



Article

Psychological Distress in People with Lower Limb Amputation

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ABSTRACT

Background: Lower limb amputation frequently results in significant psychological distress, particularly depression, yet local data from Pakistan are scarce and global evidence regarding risk factors remains inconsistent. **Objective:** To determine the prevalence and risk factors of psychological distress, with a focus on depression, among adults with lower limb amputation, and to compare outcomes based on gender and amputation etiology. **Methods:** This cross-sectional descriptive study was conducted at Fauji Foundation Hospital and allied hospitals of Rawalpindi Medical College, including 50 adults (25 males, 25 females) with lower limb amputation of traumatic or non-traumatic cause. Participants aged over 18 were selected by convenient sampling, assessed with the Hamilton Rating Scale for Depression (HAM-D), and categorized by gender and amputation etiology. Data were analyzed using SPSS v16, with chi-square testing, odds ratios, and confidence intervals reported; ethical approval was secured per the Helsinki Declaration. **Results:** Depression was observed in 62% of participants, with higher prevalence in females (72%) than males (52%) and in traumatic amputees (69.2%) compared to non-traumatic (54.2%). The odds ratio for depression in females was 2.52 (95% CI: 0.78–8.15; $p=0.09$) and for traumatic cause 1.98 (95% CI: 0.62–6.33; $p=0.22$), indicating trends but not statistically significant differences. **Conclusion:** Depression is highly prevalent after lower limb amputation, particularly among females and those with traumatic causes, highlighting the need for integrated psychological screening and intervention in amputee care to improve clinical outcomes.

Keywords: Lower Limb Amputation, Depression, Psychological Distress, Gender Differences, Trauma, Rehabilitation, Mental Health

INTRODUCTION

Lower limb amputation, whether resulting from traumatic injuries or planned surgical interventions due to chronic diseases, represents a profound and life-altering event for affected individuals. Amputation not only imposes significant physical limitations but also has far-reaching psychological consequences, often leading to psychological distress, depression, and anxiety disorders (1,2). The global incidence of amputation continues to rise, with an estimated 1.6 million people living with limb loss in the United States in 2005, a number projected to more than double by 2050 (2). While the primary focus of clinical care has often been on the physiological and functional aspects of rehabilitation, accumulating evidence underscores the importance of understanding the psychological sequelae following limb loss. Psychological outcomes such as post-traumatic stress disorder, mutilation anxiety, and depression are frequently reported among amputees, with the risk and severity varying by demographic and clinical factors (5,6,7).

Existing literature reveals that the cause and context of amputation can influence psychological adjustment. Studies have indicated that traumatic amputations are associated with higher rates of depressive symptoms compared to elective or planned amputations, likely due to the sudden and often violent nature of the injury (13,14,15). Gender differences in psychological outcomes have also been observed, with female amputees reported to have a greater propensity towards depression than their male counterparts. These disparities may be attributed to differences in social roles, coping mechanisms, and societal expectations regarding physical appearance and function (14). Furthermore, the prevalence of psychological distress appears to be higher among those experiencing upper limb loss compared to lower limb amputation, possibly due to the upper limb's unique functional and cosmetic roles (13). Nonetheless, the psychological impact of lower limb amputation remains a significant concern, affecting both men and women, and influencing long-term quality of life and rehabilitation outcomes.

Despite a growing body of international literature, there is a notable gap in the epidemiological understanding of psychological distress following lower limb amputation in Pakistan, where cultural, social, and healthcare contexts may further shape these outcomes. No local studies have quantified the burden or characterized the nature of psychological distress among Pakistani lower limb amputees, leading to limited awareness and insufficient integration of psychological assessment and intervention in routine rehabilitation care. Given the multidimensional challenges faced by amputees, and the scarcity of data from low- and middle-income countries, this study aims to address this knowledge gap by systematically evaluating the risk and distribution of psychological distress—particularly depression—among adults with lower limb amputation. The study specifically seeks to explore the influence of gender and the cause of amputation (traumatic versus non-traumatic) on psychological outcomes, using the Hamilton Rating Scale for Depression as a validated measurement tool (10,12). By identifying the magnitude and determinants of psychological distress in this population, the research seeks to inform healthcare providers and policymakers, with the ultimate objective of improving multidisciplinary rehabilitation services and advocating for integrated psychological support for all lower limb amputees in Pakistan. Therefore, the primary objective of this study is to determine the frequency and distribution of psychological distress in adults following lower limb amputation, and to compare the magnitude of distress in relation to gender and the underlying cause of amputation, with the hypothesis that traumatic amputees and females are at higher risk for depression than their non-traumatic and male counterparts.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted to evaluate the risk and distribution of psychological distress among adults with lower limb amputation, with particular attention to gender and the cause of amputation. The investigation was performed in the clinical settings of Fauji Foundation Hospital Rawalpindi and the allied hospitals of Rawalpindi Medical College, Pakistan, over a two-month period following the formal approval of the research protocol. The study was specifically designed to provide robust, context-specific evidence on psychological outcomes in this population, addressing a key knowledge gap in local epidemiology.

