

## Amputation Level and its Effects on Patients Mental and Psychological Health

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### Abstract:

**Background:** Non-traumatic lower limb amputation is a commonly performed surgical procedure and is associated with a high prevalence of psychological morbidity including anxiety and depression. Many risk factors have been identified, including the indication for amputation, perioperative pain and sociodemographic factors.

**Aim:** The aim of this study was to identify whether level of amputation has an impact on this psychological morbidity.

**Methods:** A prospective observational study was conducted in a tertiary hospital including all adult non-traumatic amputations performed during a 6 month period. The Hospital Anxiety and Depression Scale (HADS) was used to score anxiety and depression pre and postoperatively.

**Results:** 50 patients met the inclusion criteria - 23 trans-femoral amputations (AKA) and 27 trans-tibial amputations (BKA). HADS scores for anxiety and depression were high in both groups both pre and post-operatively. A higher level of anxiety was noted in the BKA group, significantly decreasing postoperatively ( $p < 0.05$ ). No other statistically significant differences were found between the two groups.

**Conclusion:** In non-traumatic amputations, there appears to be a higher rate of pre-operative anxiety in patients undergoing trans-tibial amputation compared with trans-femoral amputees. However, the level of amputation does not appear to have a significant effect on psychological status of patients with high rates of depression and anxiety demonstrated in both groups.

**Keywords:** Amputation, Hospital Anxiety And Depression Score for Anxiety, Mental And Psychological Health.

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### Introduction

Lower limb amputation is a commonly performed surgical procedure that is carried out for a variety of clinical reasons including peripheral vascular disease, diabetes, trauma and malignancy. The psychological reaction to the loss of a limb is complex and variable; depression, anxiety, as well as a wide range of other psychological responses are encountered [1]. Measuring the psychological effect of amputation is challenging and a variety of tools are available. The majority of these tools focus on quality of life or depression, such as the Patient Health Questionnaire (PHQ-9) [2]. The Hospital Anxiety and Depression scale (HADS) (Fig. 1), measures both anxiety and depression (HADS-A and HAD-D respectively) using seven questions for either metric and has been validated in multiple patient populations [3].

Through these psychological assessments, it has been demonstrated that there is a high prevalence of psychiatric morbidity existing among lower limb amputees with multiple risk factors identified [2,3].

The indication for amputation is important; higher rates of depression and anxiety demonstrated in patients undergoing surgical amputations compared those for trauma [1]. Postoperative outcomes such as pain also have an effect, with higher post-operative pain resulting in higher rates of depression and anxiety [4]. Socio-demographic factors also have an effect in the psychological adjustment to amputation [5].

There is a paucity of literature examining the effects that the level of lower limb amputation in non-traumatic amputations has on psychological health. Higher rates of anxiety have been demonstrated with traumatic trans-femoral amputations comparative to surgical amputations [4,5]. The aim of this prospective study is to evaluate the impact of amputation level on patients' mental health using the Hospital Anxiety and Depression Scale (HADS).

**Methods**

A prospective observational study was conducted between January 2023 and January 2024 in patients undergoing surgical lower limb amputations at department of Surgery in a tertiary referral centre in Maharashtra. Patients were identified from operating lists and after consent was obtained, patients were recruited into the study. Patients were suitable for inclusion to the study if they were undergoing a major lower limb amputation (trans-femoral or trans-tibial) and this was for a non- traumatic pathology. All traumatic amputations, revisions of amputation and minor amputations including toes or metatarsal amputations were excluded from the study. Patients were also excluded if they were unable to give informed consent or were unable to fill in or

give answers to the questionnaire.

Patient demographics, duration of causative illness, medical co- morbidities and the functional status prior to the surgery was recorded from patient notes and electronic records. Length of hospital stay, discharge destination and readmission were also recorded. Participants were asked to fill in the Hospital Anxiety and Depression Score questionnaire within one week prior to surgery and six to eight weeks postoperatively either in the outpatient clinic or via telephone. The collected data was analyzed using Statistical Package for Social Science Version 25.0. Ethical approval was obtained from Institutional Ethics Committee of Govt Medical College, Gondia.

**Hospital Anxiety and Depression Scale (HADS)**

Tick the box beside the reply that is closest to how you have been feeling in the past week. Don't take too long over your replies: your immediate is best.

