Assessment of health-related quality of life and its determinants among patients with diabetic foot ulcer in Ilorin, Nigeria

*Olarinoye J.K.[1], Omotoso A.B.[2], Ogunmodede A.J.[2], Opeyemi C.M.[3], Olagbaye B.A.[4], Sanni N.[1], Aderibigbe A.B.[5]

Abstract

Background: The impact of foot ulceration on the psychosocial wellbeing of the Nigerian diabetic patients has not received enough attention. This study therefore attempted to evaluate the effect of diabetic foot ulcer on the quality of life of adults in a Nigerian diabetic population.

Methodology: The impacts of diabetic foot ulcer (DFU) on the quality of life (QoL) of 104 adults living with diabetes were assessed using The Diabetes Foot Ulcer Scale and their determinants.

Results: The mean QoL score was 42.25. Fifty-five (53.4%) had poor QoL status while 48 (46.6%) had good QoL. Determinants of poor QoL outcome include low socio-economic status (p = 0.017), lack of a tertiary education (p= 0.027), no diabetes-education (p = < 0.001), low socioeconomic status (p = 0.017), multiple ulcers (p = 0.022) and Wagner grade >3 ulcers (p = 0.004).

Conclusion: Majority of patients with DFU in UITH, Nigeria have poor QoL and most of the predictors of poor QoL outcome are preventable and modifiable.

Key Words: Diabetic Foot Ulcer, quality of Life, determinants, Nigerians

*Corresponding author
Olarinoye John Kola,
Email: kolaolarinoye@yahoo.com

[1]Department of Medicine, Endocrinology, Diabetes and Metabolism Unit, University of Ilorin, Ilorin, Nigeria
[2]Department of Psychiatry and Behavioral Sciences, University of Ilorin, Nigeria
[3]Department of Medicine, Ladoke Akintola University of Technology, Ogbomoso, Nigeria
[4]Department of Anatomy, University of Ilorin, Nigeria
[5]Department of Surgery, Burns and Plastic Surgery, University of Ilorin, Nigeria

Évaluation de la qualité de vie liée à la santé et de ses déterminants chez les   patients atteints d'ulcère du pied diabétique à Ilorin, au Nigéria

*Olarinoye J.K.[1], Omotoso A.B.[2], Ogunmodede A.J.[2], Opeyemi C.M.[3], Olagbaye B.A.[4], Sanni N.[1], Aderibigbe A.B.[5]

Resume

Contexte général de l'étude : L'impact de l'ulcère du pied sur le bien-être psychosocial des patients diabétiques nigérians n'a pas reçu suffisamment d'attention. Cette étude a donc tenté d'évaluer l'effet de l'ulcère du pied diabétique sur la qualité de vie des adultes dans une population diabétique nigériane.

Méthode de l'étude: Les impacts de l'ulcère du pied diabétique (UPD) sur la qualité de vie (QdV) de 104 adultes atteints de diabète ont été évalués à l'aide de la balance d'Ulcère du Pied Diabétique et de ses déterminants.

Résultat de l'étude: Le score moyen de qualité de vie (QdV) était de 42.25. Cinquante-cinq (53.4 %) avaient un statut de qualité de vie médiocre tandis que 48 (46.6 %) avaient une bonne qualité de vie. Les déterminants d'une mauvaise qualité de vie incluent un faible statut socio-économique (p = 0.017), l'absence d'études supérieures (p = 0.027), l'absence d'éducation au diabète (p = < 0.001), un faible statut socio-économique (p = 0.017), des ulcères multiples (p = 0.022) et ulcères de grade Wagner> 3 (p = 0.004).

Conclusion : La majorité des patients atteints de DFU à l'UITH, au Nigéria, ont une mauvaise qualité de vie et la plupart des prédicateurs de mauvais résultats de qualité de vie sont évitables et modifiables.

