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# THE PSYCHOLOGICAL BURDEN OF LOWER LIMB AMPUTATION IN DIABETES: EXPLORING LEVELS OF DEPRESSION AND ANXIETY

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## Abstract

***Background:*** *This study aimed to determine the prevalence of depression and anxiety among diabetic patients with lower limb amputation in various areas of District Swabi. Beck's Depression Inventory (BDI) and the Generalized Anxiety Disorder-7 (GAD-7) scale were used for assessment.*

***Methodology:*** *A simple quantitative cross-sectional design was used. The study was conducted in different regions of District Swabi using a convenient sampling technique. A total of 169 diabetic patients were included, with the sample size calculated through the Raosoft calculator. Patients who had undergone lower limb amputation more than two months prior were eligible, while those with amputations less than two months, ICU patients, and individuals with systemic diseases were excluded. Data was collected using validated questionnaires and analyzed through SPSS version 23.*

***Results:*** *Out of 169 participants, 137 were male (81.1%) and 32 were female (18.9%). The most common amputation level was ankle disarticulation (79 participants; 46.7%), followed by transtibial (56; 33.1%) and knee disarticulation (34; 20.1%). Severe depression was reported by 96 participants (56.8%) on the BDI scale, while 79 participants (46.7%) had severe anxiety on the GAD-7 scale. Mean age was 3.14 ± 0.76, BDI mean score was 4.5 ± 0.61, and GAD mean score was 3.31 ± 0.72.*

***Conclusion:*** *Most diabetic amputees in this study had ankle disarticulation and demonstrated severe levels of depression and anxiety on standardized scales.*

## INTRODUCTION

Losing limbs is the most physically and physiologically devastating catastrophe a person can experience, yet with proper therapy, people can regain maximum function and live a quality life.(1)the entire extremity is purged of all of its parts, resulting in impairment, amputation, or portion malfunction. Amputation is carried out immediately for venous and vascular damage.(2)The first to add ligatures to Ambroise Pare was to manage post-amputation bleeding and to build a uniquely advanced prosthetic in the early sixteenth century.(3)it is one of the best of them all, having transcended its origins as a human race. More than a billion people, or 15% of the world's population, are expected to survive with some sort of disability in the near future.(4)in 2005, about 1.7 million people were reported to be living with limb loss. This rate is

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predicted to climb in 2050, reaching 3.7 million in the United States.(5)According to the World Bank, people with disabilities account for 3.08 percent to 16.21% of the population in poor countries around the world. In Pakistan, the percentage of people who are disabled is 5.99 percent.(6)First World War. Accidents, gun injuries, vascular disorders, Diabetes, terrorist acts, bombing bombs, and earthquakes all contributed to a rise in amputation rates. According to a research of the Pakistani population, despite security rules that are frequently broken in this nation, the most serious trauma (road accident) is amputation.(7)Amputation of the lower extremity is a serious health event that might have a detrimental impact on a person's functional mobility. Amputations of the lower limbs are most commonly caused by complications originating from dysvascular disorders including diabetes and peripheral vascular disease.(8, 9)As the prevalence of these chronic conditions increases in the context of an aging population, the number of amputations is expected to rise in the coming years.(10)The majority of persons who have had a lower limb amputated require long-term care.(11)Aside from the personal consequences of lower limb amputation, the individual, community, and healthcare system all bear a significant social and financial price.(12)

## METHODOLOGY

This was a cross-sectional survey, and data was collected from Diabetic patients with lower limb amputation. Convenient sampling technique was carried out to include the participants in the study. Data was collected from total of 169 Diabetic Patient. the sample size was calculated using an online calculator "Raosoft" with confidence level of 95% and 50% response distribution. The duration of study was 6 months. Beck's depression inventory, GAD-7 Anxiety questionnaires and written informed consent were provided to all diabetic patients. Those Patients who were willing to be the part study signed the consent form and filled the questionnaire. Lower limb amputation in diabetics patients was included in study and those who were in ICU, cancer or with any other systemic diseases were excluded from the study.

Data was analyzed using SPSS version 25. Mean ± S.D, range and standard deviation for demographic data were measured. Descriptive statistics were as frequency tables, bar graphs for association of another factor.

- **Study Population**

Participants included male and female diabetic patients aged 30 to 75 years who had undergone unilateral or bilateral lower limb amputation due to diabetic complications. Both above-knee and below-knee amputees were included.

