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The Psychological Impacts of Diabetic Foot in Rural Population Patients

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ABSTRACT

Purpose: This study aim to evaluate various psychiatric disorders (depression, anxiety and stress) associated with diabetic foot ulcers in rural population patients.

Methodology: The study design was Cross sectional study. The sample was taken from rural area of White Nile state- Sudan in august 2022.The sample was consisted of patients with diabetic Foot (N=112), (male=59, female=53). DASS-21 was used to measure the depression, anxiety and stress.

Findings: The result observed that 44.56%, 44.32% and 49.11% of patients with diabetic foot were suffering between (Moderate to Extremely Severe) in depression, anxiety and stress respectively. The depression in female patients was significantly higher (M =12.0, SD =6.95) than the depression in male patients (M =10.0, SD = 5.89), but the anxiety in female patients was significantly lower (M = 9.5, SD = 4.51) than the anxiety in male patients (M = 11.5, SD = 3.697). The stress in female patients was significantly higher (M = 12.25, SD = 4.19) than the stress in male patients (M =10.25, SD = 4.57).

Unique contributions to theory, practice and policy: The study concluded that there was high prevalence of depression, anxiety and stress in patients with diabetic foot.

Keywords: *diabetic Foot, foot ulcers, Depression, Anxiety, Stress*.

Introduction

Globally about 463 million people are living with diabetes mellitus (DM) and 80% are in middle and low-income countries. [1]. In 2018, the International Diabetes Federation (IDF) reported that about 4 out of 5 people aged 20– 79 live with diabetes in low and middle-income countries accounting for 5–22% of global prevalence. [2]. In 2002, the World Health Organization defined the diabetic foot as an infection, ulceration, and/or destruction of deep tissues associated with neurological abnormalities and varying degrees of peripheral vascular disease in the lower limb. [3]. Diabetic foot infection (DFI) is a serious complication of diabetes and a major cause of lower extremity amputation worldwide. [4]. Approximately one-fourth of diabetic patients develop an ulcer during their lifetime, and about half of these ulcers become infected. [5,6]. Diabetic foot problems result in high economic cost and a large national economic burden. [7].

One of the most frequent and disabling complication of diabetes is a group of condition known as diabetic limb problems. Diabetic foot problems, such as ulcers, infection, gangrene often results from peripheral neuropathy and vascular diseases. [8].

The relationship between mental illness and diabetes is complicated, bidirectional and not fully understood. [9]. The most prevalent mental illness associated with diabetes is depression, followed closely by anxiety disorders. [10]. Type 2 diabetes mellitus is especially widespread among patients with schizophrenia and bipolar disorder, and partly explained by the long-term use of antipsychotic medications.[11].

Diabetes is now common and major health problem in Sudan, like other developed and developing countries, high prevalence of uncontrolled diabetes (85%) is noted in Sudanese individuals with type 2 diabetes. [12, 13, 14].

Materials and Methods:

Data Collection

The questionnaire was used for the face-to-face interview of each patient, the questionnaire was pretested using a pilot survey. The questionnaire questions about patients' socio-demographic, in the first part of the questionnaire. The following part of the questionnaire was designed to collect clinical and diabetes-related evidence from the participants, such as duration of diabetes, anatomical area of foot ulcers, and history of foot ulcer, to determine differences in anxiety, stress and depression that is associated with the person who infected with diabetic foot ulcers scores with some demographic variables such as sex, age, academic status, marital status, and income. DASS-21 was used to measure the depression, anxiety and stress.

Data analysis

Descriptive statistics of frequency and percentages were used to summarize data on sociodemographic factors, diabetes information, and areas of foot ulcers. Chi-square was used to assess the psychological factors associated with diabetic foot. Statistical analysis was performed by the statistical package for social science (SPSS, version 22).

Ethics approval.

In this study involving human beings, all actions were according to the ethical standards of researches. In addition, the questionnaire was approved by all participants included in the study.

