic can be affected; and the degree of disruption is proportional to the severity of complication<sup>18</sup>. Therefore, it is a fact that such a serious complication may have severe effects on the QOL and mood of patients with DFUs. Thus, the issue of QOL has become an important aspect to surgeons as well, as they might recognize it both as a key measure and target of treatment outcome. Here, the consequences of diabetic foot ulceration are discussed with respect to QOL, and strategies for prevention and treatment of the condition are described.

To the best of our knowledge, the QOL in patients with DFUs in India has not been previously analysed using World Health Organization QOL-BREF (WHOQOL – BREF)<sup>19</sup>, an abbreviated 26-item version, against Wagner Ulcer Classification (WUC). The aim of our study, therefore, was to understand the QOL of patients with DFUs using WHOQOL-BREF; to investigate the influence of severity of foot ulceration on QOL; and also to identify the powerful predictor of QOL in the presurgical patients with DFUs.

### MATERIALS AND METHODS

A cross-sectional study was performed on patients who were admitted to the Department of Hand and Reconstructive Microsurgery in a Tertiary Care Hospital, Chennai, between 2016 and 2017. There was a total of 118 patients with DFUs who provided the consent to participate in this study.

DFU patients who attended our department and gave voluntary consent formed the respondents of this study.

**EXCLUSION CRITERIA:**

- a) Patients with foot ulcer secondary to venous disorders and or arterial diseases but not due to DM.
- b) Those who were already on antifungal treatment for a diagnosed fungal infection.
- c) Those DFU patients who were diagnosed to have a cognitive or psychological problem.
- d) DFU patients who did not give their consent to participate in this study.

We have obtained data from respondents using a comprehensive proforma consisting of sociodemographic details, medical history, details of WUC, and QOL. WUC has grades ranging from zero to five. The grade zero denotes no open lesions and the grade five represents extensive gangrenous involvement of the entire foot. All study respondents were graded following the above-mentioned classification. The QOL data of the respondents were collected using WHOQOL-BREF which has four domains: Physical Health, Psychological, Social Relationships, and Environment. The details of each domain and its facets are detailed in Table 1.

**TABLE 1. WHO QOL - BREF domains and facets incorporated within each domain**

Domain	Facets incorporated within domains
Physical health	Activities of daily living
Seven facets	Dependence on medicinal substances and medical aids
Seven questions	Energy and fatigue
	Mobility
	Pain and discomfort
	Sleep and rest
	Work Capacity
Psychological	Bodily image and appearance
Six facets	Negative feelings
Six questions	Positive feelings
	Self-esteem
	Spirituality / Religion / Personal beliefs
	Thinking, learning, memory and concentration
Social relationships	Personal relationships
Three facets	Social support
Three questions	Sexual activity
Environment	Financial resources
Eight facets	Freedom, physical safety and security
Eight questions	Health and social care: accessibility and quality
	Home environment
	Opportunities for acquiring new information and skills
	Participation in and opportunities for recreation / leisure activities
	Physical environment (pollution / noise / traffic / climate)
	Transport

In addition to these four domains, WHOQOL-BREF has two standalone questions assessing a patient's overall perception of quality of life and overall perception of her/his health<sup>20</sup>. These two questions were not incorporated in the analysis as we have taken the scores of each domain to arrive at the QOL of DFU patients.

We first entered the collected data in Microsoft excel and then imported into Statistical Package for Social Sciences (SPSS) Version 20. We used SPSS data analytics software for our study data analysis.

**RESULTS**

Out of 118 respondents of this study, 72% were male and 27% were

female. Almost 64% of patients were in the age group of 41-50 years. About 45% had completed primary education, 36% had completed secondary education and 11% were illiterate. Nearly 78% of patients were occupied in unskilled or coolie work, 12% were unemployed and 2% were retired. Almost 73% earned a monthly income of Rs. 5001-10000. A vast majority (92%) of respondents was married, 2% were separated, widowed and remained unmarried.

The grading based on WUC showed that a majority (51%) of patients were classified under the Grade 3 with abscessed deep ulcers, osteomyelitis, or joint sepsis. About 28% of patients in Grade 2 classification had the DFUs extended to the ligament, tendon, joint capsule, or deep fascia without abscess or osteomyelitis, and 5% of patients had gangrene localized to the forefoot or heel as evident in Table 2.

**TABLE 2. Distribution of Wagner ulcer classification in patients with DFU**

Grade	Lesion	n	%
0	No open lesions; may have deformity or cellulitis	2	1.7
1	Superficial diabetic ulcer (partial or full thickness)	14	11.9
2	Ulcer extension to ligament, tendon, joint capsule, or deep fascia without abscess or osteomyelitis	33	28.0
3	Deep ulcer with abscess, osteomyelitis, or joint sepsis	61	51.7
4	Gangrene localized to portion of forefoot or heel	6	5.1
5	Extensive gangrenous involvement of the entire foot	2	1.7
Total	118	100.0	

The QOL of respondents across four domains based on gender is given in Table 3. In the physical health domain, almost 51% male and 19% female were the mean score of  $\leq 20.3$ . In the psychological domain, a majority (64.4%) of respondents had QOL less than the mean score of  $\leq 17.3$ . Almost 47% of men and 18% of women reported psychological health lesser than the mean score. When it came to the social relationships, a mean score of  $\leq 8.7$  was obtained by 61% of respondents. In the environmental domain of the QOL about 45% of the male respondents scored the mean score of  $> 24.4$  denoting a better QOL in relation to environment. Whereas only 7.6% of female respondents scored the mean score of  $> 24.4$  in the environment domain of WHOQOL-BREF.

