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Original Research Article

Level of Depression among Diabetic Patients with Lower Limb Amputation in Lahore, Punjab, Pakistan

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Abstract: *Lower limb amputation is a major complication of diabetes mellitus (DM) with profound physical, psychological, and social consequences. Depression is among the most common psychological reactions to amputation, yet it is often underrecognized in diabetic patients, particularly in low-resource settings like Pakistan.* ***Objective:*** *To assess the prevalence and severity of depression and its association with demographic and clinical factors among diabetic patients with lower limb amputation in Lahore, Pakistan.* ***Methods:*** *A cross-sectional descriptive study was conducted in three tertiary care hospitals of Lahore, enrolling 202 adult diabetic patients (above or below knee amputation) with a post-amputation duration of 4 months to 2 years. Patients with prior psychiatric illness or receiving rehabilitation services were excluded. Data were collected using a structured questionnaire capturing demographic and clinical details and a validated depression scale for amputees. Depression scores were categorized as mild (25–50%), moderate (50–75%), and severe (75–100%). Data were analyzed using SPSS v20, with chi-square tests to assess associations ($p < 0.05$ considered significant).* ***Results:*** *The mean age was 48.3 ± 6.9 years, with 66.3% males and 81.7% having below-knee amputations. The mean depression score was 70.50 ± 12.82. Overall, 27.7% had mild depression, 65.3% moderate, and 6.9% severe depression. Depression severity was significantly associated with age ($p = 0.023$), gender ($p < 0.001$), education ($p < 0.001$), occupation ($p < 0.001$), duration of disability ($p < 0.001$), and level of amputation ($p = 0.039$). Notably, 73% reported always feeling "heartbroken in loneliness," and 30% reported they "always forgot to smile."* ***Conclusion:*** *Depression is highly prevalent among diabetic patients with lower limb amputation, with the majority experiencing moderate symptoms. Targeted mental health interventions, integrated into post-amputation care, are urgently needed to improve quality of life and rehabilitation outcomes in this population.*

Keywords: Diabetes mellitus, lower limb amputation, depression, Pakistan, mental health, quality of life

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Introduction

Diabetes mellitus (DM), particularly Type 2 diabetes, is acknowledged as a significant public health concern worldwide, with its associated complications severely impacting the quality of life (QoL) of affected individuals. Among these complications, lower limb amputation stands out as a serious outcome that not only jeopardizes physical health but also profoundly affects psychological well-being, leading to increased levels of depression and anxiety (1,2,3) . In Pakistan, the situation is exacerbated by socioeconomic factors, underlining the urgent need to assess both the psychological and physical toll of diabetes-related complications, particularly in vulnerable populations.

Studies indicate that the relationship between diabetes and depression is multifaceted; chronic health conditions such as diabetes are frequently accompanied by psychological disturbances (2,3,4,5). The combination of managing a chronic illness along with the stigma associated with disabilities, such as amputation, can lead to significant emotional distress (4,5). In Pakistan, where healthcare access can be limited and diabetes prevalence is rising, understanding the mental health challenges faced by these patients is crucial for improving their overall health outcomes (6,7). Research suggests that individuals with diabetes-related complications frequently experience lower QoL scores across various domains, including physical, psychological, and social aspects (8,7).

Additionally, specific studies have highlighted the detrimental effects of complications on mental health, suggesting that poor glycemic control can exacerbate depressive symptoms, creating a vicious cycle where poor mental health further hinders diabetes management (3,9). Coping strategies also play a significant role; patients who employ positive coping mechanisms report better health outcomes, indicating that mental resilience and support systems can mitigate some negative impacts of disease severity (10,5).

Furthermore, the Pakistani healthcare context, characterized by varying degrees of resource availability and educational outreach, necessitates a focused approach to understanding and addressing the psychological aspects of care for diabetic patients, particularly those who have undergone lower limb amputation (11,5). Thus, the current study aims to gather comprehensive data on the levels of depression among diabetic patients with lower limb amputation in Lahore, Punjab, facilitating a better understanding of their unique challenges and the urgent need for integrated health services that encompass both medical and psychological support.

