

Living with Amputation: Anxiety and Depression Correlates

SUKRITI BHUTANI¹, JAIKRIT BHUTANI², ANURAG CHHABRA³, RAJESH UPPAL⁴

ABSTRACT

Introduction: Trauma accounts for 16% of the total burden of disease in the world, making it a leading cause of morbidity and mortality especially in the developing nations. India represents about 10% (225million) of the total world workforce in agriculture. With the evolution of new machinery and better techniques of agriculture, there has been a substantial increase in the associated injuries. Depression, anxiety and post-traumatic stress are among the predictors of poor quality of life (QOL).

Aim: This study was aimed to assess and correlate of traumatic amputation on the patient's mental health in the Northern Indian rural setting.

Materials and Methods: This cross-sectional study included subjects who had undergone traumatic amputations. A pre-tested, semi-structured questionnaire was administered to each study participant after an informed verbal consent. The

questionnaire had two parts. The first part gathered socio-personal and the disability related information from the patient and the second part included a Hospital Anxiety and Depression Scale (HADS).

Results: The mean anxiety and depression scores were 9.10 ± 5.7 and 3.44 ± 3.42 , respectively. The length of original inpatient stay, people at hand for help, number of hospitalizations, number of follow ups per year, type of family (nuclear versus joint), pain perception, optimism, rehabilitation satisfaction and lower limb amputations correlated significantly with anxiety levels in the patients. The depression levels correlated significantly only with perception of pain.

Conclusion: The amputees have a large number of psychosocial concerns which need to be addressed to provide a holistic care and a better QOL. It is essential to sensitize the community, the health care providers and the patient's family to the additional psychosocial needs of the amputee.

Keywords: Amputees, Psychosocial health, Orthopaedics, Trauma

INTRODUCTION

Trauma accounts for 16% of the total burden of disease in the world [1,2], making it a leading cause of morbidity and mortality especially in the developing nations. Road traffic accidents alone are the second leading cause of death in young adults, second only to HIV/AIDS [3]. It is estimated that the various forms of injury combined account for 12% of the disability adjusted life years lost world-wide [4]. Trauma is the largest contributor to the world's burden of disability and causes loss of more Disability-Adjusted Life Years than any other disorder [5].

India represents about 10% (225million) of the total world workforce in agriculture [6]. With the evolution of new machinery and better techniques of agriculture, there has been a substantial increase in the self-sufficiency of the farmers. Simultaneously introduction of machinery is hazardous and is associated with injuries due to absence of proper handling, training and the type of machinery used. Farming being an unorganized sector, there is an absence of data on this which could be useful to quantify the health and safety, and economic consequences [6]. Importantly, most of the fatal accidents resulted from the powered machinery and the hand tools related injuries were non-fatal in nature. Traumatic limb amputation leads to higher levels of anxiety, depression [7] and emotional stress [8] in the individual. Adaptation to this event encounters a large number of physical changes such as impairments in physical functioning [9], prosthesis use, pain, changes in employment status or occupation and alterations in body image [10]. This can precipitate other compounding psychosocial factors such as lack of social acceptance [11], relationship breakdown, alcohol dependence and drug abuse. Depression, anxiety and post-traumatic stress are among the predictors of poor long-term

Quality of Life (QOL) and reliance on pain medication [12]. The impact of all these on the life of the patient and the caregivers is important for treatment, rehabilitation and social care services [13]. It has also been linked to the development of health service designs and allocation of adequate funds and resources [14]. Each person has his own method of dealing with this loss and it has been shown that hoping for a better outcome and social support play an important role in positive adjustment [15].

There is a need for early evidence based knowledge of the short and long-term outcomes of these disorders for adequate planning and delivery of healthcare services. The addressal of these changes should be done in concordance with the treatment for the physical condition [16]. There have been studies to assess the psychosocial impacts of amputations in the Indian scenario but still there are many questions left unanswered in understanding the various aspects influencing rehabilitation [17].

Thus, this study was planned to assess the impact and correlates of traumatic amputation on the patient's mental health in the North Indian rural setting.