Mots-clés : Ulcère du pied diabétique, qualité de vie, déterminants, Nigérians

*Corresponding author
Olarinoye John Kola,
Email: kolaolarinoye@yahoo.com

[1]Department of Medicine, Endocrinology, Diabetes and Metabolism Unit, University of Ilorin, Ilorin, Nigeria
[2]Department of Psychiatry and Behavioral Sciences, University of Ilorin, Nigeria
[3]Department of Medicine, Ladoke Akintola University of Technology, Ogbomoso, Nigeria
[4]Department of Anatomy, University of Ilorin, Nigeria
[5]Department of Surgery, Burns and Plastic Surgery, University of Ilorin, Nigeria

INTRODUCTION

One of the most common complications of diabetes is foot ulceration. Diabetic foot ulcer (DFU) often results from disease-related peripheral neuropathy, foot ischemia, infection or usually a combination of some or all of these factors (1). An estimated 15-25% of people living with diabetes will develop a foot ulcer at some point in their lifetime (2). The prevalence of (DFU reported from several studies ranges from 2% to 10% of adult diabetic population while the annual cumulative incidence varies between 0.5% and 3% (1,2,3). In Nigeria, DFU is the highest cause of diabetic admission and has the highest case fatality rate of all the complications of the disease (4). Globally the average hospital length of stay for patients with DFU is 59% longer than for diabetic patients without foot ulcers (5,6).

DFU is a source of major disability; only two-thirds of the foot ulcers are expected to heal, even in the best of centers and the mean time to healing is about 6 months (7). About 28% of patients with DFU will result to an amputation of some kind (7). Diabetes mellitus is the most common underlying cause of non-traumatic lower extremity amputation (LEA). More than 60% of LEAs in the US occur in diabetic patients. Generally, LEA is 15-40 times more common in diabetic patients than their non-diabetic population (5).

In addition to the huge disease burden imposed on the patient, DFU also has a significant impact on the quality of life (QoL) of both the patients and their attendants (8). The disability associated with DFU affects the patient's ability to carry out simple daily tasks and often impairs their ability to take part in leisure activities. This has been supported by a number of studies showing that diabetic patients with DFU are more likely to suffer depression than those without foot ulcers (8,9).

Presently in Nigeria, recognition of the importance of psychosocial factors in the care of individuals with diabetes is still in its infancy (10). Although many studies have been carried out on the subject of DFU, local data on the psychosocial wellbeing of the DFU patients and the people looking after them are very few (11,12,13). This study therefore set out to evaluate the psychosocial burden of patients with DFU in our local setting with a view to providing information that will help in addressing an often-neglected component of a holistic diabetes care.

MATERIALS AND METHODS

Study Design: This was a prospective cross-sectional descriptive study

Setting: It was carried out among patients with diabetes mellitus being managed at the University of Ilorin Teaching Hospital (UITH), Ilorin, Nigeria.

Inclusion Criteria: All adults (18 years) with Type 1 or Type 2 diabetes mellitus having a current foot ulcer, healed foot ulcer or an amputated lower limb was considered eligible for inclusion into the study.

Exclusion Criteria: Individuals with foot ulcers resulting from trauma, cancer, leprosy or SLE were excluded from the study. Patients with history of a neuro-psychiatric illness and use of psychoactive substances were also excluded as well as those who refused to give consent for the study.

Recruitment: All consenting eligible patients who were attended to at the Diabetes Clinic and the Diabetes Wards of the UITH, Ilorin, Nigeria during the study period were interviewed with a structured interviewer-administered questionnaire. The socio-demographic characteristics and the clinical details of DFU disease were obtained from the recruited patients.

Research Instrument

The QoL of the participants were assessed using "**The Diabetic Foot Ulcer Scale (DFS)**" instrument (8). It is a tool that is universally recognized, acceptable and validated for use among the DFU patient populations worldwide including Nigeria (8). Most of the interviews were carried out by one of the authors who was very familiar with the research instrument and very fluent in English and Yoruba languages.

DFS consists of 58 items grouped into 11 domains: Leisure; Physical Health; Daily Activities; Emotion; Non-compliance; Family; Friends; Positive Attitudes; Treatment; Satisfaction and Financial. Each item is a question with a recall period of the past four weeks. The response is graded on a 5-point Likert scale ranging from 1 ("not at all" or "none of the time") to 5 ("a great deal" or "all of the time" or "extremely").