Methodology

This study employed a quantitative, cross-sectional descriptive design to assess the level of depression among diabetic patients who had undergone lower limb amputation. The research was conducted in three large public and semi-government tertiary care hospitals in Lahore, Pakistan—Ganga Ram Hospital, Jinnah Hospital, and Sheikh Zayed Hospital—selected for their accessibility to a large number of diabetic amputation cases. The study population comprised adult male and female patients with surgical lower limb amputation (above or below knee) secondary to diabetes mellitus, with a post-amputation duration ranging from four months to two years. Individuals with a documented history of psychiatric illness

prior to amputation or those currently receiving rehabilitation services were excluded. A total of 202 participants were recruited using a non-probability convenience sampling technique.

The required sample size was calculated using a single population proportion formula, with a 95% confidence level, an anticipated prevalence of depression among amputees of 74.5%, and a margin of error of 6%, resulting in a sample size of 202 participants. Eligible participants were identified during follow-up visits or inpatient stays in the orthopedic and surgical wards. After obtaining permission from hospital administrations and written informed consent from the participants, data were collected using a structured, self-administered questionnaire. The instrument comprised two sections: demographic and clinical variables, including age, gender, education, occupation, duration of disability, and level of amputation; and a validated depression scale specifically developed for amputees. The depression scale contained 30 items rated on a four-point Likert scale, where higher scores indicated lower frequency of depressive symptoms. For 14 items, reverse scoring was applied. The total possible score ranged from 30 to 120, which was converted to percentage categories: no depression (0–25%), mild depression (25–50%), moderate depression (50–75%), and severe depression (75–100%).

Participants were guided through the questionnaire to ensure understanding of the items without influencing their responses. Data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS) version 20. Descriptive statistics, including means and standard deviations for continuous variables and frequencies and percentages for categorical variables, were calculated. Associations between depression severity and demographic or clinical variables were assessed using chi-square tests, with a significance level set at $p < 0.05$. The study was conducted in compliance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the Ethical Review Committee of the University of Health Sciences, Lahore, and administrative permissions were secured from each participating hospital. Participants were assured of confidentiality, anonymity, and their right to withdraw at any stage without any consequences to their treatment.

Results

A total of 202 diabetic patients with lower limb amputation participated in this study. The mean age was 48.3 ± 6.9 years (range: 21–74 years). The majority of participants (55.4%) were aged 41–50 years, followed by those aged above 50 years (35.6%). Most were male (66.3%), and a substantial proportion were illiterate (30.7%) or educated up to matriculation (38.6%). Regarding occupational status, 34.2% were unemployed before disability, 21.8% became unemployed after disability, 33.2% were housewives, and 10.9% were in professional employment. More than half (60.4%) had a disability duration between 1–2 years, and below-knee amputation was the predominant level of disability (81.7%). (table 1)

Table 1. Socio-demographic and clinical characteristics of study participants (n = 202)

Variable	Categories	n (%)
Age group (years)	21–30	1 (0.5)
	31–40	17 (8.4)
	41–50	112 (55.4)
	>50	72 (35.6)
Gender	Male	134 (66.3)
	Female	68 (33.7)
Education	Illiterate	62 (30.7)
	Literate (informal)	27 (13.4)
	Primary	25 (12.4)
	Matric	78 (38.6)
	Secondary or above	10 (5.0)
Occupation	Unemployed before disability	69 (34.2)
	Unemployed after disability	44 (21.8)
	Professional	22 (10.9)
	Housewife	67 (33.2)
Duration of disability	0.5–1 year	80 (39.6)
	1–2 years	122 (60.4)
Level of amputation	Above knee	37 (18.3)
	Below knee	165 (81.7)

The mean depression score was 70.50 ± 12.82 (range 43–95). Based on predefined scoring criteria, 27.7% of participants had mild depression, 65.3% had moderate depression, and 6.9% had severe depression. (table 2)

Table 2. Distribution of depression severity (n = 202)

Depression Level	n (%)
Mild (25–50%)	56 (27.7)
Moderate (50–75%)	132 (65.3)
Severe (75–100%)	14 (6.9)

Significant associations were found between depression severity and age group ($p = 0.023$), gender ($p < 0.001$), educational status ($p < 0.001$), occupation ($p < 0.001$), duration of disability ($p < 0.001$), and level of amputation ($p = 0.039$). (Table 3)