MATERIALS AND METHODS

This cross-sectional study was initially approved as a Short Term Studentship project by the Indian Council of Medical Research (ICMR) and later was carried out under the Department of Orthopaedics, Maharaja Agarsen Institute for Medical Research and Education, Agroha, Hissar - 123001, Haryana, India.

The participants for the study were obtained from the daily outpatient Department of Orthopaedics. Fifty subjects who had undergone traumatic amputations were included in the study over a span of three months. Amputees who had undergone an

amputation due to surgical, vascular, systemic or any other cause were excluded. A pre-tested, semi-structured questionnaire was administered to each study participant after an informed verbal consent. The questionnaire had two parts. The first part gathered socio-personal and the disability related information from the patient and was filled by the interviewer. The second part included a validated questionnaire, Hospital Anxiety and Depression Scale (HADS) [18] which was administered in vernacular language (Hindi) and was filled by the patient themselves (for illiterate patients, the interviewer assisted in completing the questionnaire). It assessed anxiety and depression among patients. This scale has been shown to provide satisfactory results in orthopaedic trauma patients [19]. The data was collected, entered and analysed using SPSS Version 19.0. For all the tests performed, results were considered statistically significant for $p < 0.05$.

RESULTS

Fifty subjects participated in this study. All of them were males. The maximum age of the cohort was 70 years while the minimum was 14 years with the mean age of 39.10 ± 11.90 years. In these subjects, 29 had lower limb amputations while 21 had upper limb amputations. Of these, mere 7 were prosthetic users. The overall mean anxiety and depression scores [Table/Fig-1] were 9.10 ± 5.7 and 3.44 ± 3.42 , respectively where the maximum score from the questionnaire was 21 for anxiety and depression.

The numbers of follow-up visits each year of each subject were ascertained and the mean number was 3.14 ± 7.21 . Each subject was hospitalised thrice on an average for complications since amputation. On an average, each amputee had 4 people at hand to look after his needs. The mean value for the total duration since amputation for the entire group was 34.30 ± 54.21 months. The maximum time since amputation recorded in this group was 20 years and the minimum was 6 days.

It was found that levels of anxiety and depression in the individuals were unrelated to their age. A significant inverse correlation was found between time since amputation and depression score ($p=0.043$), however, it did not correlate significantly with anxiety scores, ($p=0.473$). The length of hospital stay at the time of amputation correlated significantly with the anxiety scores ($p=0.013$, $R=0.348$) but not with the depression scores. ($p=0.350$, $R= -0.135$). The higher total number of helpers at hand negatively impacted the anxiety score ($p=0.033$, $R=-.302$) but not the depression score ($p=0.695$, $R=-0.057$).

The amputees with higher total number of hospitalizations or follow up visits post amputation were found to be more anxious ($p=0.047$, $R=0.283$); ($p=0.040$, $R=0.291$) respectively, but this was unrelated to the depression scores ($p=0.672$, $R=-0.061$); ($p=0.394$, $R=-0.123$). The persons residing in nuclear families were found to be significantly more anxious ($p=0.011$ $R=2.662$) than depressed ($p=0.849$ $R=-0.191$).

The only variable which had significant correlation with both anxiety and depression scores was presence of pain ($p=0.005$ $R=2.909$, $p=0.031$ $R=2.221$). It was also clearly observed that optimistic amputees were significantly less anxious ($p=0.001$ $R=-3.689$), but this had no significant effect on their depression scores ($p=0.160$ $R=-1.427$).

Satisfaction regarding the rehabilitation services and the level of acceptance by the society had significant effect on the anxiety scores with significantly less anxiety in satisfied subjects ($p=0.023$,

Patient Profile	Anxiety Score	Depression Score
Upper Limb Amputees	10.59 ± 5.7	2.97 ± 3.13
Lower Limb Amputees	7.07 ± 5.08	4.10 ± 3.77
Overall	9.10 ± 5.7	3.44 ± 3.42

[Table/Fig-1]: Anxiety and depression scores of amputees.