D	A		D	A	
		<b>I feel tense or 'wound up':</b>			<b>I feel as if I am slowed down:</b>
	3	Most of the time	3		Nearly all the time
	2	A lot of the time	2		Very often
	1	From time to time, occasionally	1		Sometimes
	0	Not at all	0		Not at all
		<b>I still enjoy the things I used to enjoy:</b>			<b>I get a sort of frightened feeling like 'butterflies' in the stomach:</b>
0		Definitely as much	0		Not at all
1		Not quite so much	1		Occasionally
2		Only a little	2		Quite Often
3		Hardly at all	3		Very Often
		<b>I get a sort of frightened feeling as if something awful is about to happen:</b>			<b>I have lost interest in my appearance:</b>
	3	Very definitely and quite badly	3		Definitely
	2	Yes, but not too badly	2		I don't take as much care as I should
	1	A little, but it doesn't worry me	1		I may not take quite as much care
	0	Not at all	0		I take just as much care as ever
		<b>I can laugh and see the funny side of things:</b>			<b>I feel restless as I have to be on the move:</b>
0		As much as I always could	3		Very much indeed
1		Not quite so much now	2		Quite a lot
2		Definitely not so much now	1		Not very much
3		Not at all	0		Not at all
		<b>Worrying thoughts go through my mind:</b>			<b>I look forward with enjoyment to things:</b>
	3	A great deal of the time	0		As much as I ever did
	2	A lot of the time	1		Rather less than I used to
	1	From time to time, but not too often	2		Definitely less than I used to
	0	Only occasionally	3		Hardly at all
		<b>I feel cheerful:</b>			<b>I get sudden feelings of panic:</b>
3		Not at all	3		Very often indeed
2		Not often	2		Quite often
1		Sometimes	1		Not very often
0		Most of the time	0		Not at all
		<b>I can sit at ease and feel relaxed:</b>			<b>I can enjoy a good book or radio or TV program:</b>
0		Definitely	0		Often
1		Usually	1		Sometimes
2		Not Often	2		Not often
3		Not at all	3		Very seldom

Please check you have answered all the questions

**Scoring:**

Total score: Depression (D) \_\_\_\_\_ Anxiety (A) \_\_\_\_\_  
 0-7 = Normal  
 8-10 = Borderline abnormal (borderline case)  
 11-21 = Abnormal (case)

**Figure 1: HADS scoring questionnaire.**

**Results**

We identified 82 patients, 50 patients met the inclusion criteria; 23 trans-femoral amputations (AKA) and 27 trans-tibial amputations. The duration of causative illness varied widely between patients. Average hospital inpatient stay was long (mean 12.9 days). High rates of perioperative pain were found within the cohort (81.6%). Just over half of the

patients were functionally independent prior to amputation (53.1%) and most were discharged to a rehabilitation facility (67.3%).

Perioperative HADS scores indicated a high degree of both anxiety and depression amongst this cohort, after amputation. Depression scores in HADS-D had less notable change although postoperatively the inverse trend was seen with higher depression scores.

Preoperatively, higher rates of depression were noted in the AKA group comparative to the BKA group but no difference in anxiety although both results were not statistically significant, Post-operatively, there was little change in the AKA group with high rates of anxiety and depression remaining and there was a trend to borderline depression scores

from normal after amputation in the BKA group. In the BKA group there was a statistically significant reduction in anxiety postoperatively ( $p < 0.05$ ) Figs. 2 and 3. Perioperative pain was found to be higher in the BKA group although this was also not statistically significant.

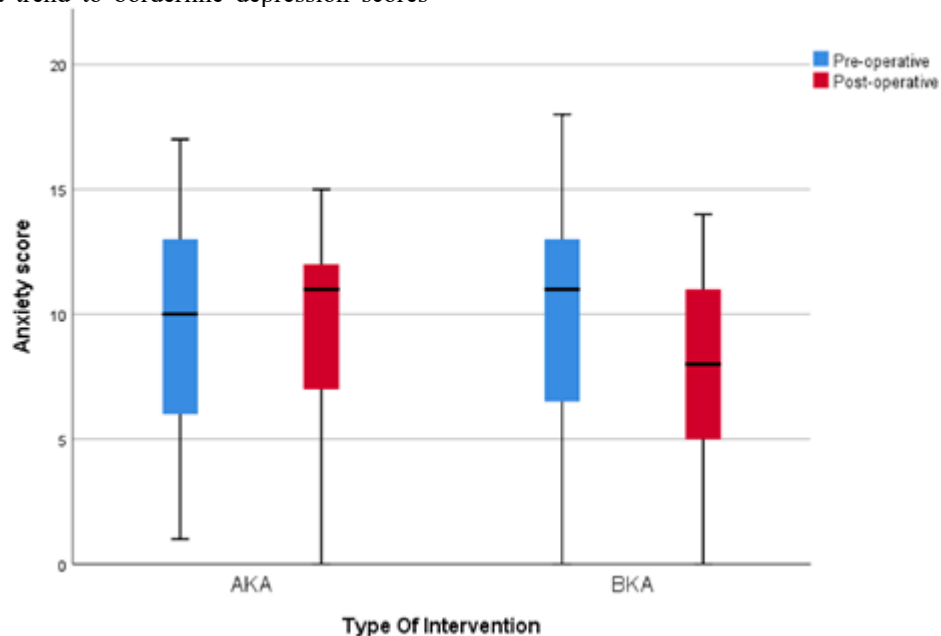


Figure 2: Comparison of the pre-operative and post-operative HADS-A in both groups.