DFS domain scores were based on the sum of all items associated with that domain. The scores per domain and the Global Score, which is the sum of all the domain scores, were

transformed on a scale from 0 to 100 where a higher score indicates a greater negative impact and a lower QoL.

Ethical Consideration: Ethical approval was obtained from the Ethics and Research Committee.

Statistical Analysis

Data collected were collated, stored and analyzed using the statistical software SPSS, version 22.0, IBM Corporation, USA. Results were expressed as means ± SD for continuous variables while categorical variables were expressed as proportions. Comparison of continuous variables was done using the student t-test and categorical values were compared using the chi-square test. A p-value of <0.05 was taken to be a statistically significant difference. Multivariate analysis was carried out to identify factors associated with the QoL scores.

RESULTS
Socio-demographics
The socio-demographic characteristics of the participants as well as clinical history relating to patients' diabetes disease are shown in Tables 1 and 2 respectively.

Profile of ulcer characteristics among the study participants (*see* Table 3)
The foot ulcers were neuropathic in 40 (38.5%) cases, ischemic in 7 (6.7%) and neuro-ischemic in 58 (55.8%) subjects. The right foot was affected in 41 (31.5%) of the patients, left foot involved in 51 (49.1%) while both feet were involved in 12 (11.5%). In 33 (31.8%) patients the ulcer location was plantar, the dorsum was involved in 44 (42.3%), digital involvement in 18 (17.3%), ankle involvement in 4 (3.8%) while the whole foot was affected in 5 (4.8%) of the cases. Ulcer occurrence was singular in 58 (55.7%) of them and multiple in the remaining 46 (44.3%). Thirty-one patients (29.8%) already had leg amputation and only 3 patients (2.9%) had prosthesis.

Impact of DFU on the QoL of the study participants
The impacts of foot ulceration on the various domains of the QoL of the participants are shown in Tables 5 and 6. Among the respondents in this study, individuals with global QoL score >50th percentile of the QoL scores distribution seen among the respondents in the study were categorized as having bad QoL. In the contrary,

individuals with global QoL score <50th percentile of the QoL scores distribution seen among the respondents in the study were categorized as having good QoL. The 50th percentile QoL score seen among the study participants is 45.25. Figure 1 shows that 55 patients (53.4%) had global poor QoL as a result of the impact of DFU while the remaining 48 (46.9%) had global good QoL.

The domains most badly affected by DFU were positive attitude, satisfaction, finances, daily activities and leisure. The least affected domains included compliance, family relationship and friendship.

Factors affecting the QoL scores among the study participants
Table 7 shows the multivariate analysis of the various factors affecting the impact of DFU on the different QoL domains of the study participants.
  i.   Gender – The gender of the participants had no significant effect on their respective QoL scores (p >0.05 in all domains).
  ii.   Education – Individuals who acquired tertiary education had a significantly less impact of DFU on their finances (p = 0.027).
  iii. Socio-economic status – DFU also had greater impact on the emotions (p = 0.027), activities (p = 0.017) and treatment (p = 0.027) domains among the patients in the lower socioeconomic group than those in the high socioeconomic group.
  iv.   Diabetes education – those without diabetes education were significantly worse impacted in activities (p = 0.01) and positive attitude (p = 0.034) domains.
  v.   Number of ulcers – individuals with multiple ulcers had worse QoL outcomes than those with single ulcers in health (p = 0.022), activities (p = 0.006) and emotions (p = 0.002) domains.
  vi.   Wagner grade – having ulcers in the grade 3 and above significantly affected the leisure (p = 0.042), physical health (p = 0.04), activities (p = 0.04), family relationship (p = 0.018) and treatment (p = 0.003) QoL domains in the study participants.