$R=-2.349$). However, no significant correlation was elicited with depression scores ($p=0.268$, $R=-1.121$). The people with lower limb amputations were more anxious ($p=0.029$, $R=-2.256$) than those with upper limb amputations. No such correlation was observed with the depression scores ($p= 0.254$, $R=1.156$).

The effect of personal and socio-economic variables on psychological health of amputees was also assessed. They were classified into two income groups (less than 5000 rupees and 5000-10000 rupees per month), four education level groups (illiterate, less than matriculation, matriculation, and senior secondary education), three marital status groups (single, married or widower), occupation into four groups (farmer, labourer, mason, or a job) and presence of an addiction into four groups (alcohol, smoking, tobacco and two or more) for convenience of analysis. There were no significant differences of anxiety and depression scores within two income groups ($p = 0.134$, $t=1.524$ for anxiety score, and $p=0.909$, $t=-0.115$ for depression scores), however, subjects with higher income had less mean scores. Similarly, analysis for educational level, marital status, occupation and addiction revealed no significant results with anxiety and depression scores. These factors have been summarized in [Table/Fig-2].

Variable	Anxiety Score		Depression Score	
	R-value	p-value	R-value	p-value
Original inpatient stay	0.348	0.013	-0.135	0.350
People at hand	-0.302	0.033	-0.057	0.695
Number of Hospitalizations	0.283	0.047	-0.061	0.672
Follow-up per year	0.291	0.040	-0.123	0.394
Nuclear families	2.662	0.011	-0.191	0.849
Pain perception	2.909	0.005	2.221	0.031
Optimistic personality	-3.689	0.001	-1.427	0.160
Rehabilitation satisfaction	-2.349	0.023	-1.121	0.268
Lower limb amputations	-2.256	0.029	1.156	0.254
Educational Level	1.277	0.267	0.525	0.862
Occupation	1.562	0.135	0.981	0.475
Income	0.134	1.524	0.909	-0.115
Marital Status	0.461	0.953	1.358	0.236
Presence of an addiction	0.906	0.574	1.659	0.126

[Table/Fig-2]: Correlations of different parameters with anxiety and depression scores. Value in bold are significant

DISCUSSION

Limb amputation is a life changing event with social, mental, psychological and spiritual sequelae [20]. These concerns stem from their inability to perform daily activities, remain independent and support their families [21]. Individuals facing disability often seek to find meaning and higher purpose in their disability and try to rationalize the incidence [22]. The QOL of a person who has undergone amputation is determined by the psychological effects of the event [23]. Also, the World Health Organization has described QoL to be affected by physical, psychological, personal, social, environmental and spiritual factors [24]. Particularly North India, has a large amputation rates due to farm instrument related injuries [25]. Threshers, farm animals and snake bites are the commonest cause of farm injuries in India [26]. During the harvesting season unskilled labourers and family members (including children and adolescents) who have no experience of working on farm machinery also help in the threshing process. These are the ones who are more prone to farming injuries and amputations. Lack of education and training amongst the farmers and labourers predisposes them to the hazards of mechanical harvesting and makes them increasingly susceptible to injury and amputations [27].

There have been studies conducted in the past with unequivocal results to show that age of the amputee affected his/her

psychosocial concern status. While some have shown that older amputees had lesser concerns [28], some others have failed to document this [29]. In our study too, no such correlation could be obtained. Despite this, it was seen that older people had lower anxiety and depression scores as compared to their younger counterparts. This may be because of the reason that older amputees have lower expectations and demands and are less likely to have emotional upset.

Contradictory to the previous data [30], the amputees in this cohort had decreased incidence of depression as the amputation became more remote in time. Since they had a longer time to adjust with their prosthesis and other issues, they were less depressed but equally anxious for the quality of their life. This clearly is in accordance to the common theories of adjustment, which state that a negative affective response to loss is most likely immediately after that loss and gradually a better adaptation develops [31]. Some studies have also shown earlier that the longer duration since amputation lead to decreased psychiatric symptoms in general [32], but in our study, this correlation could only be obtained for depression scores and not anxiety scores.