Participants included adult patients aged 18 years and above who had undergone lower limb amputation, either as a result of trauma or due to chronic disease processes necessitating surgical intervention. Eligibility criteria required subjects to have a unilateral or bilateral lower limb amputation at any anatomical level, while those with congenital limb absence, upper limb amputations, or aged below 18 years were excluded to ensure diagnostic validity and relevance to the adult rehabilitation context. Patients meeting the inclusion criteria were identified through purposive, non-random (convenient) sampling as they presented to the specified hospital departments for follow-up or rehabilitation during the study window. After initial eligibility screening, each prospective participant was approached directly by the research team, who explained the study aims and procedures in detail. Written informed consent was obtained prior to any data collection, ensuring that participation was voluntary and all questions were answered in advance.

Data collection was standardized using a structured interview process, employing the validated Hamilton Rating Scale for Depression (HAM-D) as the principal measurement tool for psychological distress. Trained interviewers administered the HAM-D instrument in a face-to-face format, ensuring that each item was clearly understood and responses were accurately captured. The HAM-D scale was chosen for its established validity in clinical depression assessment and its ability to quantify the severity of depressive symptoms (10,12). In addition to the primary outcome measure, demographic and clinical data were collected via a predesigned proforma, recording age, gender, occupation, socio-economic status, level and cause of amputation, and time since surgery. The operational definitions for traumatic versus non-traumatic amputation, as well as thresholds for depression severity on the HAM-D, adhered to established clinical guidelines to maximize reproducibility (12).

To address potential sources of bias, all interviews were conducted in a standardized manner by trained personnel, and the same interviewer was assigned to each participant throughout the study period. The use of a validated instrument for depression minimized measurement error, while restricting the study sample to adults mitigated potential confounding from developmental or pediatric-specific factors. All patients diagnosed with depression according to HAM-D cutoffs were referred for independent psychiatric evaluation, supporting external validity and ensuring ethical management of at-risk individuals.

The final sample comprised 50 participants, equally divided by gender (25 males, 25 females), a sample size determined by feasibility constraints and designed to allow subgroup analysis while capturing relevant variability within this clinical population. Data entry and management were conducted using SPSS version 16 (IBM Corp.), with built-in validity checks and double entry verification to ensure data integrity. Descriptive statistics were used to summarize the prevalence and distribution of psychological distress, expressed as frequencies and percentages. Associations between depression and variables such as gender and amputation cause were evaluated using the chi-square test of independence, with significance set at $p < 0.05$. Cases with missing data were minimized through real-time interview verification, but if encountered, were excluded from the relevant analyses; sensitivity checks confirmed that exclusion did not alter the primary findings. No imputation of missing data was required.

Ethical approval was obtained from the relevant Institutional Review Board before study initiation, with all research activities conducted in full accordance with national and institutional guidelines for research involving human subjects. All patient data were anonymized at the point of entry, securely stored, and accessible only to authorized study personnel. To ensure full reproducibility and transparency, all procedures, instruments, and data handling protocols were documented in detail, allowing for independent replication in future studies.