DISCUSSION
Our study has shown that in our local practice setting, DFU had a significant negative effect on the QoL of most of the affected patients

which quite agrees with the findings from previous studies done elsewhere (10,11,12). In this study, the development of foot ulceration was clearly shown to have resulted in a significant decline in most domains of the patient's QoL. The most commonly affected domains included the emotion, physical activities, positive attitudes and financial status. This observation is supported by previous findings in Jordanian (14) and Tunisian (15) diabetic populations where patients with DFU were also found to have poor health-related QoL.

The negative impact of DFU on the patients' perceived HR-QoL may partly be due to impairment of mobility and consequently in the impaired ability to perform daily activities thus resulting in the increased need for dependence on others (16,17). In addition, chronicity and severity of ulceration often comes with the fear of leg amputation thereby increasing the negative mood and other emotional problems associated with this condition. The often-resulting psychological co-morbidities like depression confer additional negative QoL impart in patients with DFU. Studies have shown that patients with DFU are twice more likely to have depression compared with their diabetic counterparts without foot ulceration (18).

Another QoL domain affected by DFU in our study is finance which is in agreement with previous other observers who showed that there were financial difficulties faced by patients with DFU as a result of increase in direct and indirect cost of care (17,19). Majority of our patients pay out of pocket to take care of the cost of medications, dressing materials, surgical expenses and hospital admission fees. Furthermore, there are also employment problems as most of the patients are out of job while others have limited career prospects as a result of their illness.

It is interesting to note that in this study, the family and friendship domains were less impacted. This is understandable because in African culture, the family value is sacred, and the bonding remains strong and intact even in time of sickness. It is almost considered a taboo to withdraw your support for a family relation because of an illness.

Our study, in agreement with previous opinions (20) found that acquiring a tertiary education is protective against the harmful effect of DFU on a patient's QoL. Education improves the wellbeing of an individual because it ensures increased employability, better income and better health awareness (20). It also creates access to

better coping mechanisms during chronic disabling illnesses. Moreover, our study also showed that individuals exposed to formal diabetes education had less negative impact on their HR-QoL in agreement with previous findings (21). However, contrary to the finding in the Jordanian study referred above (14), gender did not play any significant role in determining the QoL among the respondents in this study.

This study also showed that patients with multiple ulcers had more negative impact on their QoL compared with those with single ulcer foot disease. The domains affected mostly by this particular factor were the physical activities and emotional state. The reason for this may be related to observations made in a previous study that patients with multiple ulcers had poorer healing rate because of impaired circulation and reduced distal perfusion pressure (22).

Another significant predictor of QoL in our study population was the extent and severity of the ulcers as determined by the Wagner Grade. Individuals with severe foot diseases (more than Grade 3) had poor outcomes in the leisure, physical activities, and emotion domains of their QoL. This finding agrees with Policandrioti (23) who observed that there was a close relationship between DFU severity and QoL impairment. A severe DFU takes longer time to heal, demands more intensive care and causes more limitations in daily activities. Also, a severe disease would require more clinic visits, longer periods of hospital stay, and of course would be more costly to treat. Patients with higher Wagner grade of ulcers are also associated with potential risk for amputation, thus creating fear and other emotional problems. Valensi et.al (24) also demonstrated in their study an inverse relationship between good QoL in domain of leisure and Wagner grade of the ulcer.

CONCLUSION

This study has clearly shown that majority of the selected patients with diabetes mellitus had their QoL negatively impacted by foot ulceration. Nearly all the domains of their QoL were affected. Factors responsible for this poor psychosocial outcome have been recognized and are generally preventable. It is recommended that psychosocial assessment be encouraged in order to provide a comprehensive and holistic diabetes care.