Most of the subjects interviewed were either illiterate or poorly educated. This leads to lack of information about their farm instruments and also their amputated limbs. Our study, in accordance to previous studies, has clearly shown the correlation of the anxiety and depression scores with the level of education [28,33]. The illiterate had more concerns regarding their amputations.

Previously the occupational differences with respect to amputation have been well researched. The influence of workplace and its resources, work practices and worker characteristics and the mental state of the worker on the occurrence and effects of amputation has been described in detail [34,35]. Our study, did consider the occupation of the subjects in the statistical analysis, assessing its effect on the anxiety and depression scores, however, no significant correlation was found. Substance abuse has also been documented in traumatic amputees both before the occurrence of the event and later complicating the adaptation to the limb loss [36]. Similarly, in our study we assessed for outcome differences based on presence of an addiction in amputees, but no significant correlation was seen. There have not been any specific studies to demonstrate the effect of income of the subject on his adaptation to the disability; in our study too, no significant correlation existed between income and anxiety/depression scores.

We also observed that the people who had to spend longer duration of time initially in the hospital at the time of their amputation were more anxious about the outcome of it. It might be due to the fact that people who had more serious trauma needed to be hospitalized longer. This observation made is similar to observations regarding positive effect of social support on clinical outcome of amputation made in previous studies [37].

Furthermore, the course of amputation rehabilitation is complicated by the likelihood of developing a chronic limb pain or chronic phantom pain [38,39]. In our study, almost all the subjects had experienced an episode of pain or were in a state of chronic pain after amputation. Amongst all subjects, pain has been shown to breed negative outcomes - poor adjustment with life, anxiety disorder, substantial decrease in QOL, maladjustment with prosthesis and activity restriction. It was observed that presence of chronic pain or phantom pain was a significant correlate for both anxiety and depression score. This illuminates the fact that presence of pain is a major stumbling block in the rehabilitation of the amputee [40,41].

The incidence of anxiety and depression post-amputation has been repeatedly described [16] but in this study, it was observed that the incidence of anxiety was higher than the incidence of

depression. The only way to combat this depressive outlook is to provide appropriate rehabilitation and alternate methods of employment for the disabled so that they can earn their living with respect [42].

LIMITATION

There were certain limitations to this study. Due to time constraints, we were able to interview only a small sample of amputees thus inadequately assessing the magnitude of prevalent anxiety and depression. Our study population comprised of traumatic amputees, while those due to vascular causes were excluded. Also, there were no females in the study group, thus the reported results may be disproportionate. Additionally, due to resource limitations, we could not ascertain the effect of intervention on patient's mental health due to inability to follow up.

CONCLUSION

Thus, the amputees have a large number of psychosocial concerns which need to be addressed to provide a holistic care and a better QOL. The affected, which were optimistic, had more social support, had a pain free life and had to visit hospitals less were significantly less anxious than their counterparts.

It is essential to sensitize the community, the health care providers and the patient's family to the additional psychosocial needs of the amputee. Measures need to be taken to provide proper education and counseling of such patients. Provisions should be made to provide prostheses, counsel the amputees and to provide adequate physiotherapy and multidisciplinary pain relief to make the rehabilitation easier.

