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PSYCHOSOCIAL IMPACT OF LIMB AMPUTATION AMONG PATIENTS: A HOSPITAL BASED CROSS-SECTIONAL STUDY

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[doi: 10.33472/AFJBS.6.11.2024.569-578](https://doi.org/10.33472/AFJBS.6.11.2024.569-578)**ABSTRACT:**

Background: Limb amputation, a surgical procedure often necessitated by trauma, peripheral vascular disease, diabetes, infections, or malignancies, represents a significant physical and psychological challenge for patients. **Objectives:** To determine the levels of depression, anxiety and stress associated with limb amputation among patients; and to determine the quality of life of patients with limb amputations, presenting to a tertiary healthcare facility. **Methods:** This was a hospital based cross-sectional study conducted in the Department of General Surgery, Chettinad Academy of Research and Education, a tertiary healthcare facility in Chennai, India between January, and April 2024. **Results:** The present study included 100 patients who underwent limb amputation. The mean age was 48.2 years. Males constituted 79.0% of the sample. Two-thirds (66.0%) were from urban areas, and 62.0% were from lower socioeconomic backgrounds. Clinically, 61.0% had traumatic amputations, and 39.0% had vascular diseases or infections. Lower limb amputations were most common (93.0%), with below-knee amputations accounting for 46.0%. Unilateral amputations were seen in 97.0% of patients. Psychosocial assessments revealed high levels of distress: 55.0% had extremely severe depression, 33.0% severe depression, 40.0% had extremely severe anxiety, 31.0% severe anxiety, and 40.0% had extremely severe stress, with 51.0% severe stress. The mean physical and mental component summary scores of the SF-12 scale were 64.1 and 57.2, respectively. Significant associations ($p < 0.05$) were found between age, limb involved, level of amputation, and laterality with depression, anxiety, stress, and quality of life scores. **Conclusion:** These findings underscore the necessity for an integrated, multidisciplinary approach to the care of amputees, addressing both physical rehabilitation and mental health support.

Keywords: Limb amputation, Psychosocial impact, Depression, Anxiety, Stress, Quality of life

1. INTRODUCTION

Limb amputation, a surgical procedure often necessitated by trauma, peripheral vascular disease, diabetes, infections, or malignancies, represents a significant physical and psychological challenge for patients.(1) The prevalence of amputations has been rising globally, driven primarily by the increasing incidence of diabetes and associated complications, as well as traumatic injuries from accidents and conflicts (Ziegler-Graham et al., 2008;

Esquenazi, 2006).(2, 3) In India, the burden of diabetes-related amputations is particularly high, reflecting the widespread prevalence of this chronic disease and its complications.(4)

The psychosocial impact of limb amputation is profound and multifaceted. Amputees often face substantial physical disability, which can lead to loss of independence, alterations in body image, and significant lifestyle changes.(5) These physical challenges are frequently accompanied by psychological distress, including depression, anxiety, and stress. Studies have shown that amputees are at a higher risk for mental health issues, which can adversely affect their rehabilitation outcomes and overall quality of life.(6, 7) For instance, Alessa et al.(7) (2022) reported that among amputees, 42.7% experienced mild to moderate depression, while 20.5% suffered from severe depression, underscoring the critical need for psychological support in this population.

Quality of life (QoL) in amputees is often significantly impaired, as physical limitations and psychological distress can hinder social integration and functional recovery.(8) The Short Form-12 (SF-12) Health Survey, a widely used tool for assessing health-related quality of life, evaluates both physical and mental health domains and provides valuable insights into the well-being of individuals post-amputation (Ware et al., 1996).(9) Understanding the factors that influence QoL in amputees is essential for developing effective interventions to enhance their rehabilitation and support their reintegration into society.

Despite the critical importance of addressing the psychosocial impact of limb amputation, there is a paucity of comprehensive studies in the Indian context, particularly those that investigate both psychological outcomes and quality of life. Against this background, the aim of the present study was to determine the psychosocial impact of limb amputation among patients. Specifically, the objectives of the present study were to determine the levels of depression, anxiety and stress associated with limb amputation among patients; and to determine the quality of life of patients with limb amputations, presenting to a tertiary healthcare facility.

2. MATERIALS AND METHODS

This was a hospital based cross-sectional study conducted in the Department of General Surgery, Chettinad Academy of Research and Education, a tertiary healthcare facility in Chennai, India between January, and April 2024. The study was approved by the Institutional Human Ethics Committee (IHEC). The Participant Information Sheet (PIS) was made available in the local language for participants and their attendants. The contents were read aloud to them in their native language until they were satisfied with the information. All patients presenting with a history of trauma to the extremities; non-traumatic conditions such as diabetes, ischemic limb diseases requiring amputations in upper and lower limbs (at any level, including amputation of the digits) were enrolled in the present study provided they were between 30 and 80 years of age. However, patients with known intellectual disability, patients with history of psychiatric disorders, patients with acute debilitating physical illness, and patients discharged against medical advice were excluded from the present study. Importantly, patients not willing to provide informed written consent were excluded.