Conflict of Interest: There is no conflict of interest declared by any of the authors

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Table 1. Socio-demographic characteristics of the study participants

Variable	N (%)
Mean age (yrs)	59.7±11.91**
Age group(yrs)	
20-29	5(4.9)
40-59	45(43.7)
60-79	47(45.6)
80-99	6(5.8)
Gender	
Male	49(47.6)
Female	54(52.4)
Tribe	
Yoruba	91(88.3)
Igbo	1(1)
Others	11(10.7)
Religion	
Christianity	47(45.6)
Islam	56(54.4)
Education	
None	38(36.9)
Primary	18(17.5)
Secondary	13(12.6)
Tertiary	34(33)
Occupation	
Unemployed	3(2.9)
Civil servant	16(15.5)
Business	39(37.9)
Artisan	12(11.7)
Retired	27(26.2)
Clergy	6(5.8)
Economic status	
Low	56(54.4)
Middle	44(42.7)
High	3(2.9)
Funding source	
Self	81(78.6)
Family	96(93.2)
Friends	20(19.4)
Loans	2(1.9)
Alms	1(1)
Substance use	
Alcohol	9(8.7)
Cigarette	3(2.9)
Support group	
Tribal	10(9.7)
Social	18(17.5)
Religious	58(56.3)

** represents **mean±SD**

Table 2. Diabetes-related features among the study patients

Diabetes Mellitus related features	N (%)
History of diabetes education	58(56.3)
History of diet only treatment	1(1)
History of oral medication treatment	100(97.1)
History of Insulin therapy treatment	90(87.4)
Hypertension co-morbidity	70(68)
Dyslipidemia co-morbidity	7(6.8)
History of stroke	3(2.9)
Presence of retinopathy	31(30.1)
Presence of nephropathy	36(35)
History of myocardial infarction	2(2)

Table 3. Ulcer characteristics among the study subjects

Variable	N (%)
Ulcer characteristics	
Neuropathic	40(38.8)
Ischemic	7(6.8)
Neuro-ischemic	58(56.3)
Immune mediated	0(0)
Ulcer location	
Right	40(38.8)
Left	50(48.5)
Both	12(11.7)
Ulcer site	
Plantar	32(31.1)
Dorsum	43(41.7)
Ray	18(17.5)
Ankle and above	5(4.9)
Both plantar & dorsum	5(4.9)
Number of ulcers	
Single	56(54.4)
Multiple	47(44.6)
Depth of ulcer	
Subcutaneous	6(5.9)
Muscle	21(20.4)
Ligament & tendons	25(24.3)
Bone	53(51.5)
Clinical signs of ulcer infection	94(91.3)
Wagner grade of DM foot	
Grade 1	3(2.9)
Grade 2	17(16.5)
Grade 3	30(29.1)
Grade 4	35(34)
Grade 5	18(17.5)
Presence of gangrene	68(66)
Presence of pain	71(68.9)
Type of amputation	31(30.1)
Ray	10(9.7)
BKA	15(14.6)
AKA	6(5.8)
Use of prosthesis post amputation	3(2.9)

BKA = Below-knee Amputation;
AKA = Above-knee Amputation

Table 4. Clinical and laboratory parameters among the study participants

Variable	Mean±SD (N=103)
Systolic BP	131.94±16.87
Diastolic BP	81.16±13.52
FBS	7.67±3.26
RBS	12.98±7.09
HbA1c	8.82±2.23
Total Cholesterol	3.13±0.88
LDL	2.07±0.9
HDL	0.62±0.27
TG	1.19±0.41
Phosphorus	1.26±0.56
K^+	3.78±0.81
Na^+	132.23±6.22
Urea	6.48±4.44
Creatinine	113.61±66.35
Ca^{++}	2.08±0.34

BP = Blood Pressure;
FBS = Fasting Blood Sugar;
RBS = Random Blood Sugar;
HbA1c = Glycosylated hemoglobin
LDL = Low-Density Lipoprotein
HDL = High-Density Lipoprotein;
TG = Triglyceride