**Inclusion criteria:**

- Confirmed diagnosis of diabetes mellitus
- Lower limb amputation performed ≥3 months prior
- Ability to communicate and provide informed consent

**Exclusion criteria:**

- Pre-existing psychiatric disorders diagnosed before amputation
- Cognitive impairments that hindered understanding of questionnaires
- Acute medical complications requiring hospitalization

- **Sampling Technique**

A convenience sampling technique was adopted due to the limited availability of amputees within a specific geographical region. A total sample of 120 participants was achieved, which was adequate for descriptive and inferential statistical analysis.

- **Data Collection Tools**

**1. Beck Depression Inventory-II (BDI-II)**

A widely validated tool for measuring depressive symptoms. The BDI-II includes 21 items, each scored from 0 to 3. Total scores range from 0 to 63 and are categorized into four levels:

- Minimal: 0–13
- Mild: 14–19
- Moderate: 20–28
- Severe: 29–63

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The instrument demonstrates excellent reliability (α = .91) in chronic disease populations.

**2. Beck Anxiety Inventory (BAI)**

A 21-item self-report questionnaire designed to evaluate anxiety symptoms across cognitive, emotional, and somatic domains.

Score interpretation:

- Minimal: 0–7
- Mild: 8–15
- Moderate: 16–25
- Severe: 26–63

The BAI is particularly appropriate for medical patients because it distinguishes physiological anxiety symptoms from those caused by physical illness.

**3. Demographic and Clinical Questionnaire**

Included detailed information regarding:

- Age, gender
- Marital and employment status
- Duration of diabetes
- Duration since amputation
- Level of amputation (above-knee/below-knee)
- Prosthetic use
- Presence of phantom limb pain
- Comorbidities such as hypertension, neuropathy, or retinopathy

**Procedure**

Interviews were conducted face-to-face in clinical or community settings. Each session lasted 20 to 25 minutes. Ethical approval was secured, and participants provided written consent. Confidentiality and anonymity were assured throughout the study.

**Data Analysis**

Data analysis was conducted using IBM SPSS Version 26.

- Descriptive statistics (mean, SD, frequencies, percentages) summarized participant characteristics.
- Independent t-tests compared depression and anxiety levels across gender, prosthetic use, and amputation level.
- Chi-square tests assessed associations between categorical variables.
- Pearson correlation measured relationships between depression/anxiety scores and duration since amputation.

**RESULTS**

The frequency of males was 137(81.1%) and females were 32(18.9%). Majority of the participants were males. With respect to age, the frequency of age between 21 to 45 years was 39(23.1%), age between 46 to 60 years were 67(39.6%) and age between more than 24 months were 21(12.4%). Likewise, the frequency of amputation duration; the duration of 6 to 12 Months was 58(34.3%), 13 to 24 months were 90(53.3%) and duration more than 24 months were 21(12.4%). Knee disarticulation site of amputation was 34(20.1%), trans tibial amputation was 56(33.1%) and ankle disarticulation were 79(46.7%). which clearly showed that most of the participants were ankle disarticulation amputation.

The frequency of Borderline Depression in BDI scale was 11(6.5%), moderate depression was 62(36.7%) and severe depression were 96(56.8%). Likewise, the anxiety scale of GAD; the frequency of mild anxiety was 26(15.4%), moderate anxiety was 64(37.9%) and severe anxiety were 79(46.7%). which is concluded that majority of the participants were in severe depression and severe anxiety. The mean and SD of Age were 3.14± 0.76, the mean and SD of Beck Depression scale were 4.5± 0.61 and the mean and SD of GAD scale were 3.31±0.72.

**Table 1: Showing the statical data of the study**

| | | | |
|---|---|---|---|
| **Site of Amputation** | Knee disarticulation | 34 | 20.1% |
| | Trans-tibial | 56 | 33.1% |
| | Ankle disarticulation | 79 | 46.7% |
| **Hospital** | Private Hospital | 69 | 40.8% |

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| | | | |
|---|---|---|---|
| | Government Hospital | 100 | 59.2% |
| BDI | 17-20 Borderline in Clinical Depression | 11 | 6.5% |
| | 21-30 Moderate Depression | 62 | 36.7% |
| | 31-40 Severe Depression | 96 | 56.8% |
| GAD | 5-9 Mild Anxiety | 26 | 15.4% |
| | 10-14 Moderate Anxiety | 64 | 37.9% |
| | 15-21 Severe Anxiety | 79 | 46.7% |