Result:-

Table 1: Association between demographics and depression of DF patients

		Depression level					
Variable	**Category**	**Normal**	**Mild**	**Moderate**	**Severe**	**Extremely Severe**	**P-value**
Gender	Male (59)	13(11.61)	18(16.07)	10(8.93)	8 (7.14)	4 (3.57)	0.00
	Female(53)	9 (8.03)	22(19.64)	13(11.61)	9(8.04)	6(5.36)	
	Total	22 (19.64)	40 (35.71)	23(20.54)	17(15.18)	10 (8.93)	
Age	20- 36	6 (5.36)	4(3.57)	4(3.57)	3(2.68)	1(0.89)	0.005
	37-52	13(11.61)	7(6.25)	9(8.04)	4(3.57)	3(2.68)	
	53-68	7(6.25)	8(7.14)	6 (5.36)	4(3.57)	1(0.89)	
	>69	11(9.82)	10(8.93)	8(7.14)	1(0.89)	2(1.79)	
	Total	37(33.04)	29(25.89)	27(24.11)	12(10.71)	7(6.25)	
Education	Illiteracy	5(4.46)	4(3.57)	2(1.79)	1(0.89)	1(0.89)	0.00
	Elementary	8(7.14)	11(9.82)	0.0(0.0)	2(1.79)	0.0(0.0)	
	Secondary	12(10.71)	12(10.71)	1(0.89)	3(2.68)	2(1.79)	
	High school	9(8.04)	13(11.61)	1(0.89)	0.0(0.0)	2(1.79)	

	University	2(1.79)	7(6.25)	8(7.14)	5(4.46)	1(0.89)	
	Total	36 (31.14)	47(41.96)	12(10.71)	11(9.82)	6(5.36)	
Marital status	Marriage	11(9.82)	12(10.71)	13(11.61)	3(2.68)	4(3.57)	
	Single	14(12.5)	10(8.93)	8(7.14)	2(1.79)	2(1.79)	0.017
	Widows	9(8.04)	6(5.36)	9(8.04)	4(3.57)	5(4.46)	
	Total	34(30.36)	28(25.0)	30(26.79)	9(8.04)	11(9.82)	
Income	Enough	17(15.18)	18(16.07)	4(3.57)	2(1.79)	1(0.89)	
	Enough to some	13(11.61)	8(7.14)	7(6.25)	1(0.89)	3(2.68)	0.00
	Not enough	7(6.25)	11 (9.82)	10(8.93)	4(3.57)	6(5.36)	
	Total	37(33.04)	37(33.03)	21(6.25)	7(6.25)	10(8.93)	

Note. Number of *patients* = 112

$p \leq .05$

Table 2: Association between Clinical characteristics (diabetic foot information) of patients

	depression level						
Variable	Category	Normal	Mild	Moderate	Severe	Extremely Severe	P-value
Duration of diabetes (year)	< 5	5 (4.46)	3(2.68)	3(2.68)	4(3.57)	2(1.79)	0.022
	6-10	15(13.39)	12(10.71)	6 (5.36)	3(2.68)	5(4.46)	
	11-16	9 (8.04)	10 (8.93)	8 (7.14)	5(4.46)	3(2.68)	
	> 17	3 (2.68)	4 (3.57)	5(4.46)	4 (3.57)	3(2.68)	
	Total	32 (28.57)	29 (25.89)	22(19.64)	16(14.29)	13(11.61)	
Duration of foot ulcer	≤ 4	21(6.25)	17(15.18)	11(9.82)	5(4.46)	9 (8.04)	0.005
	>5	12(10.71)	8(7.14)	10(8.93)	9 (8.04)	10 (8.93)	
	Total	33 (29.46)	25(22.32)	21(18.75)	14 (12.5)	19 (16.96)	
Ulcer location	Ankle	4(3.57)	6(5.36)	9(8.04)	7(6.25)	4(3.57)	0.507
	Mild foot	5(4.46)	5(4.46)	12(10.71)	8(7.14)	6(5.36)	
	Front foot	7(6.25)	6(5.36)	14(12.5)	9(8.04)	8(7.14)	
	Total	16 (14.29)	17(15.18)	35(31.25)	24(21.43)	18(16.07)	