**TABLE 3. Quality of life of patients based on mean value across gender**

QOL Domains	Mean	Male		Female		Total	
		N	%	n	%	n	%
Physical health	$\leq 20.3$	60	50.8	22	18.6	82	69.5
	$> 20.3$	26	22.0	10	8.5	36	30.5
Psychological	$\leq 17.3$	55	46.6	21	17.8	76	64.4
	$> 17.3$	31	26.3	11	9.3	42	35.6
Social relationships	$\leq 8.7$	51	43.2	21	17.8	72	61.0
	$> 8.7$	35	29.7	11	9.3	46	39.0
Environment	$\leq 24.4$	33	28.0	23	19.5	56	47.5
	$> 24.4$	53	44.9	9	7.6	62	52.5

Then we tested the influence of severity of foot ulceration on QOL and we also wanted to identify the powerful predictor of QOL in presurgical patients with DFUs. For the purpose we used a multiple regression analysis. The results found a negative trend between age and QOL denoting that higher the age there is a poorer QOL. This negative trend was not statistically significant ( $p=0.366$ ) and so this inference cannot be claimed valid. However, there was a statistically significant ( $p=0.000$ ) association between WUC and QOL in presurgical patients with DFUs. It means that the greater the grade

of ulcer under the Wagner Ulcer Classification, lower the quality of life in patients. There was no significant correlation between gender, education, monthly income and marital status of the patients with their QOL in this study. The multiple regression analysis found WUC as the powerful predictor of QOL ( $p=0.000$ ) in presurgical patients with DFUs as shown in Table 4.

**TABLE 4. Powerful predictor of quality of life in presurgical DFU patients**

Variables	Quality of life (total score of all four domains)				
	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value
	B	Std. Error	Beta		
(Constant)	2.893	.529		5.472	.000**
Age	-.096	.105	-.067	-.908	.366
Gender	.147	.128	.079	1.147	.254
Education	.047	.079	.044	.598	.551
Monthly income	.055	.120	.034	.460	.647
Marital status	.219	.138	.103	1.586	.115
Wagner ulcer classification	-.695	.062	-.752	-11.188	.000**

\*\*Correlation is significant at the 0.01 level (2-tailed).

**DISCUSSION**

This study addressed the correlation between severity of the ulcer and QOL in presurgical patients with DFUs attending a tertiary care hospital in Chennai, India. All respondents reported that DFUs had an adverse impact on all WHOQOL-BREF domains, primarily as a result of reduction in physical mobility and the consequent need to adapt their changed lifestyle. The patients found that their loss of mobility greatly affected their ability to perform many routine tasks including bathing. The presence of a foot ulcer also imposed restrictions on patients participation in activities, including paid work and physical exercise, as reported elsewhere<sup>21</sup>.

Many studies have shown that DFUs can have a negative impact on patient's quality of life. In the psychological domain, patients reported increased anxiety probably about the possible development of new ulcers and/or the threat of amputations. Further, some patients also suffered from depression and social isolation. Carrington et al. highlighted such possibility of negative psychological effects in patients with DFUs<sup>22</sup>. The adverse economic effect of DFUs in patients were also reported widely as many are forced to leave their job; and a few found their productivity and career advancement getting jeopardised by their condition<sup>21</sup>.

In our study it was found that the increase in the severity of the wound can also impact and decrease the quality of life of presurgical patients with DFUs. Since quality of life is an important aspect in measuring the outcome of surgical procedures and recovery, it is important for the treating team to promote prevention early detection and treatment of DFUs. It is also important to include non-pharmacological interventions for managing patients with DFUs as indicated in another study<sup>23</sup>.

In a general, in patients with DFUs, physical, psychological, social and environmental aspects contributed to the overall QOL, while socio-demographics had almost no influence. This result suggests that having DFUs changes the spectrum of factors that influence QOL, with an increase in the impact of limitations related to physical functioning and mobility. This is in line with the findings of an earlier study<sup>24</sup>. In short, severity of the ulcer based on WUC had an obvious negative influence on the overall QOL in presurgical patients with DFUs.

**CONCLUSION**

DFUs have a negative impact on quality of life and reporting to the surgical department at a severe stage of the ulcer decreases the QOL further. In recent years plastic surgery techniques for soft tissue

reconstruction have demonstrated success for long-term healing and stabilization. Expedited healing of these complicated wounds not only improves the patient's quality of life but can also significantly decrease health care costs associated with extended wound care.

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