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REFERENCES

- [1] Mock C, Goosen J, Joshipura M, Peden M. Guidelines for essential trauma care. *World Health Organisation*. 2004.
- [2] Melcer T, Walker GJ, Galarnau M, Belnap B, Konoske P. Midterm health and personnel outcomes of recent combat amputees. *Mil Med*. 2010;175(3):147-54.
- [3] Krug EG, Sharma GK, Lozano R. The global burden of injuries. *Am J Public Health*. 2000;90(4):523-26.
- [4] Joshipura M, Mock C, Goosen J, Peden M. Essential trauma care: strengthening trauma systems round the world. *Injury*. 2004;35(9):841-45.
- [5] Gore FM, Bloem PJ, Patton GC, Ferguson J, Joseph V, Coffey C, et al. Global burden of disease in young people aged 10-24 years: a systematic analysis. *Lancet*. 2011;377(9783):2093-3102.
- [6] Nag PK, Nag A. Drudgery, accidents and injuries in Indian agriculture. *Ind Health*. 2004;42(2):149-62.
- [7] Becher S, Smith M, Ziran B. Orthopaedic trauma patients and depression: a prospective cohort. *J Orthop Trauma*. 2014;28(10):e242-46.
- [8] Vranceanu AM, Bachoura A, Weening A, Vrahas M, Smith RM, Ring D. Psychological factors predict disability and pain intensity after skeletal trauma. *J Bone Joint Surg Am*. 2014;96(3):e20.
- [9] Geertzen JH, Martina JD, Rietman HS. Lower limb amputation. Part 2: Rehabilitation--a 10 year literature review. *Prosthet Orthot Int*. 2001;25(1):14-20.
- [10] Desmond D, MacLachlan M. Psychosocial perspectives on post-amputation rehabilitation: a review of disease, trauma and war related literature. *Crit Rev Phys Rehabil Med*. 2004:77-93.
- [11] Munin MC, Espejo-De Guzman MC, Boninger ML, Fitzgerald SG, Penrod LE, Singh J. Predictive factors for successful early prosthetic ambulation among lower-limb amputees. *J Rehabil Res Dev*. 2001;38(4):379-84.
- [12] Helmerhorst GT, Vranceanu AM, Vrahas M, Smith M, Ring D. Risk factors for continued opioid use one to two months after surgery for musculoskeletal trauma. *J Bone Joint Surg Am*. 2014;96(6):495-99.
- [13] Khan F, Amatya B, Hoffman K. Systematic review of multidisciplinary rehabilitation in patients with multiple trauma. *Br J Surg*. 2012;99 Suppl 1:88-96.
- [14] Steffox HT, Boyd JM, Straus SE, Gagliardi AR. Developing a patient and family-centred approach for measuring the quality of injury care: a study protocol. *BMC Health Serv Res*. 2013;13:31.
- [15] Unwin J, Kacperek L, Clarke C. A prospective study of positive adjustment to lower limb amputation. *Clin Rehabil*. 2009;23(11):1044-50.
- [16] McKechnie PS, John A. Anxiety and depression following traumatic limb amputation: A systematic review. *Injury*. 2014;45(12):1859-66.