Note. Number of *patients* = 112

$p \leq .05$

Table 3: Association between demographics and Anxiety of DF patients

Variable	Anxiety level						
	Category	**Normal**	**Mild**	**Moderate**	**Severe**	**Extremely Severe**	**P-value**
Gender	Male (59)	13(11.61)	15(13.39)	14(12.5)	10(8.93)	7(6.25)	0.00
	Female(53)	15(13.39)	16(14.29)	7(6.25)	9(8.04)	6(5.36)	
	Total	28(25.0)	31 (27.68)	21(18.75)	19(16.97)	13(11.61)	
Age	20- 36	6(5.36)	3(2.68)	5(4.46)	2(1.79)	2(1.79)	0.00
	37-52	11(9.82)	9(8.04)	7(6.25)	5(4.46)	4(3.57)	
	53-68	5(4.46)	5(4.46)	7(6.25)	6(5.36)	3(2.68)	
	>69	9(8.04)	11(9.82)	7(6.25)	4(3.57)	1(0.89)	
	Total	31 (27.68)	28(25.0)	26 (23.21)	17(15.18)	10(8.93)	
Education	Illiteracy	6(5.36)	3(2.68)	1(0.89)	3(2.68)	0.0 (0.00)	0.00
	Elementary	9(8.04)	9(8.04)	1(0.89)	1(0.89)	1(0.89)	
	Secondary	10(8.93)	11(9.82)	3(2.68)	4(3.57)	2(1.79)	
	High school	7(6.25)	10(8.93)	4(3.57)	2(1.79)	2(1.79)	
	University	4(3.57)	5(4.46)	6(5.36)	4(3.57)	4(3.57)	
	Total	36 (31.14)	38 (33.93)	15(13.39)	14(12.5)	9(8.04)	
Marital status	Marriage	8(7.14)	15(13.39)	9(8.04)	6(5.36)	5(4.46)	0.00
	Single	12(10.71)	10(8.93)	9(8.04)	1(0.89)	4(3.57)	
	Widows	10(8.93)	4(3.57)	10(8.93)	6(5.36)	3(2.68)	
	Total	30 (26.78)	29 (25.89)	28(25.0)	13(11.61)	12(10.71)	
	Enough	19(16.96)	16(14.29)	5(4.46)	4(3.57)	1(0.89)	

Income	Enough to some	11(9.82)	10(8.93)	6(5.36)	3(2.68)	2(1.79)	0.00
	Not enough	4(3.57)	6(5.36)	11(9.82)	8(7.14)	6(5.36)	
	Total	34 (30.35)	32 (28.58)	22 (19.64)	15(13.39)	9(8.04)	

Note. Number of *patients* = 112

$p \leq .05$

Table 4: Association between Clinical characteristics (diabetic foot information) and Anxiety of patients

	Anxiety level						
Variable	Category	Normal	Mild	Moderate	Severe	Extremely Severe	P-value
Duration of diabetes (year)	< 5	4(3.57)	2(1.79)	5(4.46)	2(1.79)	4(3.57)	0.008
	6-10	10(8.93)	14(12.5)	8(7.14)	5(4.46)	4(3.57)	
	11-16	10(8.93)	7(6.25)	9(8.04)	7(6.25)	2(1.79)	
	> 17	2(1.79)	1(0.89)	7(6.25)	6(5.36)	3(2.68)	
	Total	26(23.22)	24(21.43)	29(25.89)	20(17.86)	13(11.61)	
Duration of foot ulcer	≤ 4	24(21.43)	18(10.07)	6(5.36)	8(7.14)	7(6.25)	0.00
	>5	8(7.14)	10(8.93)	12(10.71)	14(12.5)	5(4.46)	
	Total	32(28.57)	28(25.0)	18(10.07)	22(19.64)	12(10.71)	
Ulcer location	Ankle	5(4.46)	7(6.25)	8(7.14)	5(4.46)	6(5.36)	0.00
	Mild foot	3(2.68)	9(8.04)	11(9.82)	10(8.93)	3(2.68)	
	Front foot	11(9.82)	10(8.93)	13(11.61)	5(4.46)	6(5.36)	
	Total	19(16.96)	26(23.21)	32(28.57)	20(17.86)	15(13.40)	