Table 5. Impact of DFU on the patients' QoL

| Domains and items	Positive n(%)	Average n(%)	Negative n(%)
Leisure: How much have your foot ulcer problems:			
a) Stopped you from doing the hobbies and recreational activities you enjoy?	20(19.4)	10(9.7)	73(70.9)
b) Changed the kinds of hobbies & recreational activities that you enjoy?	90(87.4)	2(1.9)	11(10.7)
c) Stopped you from getting away for a holiday or weekend break?	52(50.5)	5(4.9)	46(44.7)
d) Made you choose a different kind of holiday or short break than you would have preferred?	97(94.2)	1(1)	5(4.9)
e) Meant that you had to spend more time planning and organizing for leisure activities?	44(42.7)	13(12.6)	46(44.7)
Physical health: Because of your foot problems, how often have you felt:			
a) Fatigued or tired?	49(47.6)	19(18.4)	35(34)
b) Drained?	53(51.5)	21(20.4)	29(28.2)
c) That you had difficulty sleeping?	52(50.5)	33(32)	18(17.5)
d) Pain while walking or standing?	30(29.1)	26(25.2)	47(45.6)
e) Pain in the night?	66(64.1)	19(18.4)	18(17.5)
f) Unwell because of taking antibiotics or other medicine for infection?	86(83.5)	13(12.6)	4(3.9)
Daily activities: because of your foot problems, how often have you:			
a) Had to depend on others to help you look after yourself?	28(27.2)	24(23.3)	51(49.5)
b) Had to depend on others to do household chores such as cooking, cleaning, or laundry?	24(23.3)	21(20.4)	58(56.3)
c) Had to depend on others to get out of the house?	29(28.2)	24(23.3)	50(48.5)
d) Had to spend more time planning or organizing your daily life?	35(34)	19(18.4)	49(47.6)
e) Felt that doing anything took longer than you would have liked?	35(34)	17(16.5)	51(49.5)
f) Felt restricted in your daily life?	29(28.2	17(16.5)	57(55.3)
Emotions: because of your foot problems, have you felt:			
a) Angry because you were not able to do what you wanted to do?	59(57.3)	14(13.6)	30(29.1)
b) Frustrated by others doing things for you when you would rather do them yourself?	72(69.9)	9(8.7)	22(21.4)
c) Frustrated because you were not able to do what you wanted to do?	67(65)	12(11.7)	24(23.3)
d) Helpless to cure your ulcers(s)?	52(50.5)	15(14.6)	36(35)
e) Worried that your ulcer(s) will never heal?	61(59.2)	22(21.4)	20(19.4)
f) Worried that you may have to have an amputation?	54(52.4)	14(13.6)	35(34)
g) Worried about injury to your feet?	58(56.3)	12(11.7)	33(32)
h) Depressed because you were not able to do what you wanted to do?	70(68)	15(14.6)	18(17.5)