Alessa et al.(7) (2022) conducted a cross-sectional study and noted that among amputees, 42.7% had mild to moderate depression, 20.5% had severe depression, and 36.8% had no depression at all.(7) Using this information, considering the type 1 error (alpha error) to be 5.0%, type 2 error (beta error) to be 20.0% (or 80.0% power), absolute precision to be 10.0% and 10.0% non-response rate the minimum estimated sample size was 100 with 95% confidence. We used a purpose predesigned, semi structured, pretested questionnaire to document the patient sociodemographic characteristics, clinical history, findings of general physical examination, clinical examination, details of amputation, Depression, Anxiety and Stress scale (DASS-21), and 12-Item Short Form Survey (SF-12).

The DASS-21 is a self-report questionnaire designed to measure the emotional states of depression, anxiety, and stress. Developed by researchers at the University of New South Wales, it is a shorter version of the original 42-item DASS, maintaining robust psychometric properties while being more convenient for quick assessments. The DASS-21 consists of three subscales, each with 7 items, which collectively assess the severity of symptoms related to depression (e.g., dysphoria, hopelessness), anxiety (e.g., autonomic arousal, skeletal muscle effects), and stress (e.g., nervous arousal, difficulty relaxing). Respondents rate the extent to which they have experienced each state over the past week on a 4-point Likert scale ranging from 0 (Did not apply to me at all) to 3 (Applied to me very much or most of the time). The scores for each subscale are summed and then multiplied by two to match the scale of the original DASS.(10, 11)

The SF-12 is a concise, 12-item questionnaire designed to measure health-related quality of life. Derived from the longer SF-36 Health Survey, the SF-12 captures essential information while minimizing respondent burden. It assesses eight health domains: physical functioning, role limitations due to physical health, bodily pain, general health perceptions, vitality (energy/fatigue), social functioning, role limitations due to emotional problems, and mental health (psychological distress and psychological well-being). The SF-12 generates two summary scores: the Physical Component Summary (PCS) and the Mental Component Summary (MCS). These scores provide a comprehensive overview of an individual's physical and mental health status. Respondents rate their health status on a variety of scales, including frequency (e.g., "all of the time" to "none of the time") and intensity (e.g., "none" to "very severe").(12, 13)

The data were entered manually into Microsoft Excel and analyzed using SPSS version 23. Categorical variables were described with frequencies and percentages, while continuous variables were summarized with the mean (standard deviation) and/or median (interquartile range), based on the normality of the data. Data normality was tested using the Kolmogorov–Smirnov test and the Shapiro–Wilk test. Statistical significance was evaluated using the Chi-square test or Fisher's exact test for categorical variables, and the independent t-test or Mann-Whitney U test for continuous variables. A p-value of less than 0.05 was considered to indicate statistical significance.

3. RESULTS

The present study included a total of 100 patients presenting with a history of trauma to the extremities; non-traumatic conditions such as diabetes, ischemic limb diseases requiring amputations in upper and lower limbs (at any level, including amputation of the digits) and had limb amputation.

Sociodemographic characteristics of patients with amputation: The mean (SD) age of the patients enrolled was 48.2 years (11.7) – 48.0% of the patients were between 50 and 70 years of age, 39.0% were between 30 and 50 years of age, and 13.0% were more than 70 years of age, in that order. More than three fourth (79.0%) patients were males, and 21.0% were females. Two thirds of the patients (66.0%) were from urban areas, and 34.0% were from rural areas. The distribution of socioeconomic status showed that 62.0% of the patients were from lower socioeconomic background, and 38.0% were from either middle or upper socioeconomic background.

Clinical characteristics of patients with amputation: The clinical characteristics of the patients showed that 61.0% of the patients had a traumatic cause; and 39.0% had vascular diseases and/or infections. Lower limbs were the most common limbs involving amputations (93.0%), followed by 5.0% having upper limb involvement and 2.0% with involvement of both upper and lower limbs. The most common level of amputation was below knee (46.0%),

followed by above knee in 35.0%, through knee in 10.0%, below elbow in 3.0%, above elbow and through hip, each in 2.0% of the patients, in that order. Importantly, 2.0% of the patients had amputation of an upper and the lower limb. In terms of laterality, majority of the patients (97.0%) had unilateral involvement, and 3.0% of the patients had bilateral involvement.