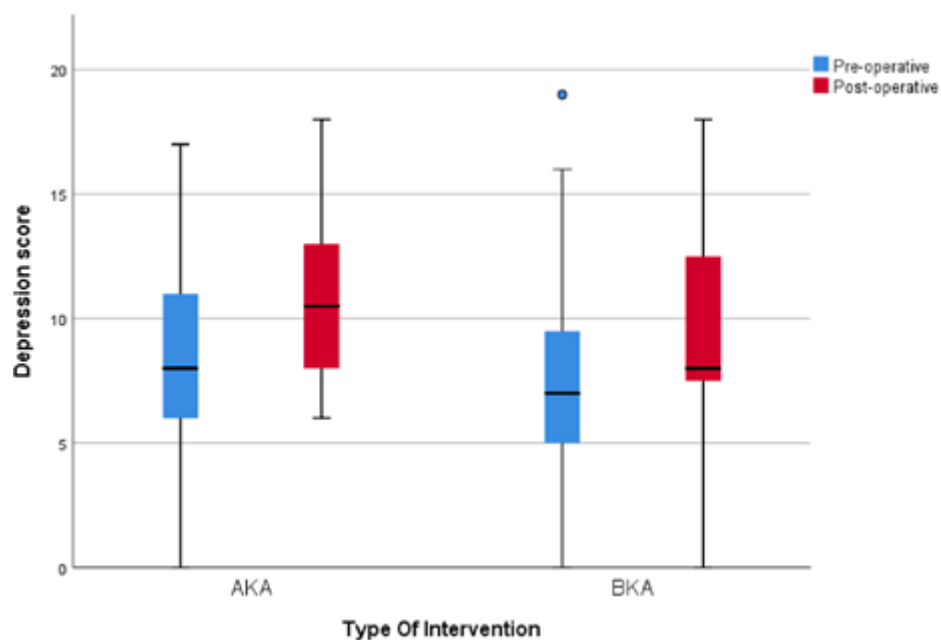


Figure 3: Comparison of the pre-operative and post-operative HADS-D in both groups.

**Discussion**

Our results confirm the high rates of psychological morbidities demonstrated in the literature and that the HADS scoring system is a useful tool in measuring anxiety and depression in this cohort of patients<sup>1-3,5</sup> This study demonstrates high rates of preoperative anxiety in patients undergoing trans-tibial amputations and that this improves after

amputation. This is contrary some of the evidence presented in the literature<sup>7</sup>. The finding may be due to the higher number of expectations among patients for full functionality post amputation. There is still clear improvements to be made in improving the psychological health of amputees however, as the large rates anxiety have been demonstrated not only in this study but also in the

literature<sup>7,8</sup>. The high rates of psychological morbidity seen may also be a result of the high rates of perioperative pain identified within both groups. Pain has been demonstrated to be an important factor in the prevalence of psychological morbidity and quality of life and may explain the overall high HADS scores demonstrated in this study<sup>4</sup>.

Two unusual results were also identified in this study; length of hospital stay and re-admission rate.

Hospital stay was long for many patients and is likely influenced not only by the high co-morbidity burden these patients have but also the lack of community placements and rehabilitation beds in the region. Readmission rates were also exceptionally high compared to that described in the literature<sup>9</sup>. Unfortunately the data for the reason of readmission was not available but is again likely a result of the co-morbid nature of these patients which is supported by high morbidity and mortality rates described in the literature<sup>10</sup>.

The limitations in this study include that it was performed in a single surgical unit and only a small number of patients were identified. The majority of patients were male; although this reflects a trend frequently seen in other studies, it does limit the generalizability of the findings. However despite this small sample, it is clear that a high degree of psychological co-morbidity exists. This remains a challenge given the multitude of factors that affect psychological wellbeing after amputation. A multifactorial approach including appropriate patient counselling, peri-operative pain control and mental health intervention in this population would appear wise; further research is required to determine the efficacy of these interventions.

### Conclusion

In non-traumatic amputations, there appears to be a higher rate of pre-operative anxiety in patients undergoing trans-tibial amputation compared with trans-femoral amputees. However, the level of amputation does not appear to have a significant effect on psychological status of patients with high rates of depression and anxiety demonstrated in both groups.

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