A Study of Psychological Correlates after Amputation

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Abstract

Background: Amputation of a limb affects almost all aspects of an individual's life. Psychological aspects are important factors for adjustment with the disability.

Methods: The present study was carried out on 50 consecutive male patients admitted to the Artificial Limb Centre. Base line and post therapy psychological assessment was carried out on Hospital Anxiety and Depression Scale (HADS). Trauma Symptom Inventory (TSI) was administered along with Millon Index of personality styles (MIPS). Psychological intervention was given to them on a therapy module proposed by authors. Data was analyzed with the help of SPSS.

Result: Findings revealed significant differences in scores on HADS, before and after therapy ($p < 0.05$). On Trauma symptom Inventory defensive avoidance and depression were noted to be above cut off level of (> 65). Predominant personality styles were self indulgence and internally focused in motivating styles (mean prevalence score < 50) and thought guided in thinking styles, dominating and controlling in behaving styles. The analysis of prevalence score of above 50 and less than 50 indicated Confident/Asserting (9B), Submissive / Yielding (11A), having significant change after therapy on score of anxiety ($P < 0.05$). The personality dimension of dutiful and conforming had shown significant influence after therapy ($P < 0.05$) on score of depression.

Conclusion: The findings indicated psychological assessment and intervention is to be included as a part of the management after amputation.

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Introduction

Psychological state of the individual is equally important in understanding the total well being of the patients. Early recognition and treatment of psychological morbidity seems to be important in preventing long-term disabilities in an amputee. Perception by amputees of their bodies and the relationship between this perception and their psychological well- being have evoked keen interest among researchers. According to Kolb [1], an alteration in an individual's body image sets up a series of emotional, perceptual and psychological reactions. Studies have reported depression being prevalent after amputation [2,3].

Psychological reactions in patients with lower-extremity amputations are studied by using psychometric tests. Minnesota Multi-phasic Personality Inventory and Beck Depression Inventory were analyzed in a group of 20 examinees treated at the Medical Rehabilitation Clinic. Findings revealed that 55% of patients presented with maladaptive responses. The registered psychopathological symptoms included reaction to

stressful events and adjustment disorder (predominantly affecting other emotions; mixed disorder of conduct and emotions; prolonged depressive reaction) and dysthymia [4-6]. Thorough evaluation of psychiatric and emotional sequel of amputation helps in improving psychological intervention after amputation. The study carried out in the rehabilitation unit on the prevalence of PTSD and other psychiatric disorders after surgical, therapeutic amputation, found experience of multiple traumas being associated with greater post-traumatic symptomatology than single traumas [7]. Few studies have evaluated the psychosocial factors in amputees, moreover personality correlates have not been evaluated by these studies. Personality correlates do play an important role in adjustment. Certain personality parameters have been studied and authors found individuals who are narcissistically invested in their physical appearance and power tend to react negatively to the loss of the limb. They see it as a major assault upon their dignity and self-worth. Conversely, dependent individuals may cherish the sick role and find in it welcome relief from pressure and responsibility [8]. Timid and self-conscious individuals who are excessively concerned about their

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social standing are more likely to suffer psychologically from limb loss than are self-assured individuals [9,10].

Although Kolb and Brodie report that rigid personality style may predispose to a greater incidence of postoperative complications, including phantom pain, the recent literature review of Sherman et al [11] indicates no relationship between such a personality and phantom pain. Those tending toward a pessimistic or paranoid outlook are likely to find their worst expectations confirmed and their rehabilitation may be colored by much bitterness and resentment [12].

Psychological intervention is indicated for individuals who suffer difficulty in any of the stages previously described and who are unable to resume a normal existence that otherwise should be possible for them. There are those individuals who may continue to mourn the loss of their limb for a long time. Vivid flashbacks have been reported as among the most common early reactions to amputation [13]. Occasionally, family therapy may be indicated to assist in reaching the proper balance between the legitimate support amputees need and the independence that they must regain. These psychiatric challenges can be addressed therapeutically on their own merit, without the necessity of determining the degree to which they are related to the amputation.