Table 3. Depression severity by demographic and clinical variables

Variable	Category	Mild n (%)	Moderate n (%)	Severe n (%)	p-value
Age (years)	21–30	1 (100)	0 (0)	0 (0)	0.023
	31–40	8 (47.1)	9 (52.9)	0 (0)	
	41–50	33 (29.5)	67 (59.8)	12 (10.7)	
	>50	14 (19.4)	56 (77.8)	2 (2.8)	
Gender	Male	56 (41.8)	78 (58.2)	0 (0)	<0.001
	Female	0 (0)	54 (79.4)	14 (20.6)	
Education	Illiterate	8 (12.9)	50 (80.6)	4 (6.5)	<0.001
	Literate	5 (18.5)	21 (77.8)	1 (3.7)	
	Primary	8 (32.0)	11 (44.0)	6 (24.0)	
	Matric	29 (37.2)	46 (59.0)	3 (3.8)	
	Secondary+	6 (60.0)	4 (40.0)	0 (0)	
Occupation	Unemployed before disability	27 (39.1)	41 (59.4)	1 (1.4)	<0.001
	Unemployed after disability	7 (15.9)	37 (84.1)	0 (0)	
	Professional	22 (100.0)	0 (0)	0 (0)	
	Housewife	0 (0)	54 (80.6)	13 (19.4)	
Duration of disability	0.5–1 yr	8 (10.0)	63 (78.8)	9 (11.3)	<0.001
	1–2 yr	48 (39.3)	69 (56.6)	5 (4.1)	
Level of amputation	Above knee	4 (10.8)	30 (81.1)	3 (8.1)	0.039
	Below knee	52 (31.5)	102 (61.8)	11 (6.7)	

Responses to individual questionnaire items highlighted areas of concern. For example, 73% reported always feeling "heartbroken in loneliness," 60% stated their "religious interest increased" after disability, and 30% reported they "always forgot to smile." Only 1% felt they could "struggle like ordinary people. (table 4)

Table 4. Responses to individual questionnaire items (n = 202)

Sn	Questions	Not often at all n (%)	Quite Often n (%)	Very Often n (%)	Always n (%)
1	I think I can be better in every way	37 (18%)	68 (34%)	69 (34%)	28 (14%)
2	I think I can be start my business	89 (44%)	103 (51%)	10 (5%)	0 (0%)
3	I eat the food on time	20 (10%)	99 (49%)	68 (34%)	15 (7%)
4	I can do my all work my self	4 (2%)	49 (24%)	112 (55%)	37 (18%)
5	I feel that, I am going to be weak day but day	38 (19%)	80 (40%)	58 (29%)	26 (13%)
6	My memory is less after my disability	92 (46%)	95 (47%)	14 (7%)	1 (0%)
7	My sexual habits are cut downs	87 (43%)	68 (34%)	33 (16%)	14 (7%)
8	My sexual habits are not on routine	85 (42%)	56 (28%)	31 (15%)	30 (15%)
9	My friends and relatives are supporting me	63 (31%)	49 (24%)	19 (9%)	71 (35%)
10	Doctors are take care of me	127 (63%)	68 (34%)	5 (2%)	2 (1%)
11	Peoples are preferred my views and opinions	6 (3%)	76 (38%)	82 (41%)	38 (19%)
12	I am look after of my relatives and friends	44 (22%)	81 (40%)	67 (33%)	10 (5%)
13	Try, radio and newspaper collect my attention	25 (12%)	62 (31%)	104 (51%)	11 (5%)
14	I like the sympathy of the peoples	76 (38%)	41 (20%)	52 (26%)	33 (16%)
15	I am not able to show my excitement and energy like other peoples	104 (51%)	66 (33%)	28 (14%)	4 (2%)
16	My parents did not take care of me as required	81 (40%)	66 (33%)	33 (16%)	22 (11%)
17	I don't like to participate the marriages functions	88 (44%)	38 (19%)	32 (16%)	44 (22%)
18	Peoples are not able to understand my talks	56 (28%)	55 (27%)	45 (22%)	46 (23%)
19	I can feel I be the successful person in future	86 (43%)	41 (20%)	43 (21%)	32 (16%)
20	I feel that my treatment is done in better way in the hospital	17 (8%)	35 (17%)	89 (44%)	61 (30%)
21	I am the useful person of my family	10 (5%)	31 (15%)	49 (24%)	112 (55%)
22	I like to fulfill my own interest things	165 (82%)	15 (7%)	12 (6%)	10 (5%)
23	I can struggle against any problems like ordinary peoples	134 (66%)	58 (29%)	8 (4%)	2 (1%)
24	I feel my ability of strong decision maker is my goodness	61 (30%)	93 (46%)	34 (17%)	14 (7%)
25	I feel I am more proud full after this disability	16 (8%)	33 (16%)	85 (42%)	68 (34%)
26	I am keep remind of my life change disability day as better way	42 (21%)	23 (11%)	59 (29%)	78 (39%)