- [17] Srivastava K, Chaudhury S. Rehabilitation after amputation: psychotherapeutic intervention module in Indian scenario. *Scientific World Journal*. 2014;2014:469385.
- [18] Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand*. 1983;67(6):361-70.
- [19] Hung M, Bounsanga J, Tang P, Chen W, Cheng C. The factor structure of the hospital anxiety and depression scale in orthopaedic trauma patients. *Journal of Clinical Medicine Research*. 2015;7(6):453-59.
- [20] Horgan O, MacLachlan M. Psychosocial adjustment to lower-limb amputation: a review. *Disabil Rehabil*. 2004;26(14-15):837-50.
- [21] Bosmans JC, Suurmeijer TP, Hulsink M, van der Schans CP, Geertzen JH, Dijkstra PU. Amputation, phantom pain and subjective well-being: a qualitative study. *Int J Rehabil Res*. 2007;30(1):1-8.
- [22] Boswell B HM, Knight S, Glacoff M, McChesney J. Dance of spirituality and disability. *J Rehabil*. 2007;73(4):33-40.
- [23] O'Donnell ML, Creamer M, Elliott P, Atkin C, Kossmann T. Determinants of quality of life and role-related disability after injury: impact of acute psychological responses. *J Trauma*. 2005;59(6):1328-34; discussion 34-35.
- [24] Group. WHOQoLW. The World Health Organization Quality of Life assessment (WHOQOL): position paper from the World Health Organization. *Soc Sci Med*. 1995;41(10):1403-09.
- [25] Kumar A, Singh JK, Singh C. Prevention of chaff cutter injuries in rural India. *Int J Inj Contr Saf Promot*. 2013;20(1):59-67.
- [26] Tiwari PS, Gite LP, Dubey AK, LS K. Agricultural injuries in central India: nature, magnitude and economic impact. *J Agric Saf Health*. 2002;8(1):95-111.
- [27] Singh R, Sharma A, Jain S, Sharma S, Magu N. Wheat thresher agricultural injuries: a by-product of mechanised farming. *Asia-Pacific Journal of Public Health*. 2005;17(1):36-39.
- [28] Peirano AH, Franz RW. Spirituality and quality of life in limb amputees. *Int J Angiol*. 2012;21(1):47-52.
- [29] Singh R, Ripley D, Pentland B, Todd I, Hunter J, Hutton L, et al. Depression and anxiety symptoms after lower limb amputation: the rise and fall. *Clin Rehabil*. 2009;23(3):281-86.
- [30] Rybarczyk B, Edwards R, Behel J. Diversity in adjustment to a leg amputation: case illustrations of common themes. *Disabil Rehabil*. 2004;26(14-15):944-53.
- [31] Horowitz MJ. Stress response syndromes: PTSD, grief, and adjustment disorders: Jason Aronson; 1997.
- [32] Durmus D, Safaz I, Adiguzel E, Uran A, Sarisoy G, Goktepe AS, et al. The relationship between prosthesis use, phantom pain and psychiatric symptoms in male traumatic limb amputees. *Compr Psychiatry*. 2014.
- [33] Dajpratham P, Tantiriramai S, Lukkanapichonchut P. Health related quality of life among the Thai people with unilateral lower limb amputation. *J Med Assoc Thai*. 2011;94(2):250-55.
- [34] Nag PK, Patel VG. Work accidents among shiftworkers in industry. *International Journal of Industrial Ergonomics*. 1998;21(3-4):275-81.
- [35] Kelsh MA, Sahl JD. Sex differences in work-related injury rates among electric utility workers. *Am J Epidemiol*. 1996;143(10):1050-58.
- [36] Perkins ZB, De'Ath HD, Sharp G, Tai NRM. Factors affecting outcome after traumatic limb amputation. *British Journal of Surgery*. 2012;99(S1):75-86.
- [37] Williams RM, Ehde DM, Smith DG, Czerniecki JM, Hoffman AJ, Robinson LR. A two-year longitudinal study of social support following amputation. *Disabil Rehabil*. 2004;26(14-15):862-74.
- [38] Morey TE, Giannoni J, Duncan E, Scarborough MT, Enneking FK. Nerve sheath catheter analgesia after amputation. *Clin Orthop Relat Res*. 2002(397):281-89.
- [39] Middleton C. The causes and treatments of phantom limb pain. *Nurs Times*. 2003;99(35):30-33.
- [40] Desmond D, Gallagher P, Henderson-Slater D, Chatfield R. Pain and psychosocial adjustment to lower limb amputation amongst prosthesis users. *Prosthet Orthot Int*. 2008;32(2):244-52.
- [41] van der Schans CP, Geertzen JH, Schoppen T, Dijkstra PU. Phantom pain and health-related quality of life in lower limb amputees. *J Pain Symptom Manage*. 2002;24(4):429-36.
- [42] Burger H, Marinček C. Return to work after lower limb amputation. *Disabil Rehabil*. 2007;29(17):1323-29.

PARTICULARS OF CONTRIBUTORS:

1. Medical Officer, Maharaja Agrasen Medical College, Agroha, Haryana, India.
2. Medical Officer, Pt. B.D. Sharma PGIMS, Rohtak, Haryana, India.
3. Professor and Head, Department of Orthopaedics, Maharaja Agrasen Medical College, Agroha, Haryana, India.
4. Former Member Secretary, Ethical Committee, Maharaja Agrasen Medical College, Agroha, Haryana, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Jaikrit Bhutani,
Medical Officer, Pt. B.D. Sharma PGIMS, Rohtak, Haryana, India.
E-mail: Sukjai2002@gmail.com

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