i) Worried about getting ulcers in the future?	82(79.6)	14(13.6)	7(6.8)
j) Worried about being a burden on others?	74(71.8)	17(16.5)	12(11.7)
k) That you have no control over your life?	61(59.2)	25(24.3)	17(16.5)
l) Angry that this has happened to you?	68(66)	21(20.4)	14(13.6)
m) Alone?	87(84.5)	7(6.8)	9(8.7)
n) Frustrated because you have difficulty in moving about?	68(66)	16(15.5)	19(18.4)
o) Frightened about the future?	67(65)	21(20.4)	15(14.6)
p) Badly about yourself because you can no longer work or be productive?	72(69.9)	15(14.6)	16(15.5)
q) Hopeless that things will never get better?	86(83.5)	10(9.7)	7(6.8)
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?	102(99)	0(0)	1(1)
b) Did you disregard medical advice about how to care for your ulcer?	103(100))	0(0)	0(0)
Family: Because of your foot ulcer problems, how much:			
a) Strain has there been on your relationship with your spouse or partner?	93(90.3)	7(6.8)	3(2.9)
b) Strain has there been on your relationship with other family members?	98(95.1)	3(2.9)	2(1.9)
c) Do you argue with your spouse or partner?	97(94.2)	3(2.9)	3(2.9)
d) Have you felt that you are a burden on your family?	93(90.3)	7(6.8)	3(2.9)
e) Have you felt that there has been a decline in your sexual relations?	78(75.7)	6(5.8)	19(18.4)
Friends: Because of your ulcer problems, how much have you felt:			
a) Guilty because your friends have to change plans to fit with your limitations?	102(99)	1(1)	0(0)
b) That your circle of friends is getting smaller?	100(97.1)	1(1)	2(1.9)
c) That there are restrictions on the kinds of things you do with your friends?	86(83.5)	5(4.9)	12(11.7)
d) Hindered in your social life?	70(68)	9(8.7)	24(23.3)
e) That you are a burden on your friends?	99(96.1)	4(3.9)	0(0)
Treatment: Because of your foot ulcer problems, how much are you bothered by:			
a) Having to keep weight off your foot ulcer?	28(27.2)	19(18.4)	56(54.4)
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)?	52(50.5)	20(19.4)	31(30.1)
c) The appearance, odour, or leaking of your ulcer?	57(55.3)	18(17.5)	28(27.2)
d) Having to depend on others to help you care for your foot ulcer?	39(37.9)	21(20.4)	43(41.7)
Satisfaction: How satisfied have you been with your medical care for your foot ulcer problems?	90(87.4)	11(10.7)	2(1.9)
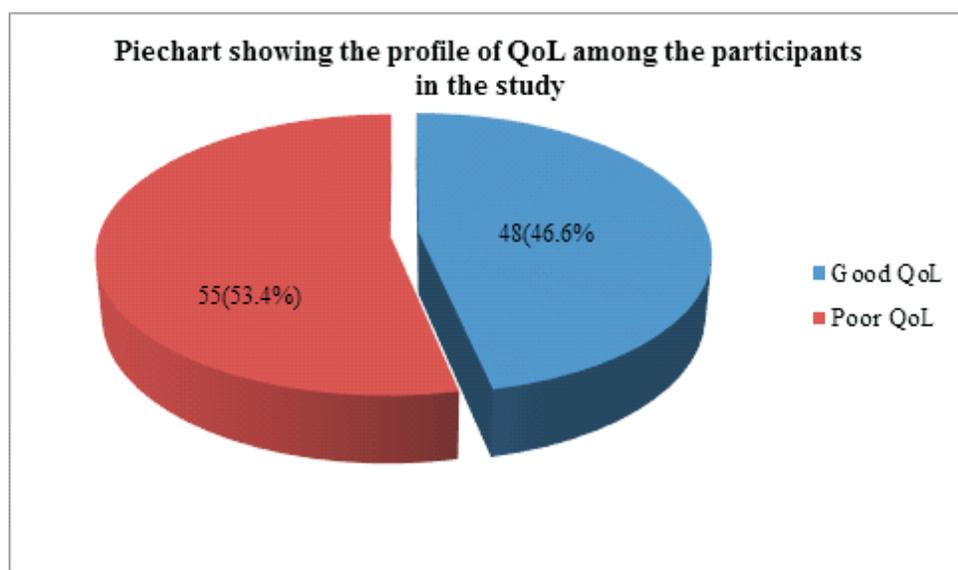
Figure 1. QoL status among the DFU patients