Psychosocial impact of amputation among patients: The results of psychosocial impact of amputation among patients showed that 55.0% of the patients had extremely severe depression, 33.0% had severe depression, 8.0% had moderate and 4.0% had mild or no depression. In terms of anxiety, 40.0% of the patients had extremely severe anxiety, 31.0% had severe anxiety, 20.0% had moderate, and 9.0% had mild or no anxiety. In terms of stress, 40.0% of the patients had extremely severe stress, 51.0% had severe stress, 7.0% had moderate, and 2.0% had mild or no stress. The mean (SD) physical component summary scores of SF-12 scale was 64.1 (12.8); mental component summary scores of SF-12 scale was 57.2 (12.1).

Factors associated with psychosocial outcomes in patients with amputation: The tests of association showed that the age of the patients with amputation was significantly ($p < 0.05$) associated with presence of depression, anxiety, stress, higher physical component summary scores and higher mental component summary scores. Similarly, it was found that the limb involved in amputation, level of amputation, and laterality were significantly ($p < 0.05$) associated with presence of depression, anxiety, stress, higher physical component summary scores and higher mental component summary scores. However, in the present study gender, residence, socioeconomic status, and cause of amputation were not significantly ($p > 0.05$) associated with presence of depression, anxiety, stress, higher physical component summary scores and higher mental component summary scores.

4. DISCUSSION

This study sought to elucidate the psychosocial impact of limb amputation among patients in a tertiary healthcare facility. The majority of the patients in this study were male (79.0%) and from urban areas (66.0%). This gender distribution aligns with other studies which have found higher rates of amputation among males, potentially due to greater exposure to trauma and risk-related activities.(14) The urban predominance might reflect access to tertiary healthcare facilities and the higher incidence of vehicular accidents in urban settings.(15) The mean age of 48.2 years indicates that limb amputations affect a significant portion of the working-age population, which can have profound implications on economic productivity and dependency.(16) The socioeconomic distribution showed that a majority (62.0%) were from lower socioeconomic backgrounds, a finding consistent with other studies that suggest socioeconomic status is a critical determinant in the incidence of amputations, particularly due to limited access to preventive healthcare and timely medical interventions.(17)

The predominance of lower limb amputations (93.0%) and the high rate of traumatic causes (61.0%) are notable. These findings are in line with global trends, where lower limb amputations are more common due to the prevalence of diabetes and peripheral arterial disease.(18, 19) The significant percentage of trauma-related amputations underscores the need for better trauma care and preventive strategies, particularly in urban areas where the majority of trauma cases are reported. The most common level of amputation was below knee (46.0%), followed by above knee (35.0%). This distribution is clinically significant as below-knee amputations generally result in better functional outcomes and prosthetic use compared to above-knee amputations.(20) The higher prevalence of lower limb amputations due to vascular diseases and infections further emphasizes the need for improved management of chronic

conditions like diabetes and peripheral vascular disease, which are major contributors to limb loss.

The psychological impact of limb amputation is profound. The use of DASS-21 in this study to measure depression, anxiety, and stress provides a comprehensive understanding of the emotional states of amputees. Specifically, 55.0% of the patients experienced extremely severe depression, 33.0% severe depression, and 8.0% moderate depression. Similarly, 40.0% of the patients reported extremely severe anxiety, with another 31.0% experiencing severe anxiety. Stress levels were also high, with 40.0% experiencing extremely severe stress and 51.0% severe stress. These findings align with previous research indicating that amputation significantly impacts mental health, leading to high rates of depression, anxiety, and stress. Studies have shown that amputees are at a higher risk of psychological distress, including depression, anxiety, and post-traumatic stress disorder (PTSD).^(6, 21) The significant levels of depression and anxiety observed in amputees in various studies, including Alessa et al. (2022),⁽⁷⁾ which reported 42.7% of amputees experiencing mild to moderate depression and 20.5% severe depression, are consistent with our findings and highlight the need for psychological support services for these patients.

The SF-12 questionnaire used in this study to assess health-related quality of life (HRQoL) is instrumental in providing a holistic view of the patients' physical and mental health status. The mean physical component summary score was 64.1 (12.8), and the mean mental component summary score was 57.2 (12.1). Amputees often experience significant impairments in physical functioning and mental health, which adversely affect their overall quality of life.⁽²²⁻²⁴⁾ The loss of a limb can lead to decreased mobility, increased dependence, and social isolation, further exacerbating mental health issues.

The study highlights the multifaceted challenges faced by amputees, including significant psychological distress and reduced quality of life. These findings underscore the importance of a multidisciplinary approach in managing limb amputations, incorporating medical, psychological, and social support to improve outcomes for patients. Enhanced preventive strategies, better management of chronic conditions, and comprehensive rehabilitation programs are essential to address the needs of amputees effectively.