RESULTS

A total of 50 adults with lower limb amputation participated in this study, equally divided between males and females (25 each). The overall prevalence of depression, as assessed by the Hamilton Rating Scale for Depression, was found to be 62%, with 31 individuals exhibiting symptoms consistent with depression. Among females, 18 out of 25 (72%) were diagnosed as depressed, compared to 13 out of 25 males (52%). The odds of depression in females were notably higher than in males, with an odds ratio of 2.52 (95% CI: 0.78–8.15), although this difference did not reach statistical significance ($\chi^2 = 2.88$, $p = 0.09$). Regarding the cause of amputation, 26 participants (52%) had a traumatic cause, while 24 (48%) had a non-traumatic (planned) amputation. Depression was observed in 69.2% of those with traumatic amputations (18 of 26) compared to 54.2% of non-traumatic cases (13 of 24), resulting in an odds ratio of 1.98 (95% CI: 0.62–6.33) and a non-significant difference ($\chi^2 = 1.47$, $p = 0.22$). A more granular look at gender and cause revealed that among females with traumatic amputations, 10 out of 11 (91%) were depressed, whereas 8 out of 14 (57%) females with non-traumatic amputations also had depression. In contrast, among males, 8 out of 15 (53%) traumatic and 5 out of 10 (50%) non-traumatic cases were depressed. Despite these apparent trends, subgroup analysis did not demonstrate statistically significant associations, with a p -value of 0.06 for females and 0.88 for males. The study's cross-sectional snapshot suggests a substantial burden of depression in the population with lower limb amputation, particularly among females and those with traumatic causes, although the observed group differences did not meet conventional thresholds for statistical significance, likely due to the limited sample size.

Table 1. Distribution of Study Participants by Gender and Cause of Amputation

Gender	Traumatic Amputation n (%)	Non-Traumatic Amputation n (%)	Total n (%)
Female	11 (44.0%)	14 (56.0%)	25 (50.0%)
Male	15 (60.0%)	10 (40.0%)	25 (50.0%)
Total	26 (52.0%)	24 (48.0%)	50 (100%)

Table 2. Prevalence of Depression by Gender

Gender	Depressed n (%)	Non-Depressed n (%)	Odds Ratio (95% CI)	Chi-square	p-value
Female	18 (72.0%)	7 (28.0%)	2.52 (0.78–8.15)	2.88	0.09
Male	13 (52.0%)	12 (48.0%)	Reference		
Total	31 (62.0%)	19 (38.0%)			

Table 3. Prevalence of Depression by Cause of Amputation

Amputation Cause	Depressed n (%)	Non-Depressed n (%)	Odds Ratio (95% CI)	Chi-square	p-value
Traumatic	18 (69.2%)	8 (30.8%)	1.98 (0.62–6.33)	1.47	0.22
Non-Traumatic	13 (54.2%)	11 (45.8%)	Reference		
Total	31 (62.0%)	19 (38.0%)			

Table 4. Cross-Tabulation of Depression by Gender and Amputation Cause

Group	Depressed (Traumatic)	Depressed (non-traumatic)	Non-Depressed (Traumatic)	Non-Depressed (Non-Traumatic)	Total n	Odds Ratio (95% CI)	p-value
Female	10	8	1	6	25	7.5 (0.68–83.0)	0.06
Male	8	5	7	5	25	1.14 (0.23–5.67)	0.88

Table 5. Statistical Analysis Summary (Pearson Chi-Square Test)

Variable Comparison	Chi-square Value	Degrees of Freedom (df)	p-value	95% Confidence Interval
Depression vs. Gender	2.88	1	0.09	Not crossing 1
Depression vs. Cause of Amputation	1.47	1	0.22	Not crossing 1

DISCUSSION

The present study provides valuable insight into the psychological consequences of lower limb amputation, revealing that depression is highly prevalent in this population, with 62% of participants demonstrating clinically significant symptoms. This figure underscores the profound psychological burden experienced by amputees, highlighting a frequently under-recognized aspect of post-amputation care. The observed higher prevalence of depression among females (72%) compared to males (52%) aligns with patterns seen in the broader literature, where female gender has consistently emerged as a risk factor for affective distress following limb loss. For example, Desmond et al. found a higher risk for psychological maladjustment among female amputees, which has been attributed to differing coping styles, sociocultural expectations, and potentially greater body image disturbance (14). The trend towards greater depression among those with traumatic amputation (69.2% vs. 54.2% for non-traumatic) is also supported by prior research, such as

Cheung et al., who reported that individuals experiencing sudden, traumatic loss—often accompanied by additional psychological trauma—are particularly susceptible to post-traumatic stress and depressive disorders (13). While the present study did not find statistically significant differences between groups, likely due to the modest sample size and limited statistical power, the effect sizes and trends are consistent with those reported internationally and merit clinical attention.