**Table 2: Showing the descriptive statistics of the study**

| Descriptive Statistics of the Study | | | | | |
|---|---|---|---|---|---|
| | N | Mean | Std. Deviation | Kurtosis | |
| | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Age in Years | 169 | 3.1420 | .76606 | -1.254 | .371 |
| Duration of Amputation | 169 | 2.7811 | .64963 | -.694 | .371 |
| Site of Amputation | 169 | 4.2663 | .77543 | -1.167 | .371 |
| Beck Depression Scale | 169 | 4.5030 | .61841 | -.272 | .371 |
| GAD | 169 | 3.3136 | .72530 | -.924 | .371 |

**Table 3: Showing the frequency of percentage of demographic data**

| Variables | | Frequency | Percentages |
|---|---|---|---|
| Gender | Male | 137 | 81.1% |
| | Female | 32 | 18.9% |
| Age | 31-45 Years | 39 | 23.1% |
| | 46-60 Years | 67 | 39.6% |
| | More than 60 Years | 63 | 37.3% |
| Duration of Amputation | 6-12 Months | 58 | 34.3% |
| | 13- 24 Months | 90 | 53.3% |
| | More Than 24 Months | 21 | 12.4% |

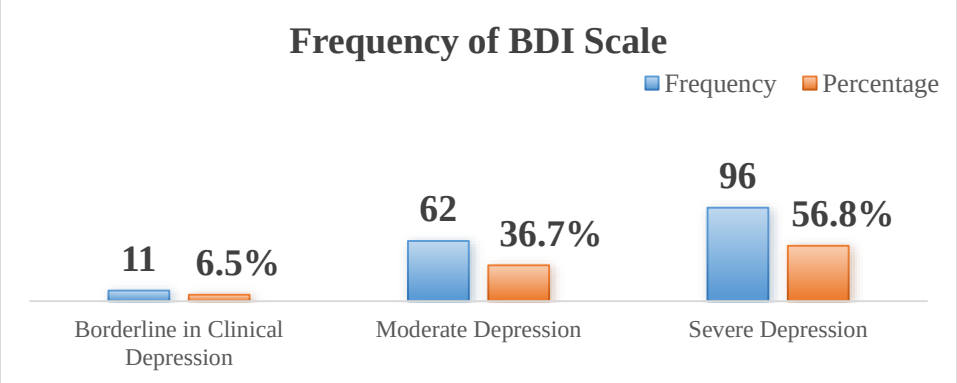


**Figure 1: Showing the frequency and percentage of BDI Scale**

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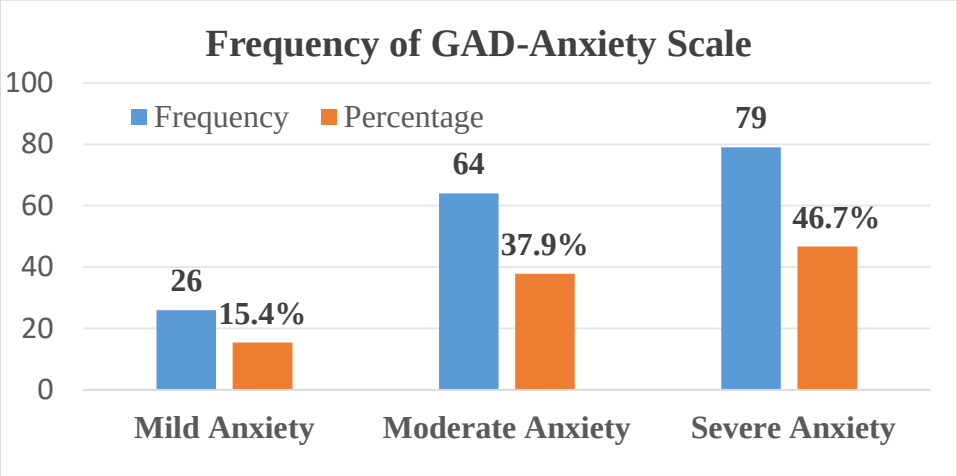