Table 6. Mean Domain QoL Scores of Study Subjects

Domains	QoL score (mean±SD)	CI (95%)
Leisure	4.95±1.75	4.61-5.27
Physical health	4.76±1.68	4.44-5.08
Daily activities	6.70±2.47	6.21-7.17
Emotions	4.31±1.85	3.94-4.69
Noncompliance	2.04±0.22	2.01-2.08
Family	2.48±1.01	2.30-2.68
Friends	2.91±1.16	2.68-3.15
Treatment	5.77±2.23	5.30-6.21
Satisfaction	8.42±1.49	8.11-8.71
Positive attitude	7.39±1.51	7.10-7.69
Financial	6.71±2.38	6.22-7.16
Global QoL score	45.25±7.23	48.20-51.32

The table above shows the values of the mean QoL scores and their associated 95% CI for each of the 11 domains of DFU scale among the respondents in the study.**.**

TABLE 7. Multivariate Analysis of Factors influencing the Domains QoL Scores among the Participants in the Study

	Leisure	Health	Activities	Emotions	Noncompliance	Family	Friends	Treatment	Satisfaction	Attitude	Financial
Gender											
Male	5.11±1.66	4.81±1.71	6.51±2.46	4.19±1.82	2.06±0.24	2.62±1.22	3.04±1.24	5.40±2.46	8.16±1.72	7.46±1.45	6.67±2.13
Female	4.80±1.83	4.72±1.67	6.89±2.49	4.42±1.89	2.03±0.19	2.34±0.75	2.79±1.08	6.10±1.96	8.67±1.22	7.33±1.56	6.74±2.61
p value	0.359	0.795	0.440	0.533	0.573	0.169	0.273	0.12	0.089	0.649	0.887
Education											
<Tertiary	4.93±1.77	4.98±1.67	7.04±2.41	4.56±1.93	2.06±0.24	2.39±0.87	2.85±1.09	6.03±2.12	8.41±1.17	7.19±1.46	7.07±2.44
Tertiary	4.98±1.72	4.31±1.64	6.04±2.49	3.83±1.62	2.02±0.17	2.65±1.23	3.03±1.30	5.23±2.37	8.47±2.03	7.81±1.52	5.97±2.11
p value	0.882	0.057	0.057	0.064	0.531	0.211	0.454	0.087	0.864	0.05	0.027**
Economic Status											
Low	5.07±1.84	4.95±1.78	7.23±2.26	4.68±1.91	2.05±0.22	2.48±1.12	2.81±1.13	6.21±2.09	8.57±1.30	7.31±1.47	7.12±2.55
High	4.81±1.64	4.54±1.54	6.07±2.57	3.87±1.71	2.04±0.20	2.47±0.85	3.03±1.19	5.24±2.30	8.25±1.69	7.49±1.55	6.21±2.07
p value	0.450	0.232	0.017**	0.027**	0.798	0.964	0.316	0.027**	0.289	0.540	0.053
Diabetes Education											
No	5.23±1.69	5.02±1.69	7.72±2.39	4.26±1.62	2.05±0.22	2.34±0.83	2.94±1.07	6.17±2.38	8.52±1.25	7.08±1.46	6.88±2.58
Yes	4.66±1.76	4.52±1.61	5.94±2.22	4.31±2.01	2.05±0.22	2.58±1.12	2.84±1.22	5.43±2.06	8.31±1.67	7.71±1.43	6.5±2.20
p value	0.110	0.143	<0.001**	0.886	0.926	0.239	0.690	0.106	0.486	0.034**	0.430
Number of ulcers											
Single	4.85±1.70	4.42±1.46	6.07±2.47	3.79±1.52	2.05±0.23	2.35±0.62	2.72±1.04	5.47±2.26	8.53±1.59	7.35±1.58	6.42±2.37
Multiple	5.02±1.83	5.2±1.88	7.42±2.31	4.95±2.08	2.04±0.21	2.64±1.34	3.11±1.26	6.17±2.19	8.26±1.38	7.48±1.43	7.06±2.41
p value	0.627	0.022**	0.006**	0.002**	0.836	0.153	0.098	0.118	0.375	0.660	0.185
Ulcer duration											
<1month											
>1month	4.92±1.54	4.87±1.47	7.24±2.27	4.07±1.59	2.03±0.18	0.83±0.15	1.41±0.25	2.31±0.42	1.42±0.26	1.47±0.27	2.44±0.44
	4.96±1.83	4.71±1.77	6.48±2.53	4.42±1.95	2.05±0.23	1.07±0.12	1.01±0.11	2.17±0.26	1.53±0.18	1.52±0.18	2.36±0.27
p value	0.908	0.662	0.160	0.393	0.649	0.924	0.032**	0.150	0.907	0.418	0.353
Wagner grade											
<3	4.24±1.64	3.8±1.59	5.3±2.66	3.43±1.5	2.05±0.22	2.18±0.44	2.78±1.16	4.47±2.34	7.6±1.90	7.56±1.65	5.8±2.37
>3	5.12±1.74	4.99±1.63	7.04±2.31	4.53±1.87	2.04±0.22	2.55±1.09	2.94±1.16	6.08±2.09	8.62±1.32	7.36±1.47	6.93±2.34
p value	0.042**	0.004**	0.004**	0.016**	0.973	0.018**	0.572	0.003**	0.005**	0.595	0.057