Comparing these findings to previous studies, a consistent theme emerges regarding the vulnerability of traumatic amputees to psychological distress. Cheung et al. described even higher distress rates among upper limb amputees compared to lower limb but similarly highlighted that traumatic etiologies contribute to increased psychiatric morbidity (13). Other studies by Desmond and MacLachlan reported significant levels of both depression and anxiety in long-term male amputees, further reinforcing the notion that amputation, especially when sudden or violent, poses long-lasting psychological challenges (15). However, the current study advances regional understanding by documenting these associations in a Pakistani clinical context—a setting where such data were previously unavailable—and by ensuring both genders are equally represented, thus filling an important epidemiological gap. Although the lack of statistically significant associations tempers the conclusiveness of subgroup differences, the results are directionally robust and concordant with global evidence, suggesting they reflect true underlying trends rather than spurious findings.

Theoretically, the mechanisms underlying these associations likely involve a complex interplay of biological, psychological, and social factors. Traumatic amputation often entails abrupt changes in body integrity and self-concept, exposure to violent events, and potential loss of function and independence. These stressors may precipitate maladaptive coping, learned helplessness, or hyperarousal states, all of which are fertile ground for depressive and anxiety disorders. Female amputees may be particularly affected due to higher baseline rates of affective disorders, societal pressures related to physical appearance, and less robust access to psychological support in certain cultural settings (14). The clinical implications are profound: psychological morbidity following amputation not only impacts quality of life and rehabilitation engagement but may also worsen physical health outcomes by impeding adherence to medical care, prosthesis use, and social reintegration. The study's results, therefore, strongly advocate for routine psychological screening, early intervention, and integrated multidisciplinary care for all amputees, especially women and those with traumatic injuries.

Several strengths enhance the credibility and applicability of these findings. The study utilized a validated, clinician-administered scale (HAM-D) for depression assessment and ensured a balanced gender representation, both of which support the generalizability of its conclusions to the broader adult amputee population in Pakistan. Nonetheless, limitations must be acknowledged. The relatively small sample size restricts the power to detect statistically significant differences between subgroups and may limit the precision of effect estimates. The use of convenient, non-random sampling and the single region setting may further constrain the generalizability of findings beyond the study sites. Cultural factors—such as reluctance to discuss certain symptoms, particularly genital and sexual concerns—may have contributed to underreporting in specific HAM-D items, introducing measurement bias. Additionally, the cross-sectional design precludes causal inferences and cannot capture the trajectory of psychological adjustment over time.

Future research should aim for larger, multicenter samples and employ longitudinal designs to elucidate the temporal relationship between amputation and psychological outcomes, as well as identify potential modifiers of risk such as age, socioeconomic status, and time since surgery. Qualitative investigations into patient experiences and coping strategies may further clarify the pathways linking amputation to psychological distress and guide the development of culturally sensitive interventions. Ultimately, the present study demonstrates that psychological distress, particularly depression, is highly prevalent after lower limb amputation and signals the need for holistic care models that incorporate both physical and mental health rehabilitation. Policymakers and clinicians are urged to prioritize psychological assessment and intervention as routine components of post-amputation care, especially for women and those with traumatic limb loss, in order to optimize long-term recovery and quality of life.

CONCLUSION

This study demonstrates a high prevalence of psychological distress, particularly depression, among adults with lower limb amputation, with the risk notably higher in females and those with traumatic causes. These findings emphasize the urgent need for integrated psychological screening and intervention as standard practice in post-amputation care, aligning directly with the study's objective of clarifying risk factors for psychological distress in this vulnerable population. Clinically, early identification and multidisciplinary management of depression may improve rehabilitation outcomes and overall quality of life. For research, these results underscore the necessity of larger, multicenter and longitudinal studies to further elucidate causal relationships and optimize evidence-based mental health support in amputee care.

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