**Figure 2: Showing the frequency and percentage of GAD-Anxiety Scale**

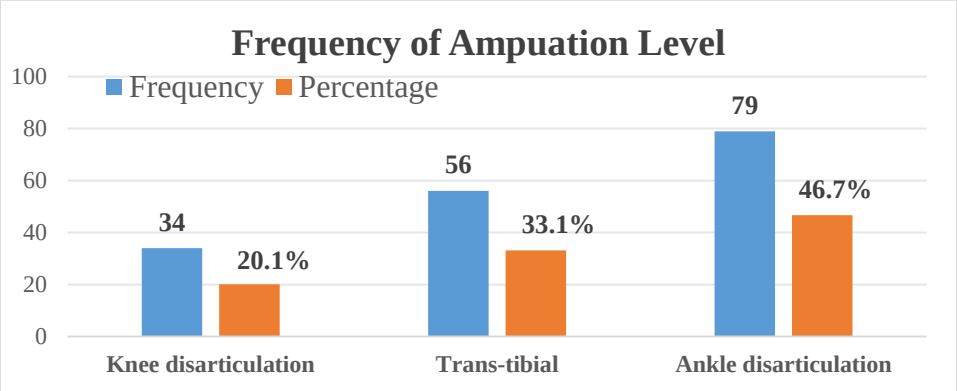


**Figure 3: Showing the Frequency and percentage of Amputation Level**

## DISSCUSION

The purpose of this study is to evaluate the prevalence of depression and anxiety in lower limb amputation of diabetic patients. It is a descriptive cross-sectional study carried out to find the prevalence of depression and anxiety in lower limb amputation in different aged patients. Beck's depression inventory, GAD-7 Anxiety Questionnaire was used to collect the data from 169 participants from different areas of hospitals of District swabi. Current study showed that most of the participants were in ankle amputation and were in severe depression and with severe anxiety with respect to BDI and GAD Scale.

An epidemiological study was carried out in which 124 subjects, three of them died. Nine of them returned the Questionnaire without answering the questions because of privacy issues. Thirteen did not respond for any reason, remaining 99 subjects (80%) returned the questionnaire and partial amputation of right hand as well. limbs one of the teen participants among them reported some sensations of pain presence, phantom pain, phantom sensations, and stump pain was also equal for both right and left side. But only information of one limb was entered into data base. In all of the participants only 72 of the subjects had acquired amputation (acquired group) and in other 27 subjects the limb was defected. (13)

One study was done in which 79% of the participants reported phantom limb pain sensations, 72% of them reported phantom limb pain, and 74% of them reported the pain as residual limb pain. Most of the participants

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described their pain as phantom limb pain and residual limb pain and was as episodic and was not particularly bothersome type. most of the participants under study were represented as phantom limb pain and were classified into the two low-pain related disability categories: Grade 1,low disability/low pain intensity(47%) or grade 2,low disability/high intensity pain(28%),but most of the participants showed pain in other anatomic locations including that of the back(52%).(14)

Another descriptive study was done in which number of participants (n=183), who were having phantom limb pain were having 72% of the pain, others who were having 53% of the pain were respondents with phantom limb pain (PLP) and 38% of the participants were having severe type of phantom limb pain, and they were never treated for it those participants who had treatment reported greater number of severity and its interference. Most common treatment was modality which was used as analgesic medication, which includes acetaminophen, opioids, and NSAIDs. But of many treatments only opioids and chiropractic were moderately to severely helpful in relieving of symptoms. (15)

Another study was done in which all the patients were invited to participate in the study. All of them were symptoms. The mean age group was 69.8 with the standard deviation of 14.6 years. And they were in the mean age was from 24-91 years. The mean age of females (50% of total group) was 72.3 ± 14.8 years and of males 67.3 ± 14.2 years. The main reason for the amputation was occlusive arterial disease, mostly 88% of the cases. Seventeen patients were having amputations on contralateral limbs and were having no pain. In last 6 months prior to amputation only 57 patients had some type of pain in their limbs., but the day before operation were only 41 patients who were having pain, while amongst them 17 of them were pain free. There were 56 lower limb amputees (32 below-knee, 23 above-knee, 1 through the knee joint) of the total amputations 58 were left-sided amputations. Seven patients died during follow-up period, so information on the time course was obtained in 51 patients. (16)

Another study was reported on presence of phantom pain in which 90 of the respondents (63.8%) reported PLP, n=78 (55%) reported RLP and 67 of the individuals (47.5%) reported both RLP and PLP among them just 41(29.1%) of the participants did not report any type of pain that is PLP and RLP. But those participants who did not respond to any of the pain they are either not different from others in the level of amputation, below/above knee, age, time since amputation, prosthesis use Similarly, individuals who experienced RLP did not differ from those who did not in terms of these variables. There was a significant association between PLP and RLP. (17)

## CONCLUSION

The current study concluded that most of the patients were ankle disarticulation level of amputation and participants between the age of 40 to 60 years were in severe depression and anxiety. Moreover, with respect to BDI and GAD-Anxiety scale majority of the participants were in severe depression and anxiety level.

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