There is a paucity of information in the domain of psychological correlates and assessment of trauma in cases after amputation especially associated with personality parameters styles in Indian setting. The study aims to evaluate the personality styles, psychological sequel of traumatic events and distress after amputation and outcome of psychological management in these cases. It will further help in understanding the influence of these factors in the management after amputation.

Material and Methods

The study was a Hospital based prospective pre- and post-treatment study. Sample for the study comprised of 50 consecutive adult male amputees who underwent amputation in the past one year to the time of study. They were selected after applying exclusion criteria ie patients who didn't want to participate in the study after being explained about the nature and purpose of the study and patients with past history of psychiatric disorders and associated physical disabilities other than amputation.

Those having psychiatric morbidity during the period of study were treated. Sample for the study comprised of both upper and lower limb amputees of Artificial Limb Centre, Pune. Patients with associated physical disabilities other than amputation were excluded from the study. Informed consent was taken from them.

They were interviewed individually and especially designed performa was administered by a trained mental health professional, to elicit data on socio-demographic factors.

Psychiatrist carried out physical examination and mental status examination of the subjects. Following psychological tests were administered individually.

i. Trauma Symptom Inventory [14]

The Trauma Symptom Inventory (TSI) is a 100-item test of post-traumatic stress and other psychological sequel of traumatic events. It is intended for use in the evaluation of acute and chronic traumatic symptomatology, including physical assault, combat, major accidents and natural disasters. The TSI contains 3 validity scales and 10 clinical scales. The TSI can be administered in individual or group setting. Higher raw and T scores indicate greater degrees of symptomatology. T scores 65 and above are considered clinically significant. For validity indicators cut off is taken as 70.

ii. Millon Index of Personality Style [15]

The Millon Index of Personality Styles (MIPS) is a 180 item true and false questionnaire designed to measure personality styles of normally functioning adults between the ages of 16 and 85 years. There are 24 scales grouped into 12 pairs. Three pairs of motivating styles scales assess the person's disposition towards dealing with the environment.

Five pairs of behaving styles assess the person's style of relating with others. Four pairs of thinking styles examine in which the information is processed. The position on particular dimension is categorized based on the prevalence score (PS). The reference point of interpretation is PS 50. An individual scoring at or above PS 50, on any scale is classified as belonging to the trait group measured by that scale. The higher the person scores on that more of the trait he or she possesses. For the purpose of analysis scores below and above 50 PS were taken. Influence of traits on anxiety and depression was assessed in pre-therapy and post-therapy condition.

iii. Hospital Anxiety and Depression Scale (HADS) [16]

The HADS was developed as a self-report questionnaire to detect adverse anxiety and depressive states. Subjects are asked to choose one response from the four given. The questions relating to anxiety are marked 'A' and to depression 'D'. It has 14 items, 7 related to anxiety and 7 to depression. Scoring is from 0-3 and score ranges from 0-56. The norms give an idea of the level of anxiety and depression.

After psychological assessment was completed, psychological management was carried out. Psychological therapy was given over a period of one month. The therapeutic module was on the parameters of brief psychological intervention followed in stages as reassurance, ventilation, acceptance of self and therapeutic milieu. The intervention was completed with these sessions. The frequency was twice a week for one month duration. The brief intervention approach was followed. Those requiring pharmacotherapy were few in number [4] and were treated by psychiatrist. Post treatment effect was assessed on psychological tests. Data so generated was analyzed with appropriate statistical methods.

Results

Mean age of the subjects was 27.68 years, all of them were males, majority of them hailed from rural background and 74% of them were married (Tables 1,2). Upper limb amputation was noted in 18% of cases (Table 3). Mine blast injuries in lower limb were noted in most cases (56%) followed by accident (18%) (Table 4). The patients were from the younger group (mean age 27 years) and were deployed in counter insurgency areas, hence the percentage of patients with mine blast injuries is high. 52% of the cases had reported within six months of amputation (Table 5). 82% of the soldiers had lower limb amputation. Upper limb amputation was noted in 18% of the cases. There was a significant difference on scores of depression and anxiety before and after therapy

Table 1
Family background

Category	Sub-category	Frequency (n=50)	Percentage
Background	Rural	45	90
	Urban	5	10
Religion	Hindu	36	72
	Muslim	2	4
	Sikh	10	20
	Christian	2	4
Trade	Driver	5	10
	GD	38	76
	Operator	2	4
	SWR	5	10
Age	Mean (SD) 27.68 (6.83)		

Majority of the patients hail from rural background and are Hindu, further 76% of them are General Duty soldiers.