Note. Number of *patients* = 112

$p \leq .05$

Table 5: Association between demographics and stress of DF patients

	Stress level						
Variable	Category	Normal	Mild	Moderate	Severe	Extremely Severe	P-value
Gender	Male	12(10.71)	17(15.18)	9(8.04)	7(6.25)	8(7.14)	0.00
	Female	10(8.93)	18(16.07)	11(9.82)	12(10.71)	8(7.14)	
	Total	22(19.64)	35(31.25)	20(17.86)	19(16.96)	16(14.28)	
Age	20- 36	7(6.25)	4(3.57)	3(2.68)	3(2.68)	1(0.89)	0.010
	37-52	15(13.40)	8(7.14)	6(5.36)	3(2.68)	4(3.57)	
	53-68	7(6.25)	6(5.36)	5(4.46)	4(3.57)	4(3.57)	
	> 69	6(5.36)	9(8.04)	11(9.82)	3(2.68)	3(2.68)	
	Total	35(31.26)	27(24.11)	25(22.32)	13(11.61)	12(10.71)	
Education	Illiteracy	7(6.25)	2(1.79)	0.0(0.00)	1(0.89)	3(2.68)	0.00
	Elementary	10(8.93)	7(6.25)	1(0.89)	2(1.79)	1(0.89)	
	Secondary	8(7.14)	7(6.25)	6(5.36)	5(4.46)	4(3.57)	
	High school	5(4.46)	12(10.71)	2(1.79)	3(2.68)	3(2.68)	
	University	2(1.79)	4(3.57)	8(7.14)	3(2.68)	6(5.36)	
	Total	32(28.57)	32(28.57)	17(15.18)	14(12.5)	17(15.18)	
Marital status	Marriage	6(5.36)	13(11.61)	10(8.93)	8(7.14)	6(5.36)	0.002
	Single	14(12.5)	12(10.72)	7(6.25)	2(1.79)	1(0.89)	
	Widows	7(6.25)	5(4.46)	13(11.61)	2(1.79)	6(5.36)	

	Total	27(24.11)	30(26.79)	30(26.79)	12(10.71)	13(11.61)	
Income	Enough	17(15.18)	20(17.86)	3(2.68)	2(1.79)	3(2.68)	0.298
	Enough to some	13(11.61)	8(7.14)	4(3.57)	5(4.46)	2(1.79)	
	Not enough	2(1.79)	3(2.68)	14(12.50)	9(8.04)	7(6.25)	
	Total	32(28.57)	31(27.68)	21(18.75)	16 (14.29)	12(10.71)	

Note. Number of *patients* = 112

$p \leq .05$

Table 6: Association between clinical characteristics (diabetic foot information) and stress of patients

	Stress level	N(%)					
Variable	Category	Normal	Mild	Moderate	Severe	Extremely Severe	P-value
Duration of diabetes (year)	< 5	3(2.68)	4(3.57)	2(1.79)	5(4.46)	3(2.68)	0.230
	6-10	12(10.71)	10(8.93)	9(8.04)	6(5.36)	4(3.57)	
	11-16	6(5.36)	8(7.14)	12(10.71)	4(3.57)	5(4.46)	
	> 17	1(0.89)	0.0(0.00)	10(8.93)	4(3.57)	4(3.57)	
	Total	22(19.64)	22(19.64)	33(29.47)	19(16.96)	16(14.28)	
Duration of foot ulcer	≤ 4	27(24.11)	15(13.40)	9(8.04)	6(5.36)	6(5.36)	0.011
	>5	5(4.46)	12(10.71)	15(13.39)	10(8.93)	7(6.25)	
	Total	32(28.57)	27(24.11)	24(211.43)	16(14.29)	13(11.61)	
Ulcer location	Ankle	6(5.36)	3(2.68)	9(8.04)	8(7.14)	5(4.46)	0.061
	Mild foot	7(6.25)	10(8.93)	7(6.25)	5(4.46)	7(6.25)	
	Front foot	9(8.04)	9(8.04)	16(14.29)	8(7.14)	3(2.68)	

Total	22(19.64)	22(19.64)	32(28.58)	21(18.74)	15(13.39)

Note. Number of *patients* = 112

$p \leq .05$

Table 7: Prevalence of Depression, Anxiety and Stress among Diabetes foot Patients on DASS-21 Scale

Level	Depression N (%)	Anxiety N (%)	Stress N (%)
Normal	22 (19.64)	28 (25.0)	22 (19.64)
Mild	40 (35.71)	31 (27.68)	35 (31.25)
Moderate	23(20.54)	21 (18.75)	20 (17.86)
Severe	17(15.18)	19 (16.96)	19 (16.96)
Extremely Severe	10 (8.93)	13 (11.61)	16 (14.29)