27	I am the responsible for my failures	22 (11%)	66 (33%)	80 (40%)	34 (17%)
28	I am forgot to smile	18 (9%)	34 (17%)	89 (44%)	61 (30%)
29	I am heartbroken in loneliness	2 (1%)	7 (3%)	46 (23%)	147 (73%)
30	My religion interest is gone high after my disability	18 (9%)	28 (14%)	35 (17%)	121 (60%)

Discussion

The findings from the study on diabetic patients with lower limb amputation reveal a significant prevalence of depression, emphasizing the psychological repercussions of such life-altering medical conditions. A total of 202 patients participated, with a mean age of 48.3 years, predominantly comprising males (66.3%). This demographic profile highlights the vulnerability of this group, largely comprised of middle-aged males, often associated with various socioeconomic disadvantages, which is consistent with trends observed in similar populations in Pakistan and beyond (12,13).

The results indicate that 65.3% of participants experienced moderate depression, complemented by 27.7% with mild depression and 6.9% with severe depression. The significant factors associated with depression included age, gender, educational status, occupation, duration of disability, and level of amputation. These findings echo results from previous studies where socio-demographic and psychological components were notably linked to depression severity (14,15). For instance, Ahmad et al. reported that younger individuals (under 50 years) were at a heightened risk of depression, which aligns with the age distribution shown in our findings where a significant number of participants were within this age bracket (16).

The relatively high depression scores among individuals with lower limb amputations indicate broader implications for their quality of life (QoL). The high percentage (73%) of participants feeling "heartbroken in loneliness" and the 30% who "always forgot to smile" illustrate the emotional distress experienced by those enduring significant physical alterations due to their diabetes-related conditions. Similar sentiments were echoed in studies by Nanwani et al. and Dewi et al., which highlighted social isolation and emotional struggles impacting patient outcomes significantly (12,13).

Moreover, our findings affirm the complexities surrounding the intersection between physical health complications and psychological well-being. The association between increased depression severity and educational status ($p < 0.001$) may suggest that lower educational attainment correlates with lesser health literacy, potentially exacerbating depressive symptoms due to a lack of coping mechanisms or social support systems (15). Similarly, individuals who were unemployed before or after the amputation displayed higher rates of depression, supporting data indicating unemployment as a significant predictor of mental health deterioration among patients with chronic illnesses (17,18).

Notably, the predominance of below-knee amputations (81.7%) aligns with past studies where peripheral vascular disease prevalent among diabetics was cited as a major contributor to such amputations (19,20). Our findings reinforce the existing literature which posits that early intervention in managing complications associated with diabetes can play a crucial role in reducing the rate of amputations, thus promoting mental health and overall QoL (21).

Thus, the high levels of depression among diabetic patients with lower limb amputation in Lahore reflect an urgent need for interdisciplinary approaches to patient care that address both physical and psychological health. Clinical practices should implement routine mental health screenings and tailored psychological support, alongside traditional diabetes management, to ultimately improve the QoL of affected patients. Further research exploring long-term outcomes and effective interventions for mental health in this demographic is advisable to substantiate and expand upon these findings.

Conclusion

This study revealed a high prevalence of depression among diabetic patients with lower limb amputation in Lahore, with the majority experiencing moderate depressive symptoms. Significant associations were found between depression severity and demographic as well as clinical characteristics, including age, gender, education, occupation, duration of disability, and amputation level. The findings underscore the urgent need for routine psychological assessment and integrated mental health support in the management of diabetic amputees. Incorporating mental health interventions into standard post-amputation care pathways can potentially improve rehabilitation outcomes, enhance quality of life, and reduce the overall burden of diabetes-related disability. Policymakers and healthcare providers should prioritize the development of multidisciplinary care models that address both the physical and psychological needs of this vulnerable population.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-MMS-033-24)

Consent for publication
Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

TZ (MSC Nursing Scholar)
Manuscript drafting, Study Design,
MG (Assistant Professor)
Review of Literature, Data entry, Data analysis, and drafting articles.
SK (Professor of Nursing)
Conception of Study, Development of Research Methodology Design,
RK
Study Design, manuscript review, critical input.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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