The study found significant associations between the age of patients and the presence of depression, anxiety, stress, and both physical and mental component summary scores. Older patients were more likely to experience severe psychological distress, potentially due to increased difficulty in adapting to life post-amputation and greater comorbidities.⁽²⁵⁾ The level and laterality of amputation were also significantly associated with psychological outcomes. Patients with higher levels of amputation (e.g., above-knee or through-hip) and bilateral amputations reported higher levels of depression, anxiety, and stress. This is consistent with existing literature that indicates higher levels of amputation, and bilateral amputations result in greater functional impairment, leading to increased psychological distress.⁽²⁶⁾ Interestingly, the study did not find significant associations between gender, residence, socioeconomic status, and the cause of amputation with psychological outcomes and quality of life scores. This contrasts with some studies that suggest socioeconomic status and rural residency may exacerbate psychological distress due to limited access to healthcare resources and support systems. The lack of significant gender differences in psychological outcomes may reflect similar coping mechanisms and support structures across genders in this population.

5. CONCLUSION

The present study provides a comprehensive analysis of the psychosocial impact of limb amputation among patients in a tertiary healthcare facility. The findings reveal a significant prevalence of severe psychological distress, including depression, anxiety, and stress, among

amputees. Notably, over half of the patients experienced extremely severe depression and anxiety, highlighting the profound mental health challenges faced by this population. The study also identifies important associations between demographic and clinical factors and the psychological outcomes of amputation. Age, level of amputation, and laterality were significantly associated with the severity of psychological distress and quality of life scores, underscoring the need for tailored interventions based on these factors. However, gender, residence, socioeconomic status, and the cause of amputation were not found to be significantly associated, suggesting that psychological distress following amputation may transcend these variables. These findings underscore the necessity for an integrated, multidisciplinary approach to the care of amputees, addressing both physical rehabilitation and mental health support. Early psychological screening and intervention should be standard practice in post-amputation care to improve overall outcomes and quality of life for these patients.

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Table 1: Sociodemographic characteristics of patients with amputation

		Number N = 100	Percent
		n	%
Age (in years)	30 to 50	39	39.0
	50 to 70	48	48.0
	More than 70	13	13.0
Gender	Male	79	79.0
	Female	21	21.0
Residence	Urban	66	66.0
	Rural	34	34.0

SES	Lower	62	62.0
	Middle or Upper	38	38.0
SES, Socioeconomic status			

Table 2: Clinical characteristics of patients with amputation

		Number N = 100	Percent
		n	%
Cause of amputation	Traumatic	61	61.0
	Vascular disease or infections	39	39.0
Limb involved in amputation	Upper limb	5	5.0
	Lower limb	93	93.0
	Both limbs	2	2.0
Level of amputation	Above elbow	2	2.0
	Below elbow	3	3.0
	Through hip	2	2.0
	Above knee	35	35.0
	Through knee	10	10.0
	Below knee	46	46.0
	Below elbow and through ankle	1	1.0
Laterality	Below elbow and above knee	1	1.0
	Unilateral	97	97.0
	Bilateral	3	3.0

Table 3: Psychosocial impact of amputation among patients

		Number N = 100	Percent
		n	%
Depression	No or mild	4	4.0
	Moderate	8	8.0
	Severe	33	33.0
	Extremely severe	55	55.0
Anxiety	No or mild	9	9.0
	Moderate	20	20.0
	Severe	31	31.0
	Extremely severe	40	40.0
Stress	No or mild	2	2.0
	Moderate	7	7.0
	Severe	51	51.0
	Extremely severe	40	40.0
QoL – PCS Mean (SD)		64.1 (12.8)	
QoL – MCS Mean (SD)		57.2 (12.1)	
QoL, Quality of life; PCS, Physical Component Summary; MCS, Mental Component Summary			

Table 4: Factors associated with psychosocial outcomes in patients with amputation

	Depression	Anxiety	Stress	QoL – PCS	QoL – MCS
	P value				
Age (in years)	0.001*	0.838	0.020*	0.021*	0.003*
Gender	0.574	0.062	0.915	0.336	0.412
Residence	0.989	0.347	0.988	0.782	0.619
SES	0.834	0.943	0.207	0.279	0.139
Cause of amputation	0.241	0.139	0.279	0.392	0.457
Limb involved in amputation	0.031*	0.023*	0.037*	0.044*	0.041*
Level of amputation	0.001*	0.001*	<0.001*	<0.001*	<0.001*
Laterality	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
QoL, Quality of life; PCS, Physical Component Summary; MCS, Mental Component Summary					