Note. Number of *patients* = 112

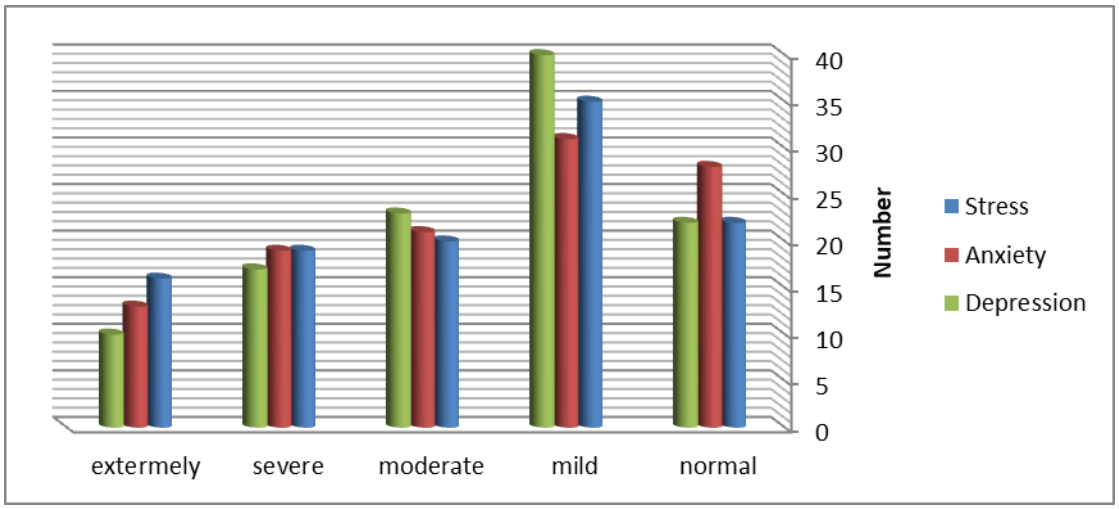

Figure (1): Prevalence of psychological Impacts of Diabetic Foot in Rural population patients

Discussion

For our cross-sectional study of 112 Diabetes foot patients, we found that this sample perceived mild depression, anxiety and stress. Participants who reported more depression

were more likely to be older, single, of Secondary education. This study was agree with the study conducted by [15]. who explored 260 Diabetes foot patients in a diabetic foot clinic showed more prevalent depression in Diabetes foot patients <50 years of age, which agree the present finding that patients 37-52 years felt more depression, addition to the demographic characteristics, the Diabetes foot patients face with multiple problems that may trigger or exacerbate depression, such as physical impairment, changes in roles, increased risks of recurrence, expensive treatment, diminished quality of life, prolonged hospitalization, complex medical procedures, uncertainty, and fears about mortality [16,17].

Regarding educational background, patients with Secondary school education experienced more depression. Higher educational level seems to have a protective effect against anxiety and depression, which accumulates throughout life, because individuals with a higher education level are more likely to obtain and comprehend information regarding care this result finding was similar with opinion of [18]. The marriage patients with diabetes foot whom living with their family are more likely to report feelings of depression, anxiety and stress. Whom don't utilize health services infrequently, and loss family support and emotional support, and to face with several problems related to rural community behavior such as loss care.

Diabetic Foot ulcer patients are more likely to have depression, anxiety and stress compared with diabetic patients without foot complications. Depression, anxiety and stress were different medical conditions, their symptoms, causes, and treatments often overlap. Furthermore, each mental disorder (anxiety, depression and stress) in physical illness may perpetuate the other. However, there are some distinguishing features. For instance, depressed individuals move slowly, and their reactions seem flattened whereas individuals with anxiety experience racing thoughts and tend to be more keyed up. Prevalence of psychological disorders (anxiety, depression and stress) among diabetic foot patients whom have not enough income were higher than other income levels (27.68%, 27.68% and 29.46%) respectively. There was no significant differences (P=0.507) in Clinical characteristics (diabetic foot information) of patients about ulcer location that is causes the depression. But there was high depression and anxiety resulting from significant differences (P =0.000) causes by Duration of diabetes and Duration of foot ulcer also there was no significant differences (P =0.507) in stress from patients whom had Duration of diabetes more than six years and location of Ulcer. But there was significant differences (P =0.011) in stress in patients whom had Duration of foot ulcer less than four years.

Conclusion

Psychological consequences of diabetic foot problem may be more widespread and serious than it is thought. This study was concluded that diabetic foot illness had increased prevalence of psychiatric disorders, depression, anxiety and stress which was being more common. Anxiety and depression problems are more severe and more common in diabetes patients with foot ulcer. In our sample anxiety scores were particularly high for females.

Given the poor outcomes in patients with depression and the availability of effective psychological interventions for patients with diabetic foot complications, this study recommended. That the educational interventions should address psychological factors that often undermine comprehension of information and increase knowledge deficits about diabetic foot care in rural communities, also the family support may give have a role in preventing serious mental illness.

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Conflicts of interest

There are no conflicts of interest

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