Table 2
Marital status

Marital Status	No	Percentage
Married	37	74%
Unmarried	13	26%

74% of them are married, where as only 26% are unmarried in the study group.

Table 3
Type of amputation

	Frequency (n=50)	Percentage
Upper limb amputation		
Through wrist	0	0
Below elbow	9	18
Above elbow	0	0
Through shoulder	0	0
Lower limb amputation		
Below knee	24	48
Above knee	6	12
Around knee	0	0
Around ankle	4	8
Through hip	7	14
Total	50	100

82% of the soldiers had lower limb amputation upper limb amputation is noted in 18% of the cases.

($p < 0.05$) (Table 6). The mean prevalence scores on Millon Index of personality styles found in the group of motivating styles, passively accommodating (2B) self and indulging styles (3A) to be prevalent (Table 7). Thought guided (6B) and feeling guided are the other patterns prevalent in the thinking style. Among the behaving styles most prevalent is anxious /hesitating (9A), unconventional dissenting and dominant /controlling (11B) (prevalence score > 50). On Trauma Symptom Inventory the mean scores of RL determined the validity of the response pattern as it is below the cutoff of 70 (Table 8). Atypical responding is also not noted above the cut off of 70. The cut off is different for validity indicators, whereas separate cut off is used for clinical interpretation. However, marginal elevation is noted on scales of defensive avoidance, dissociation, intrusive experiences and depression. The data was analyzed for the influence of personality variable vis a vis findings of hospital anxiety depression scale. Scores were divided in the two category ie less than 50 prevalence score and more than 50 prevalence score as this is suggestive of more of that trait on that dimension. Findings revealed Confident/Asserting (9B), Submissive /Yielding (11A), having significant change after therapy on scale of anxiety ($p < 0.05$) (Table 9). The personality dimension of dutiful

Table 4
Causes of amputation

	Frequency (n=50)	Percentage
Disease	2	4
Accident	18	36
Frost-Bite	2	4
Mine Blast	28	56
Total	50	100

56% of the cases had to undergo amputation because of mine blast injuries remaining were distributed among accident cases and disease

Table 5
Duration of amputation

Age (months)	Frequency (n=50)	Percentage
3 months	4	8
6 months	26	52
12 months	18	36
> 12 months	2	4
Total	50	100

52% of the cases had reported within six months of amputation.

Table 6
Hospital anxiety depression scale

Scores	Mean	n	SD	Significance
Depression scores before therapy	8.92	50	3.244	$< .001$
Depression scores after therapy	3.82	50	1.320	
Anxiety scores before therapy	7.58 (SD=3.22)	50	3.22	$< .0.05$
Anxiety scores after therapy	4.48 (SD=1.31)	50	1.31	

Table 7**Millon index of personality styles**

Categories	Sub-categories	Prevalence scores mean
Motivating styles	Pleasure-enhancing (1A)	54.04
	Pain-avoiding (1B)	54.24
	Actively modifying (2A)	55.66
	Passively accommodating (2B)	66.28
	Self-indulging (3A)	72.1
	Other-nurturing (3B)	43.84
Thinking styles	Externally focused (4A)	44.46
	Internally focused (4B)	72.64
	Realistic/sensing (5A)	60.92
	Imaginative/intuiting (5B)	62.18
	Thought-guided (6A)	74.3
	Feeling-guided (6B)	60.76
Behaving styles	Conservation-seeking (7A)	41.98
	Innovation-seeking (7B)	49.76
	Asocial/withdrawing (8A)	61.08
	Gregarious/outgoing (8B)	49.66
	Anxious/hesitating (9A)	63.56
	Confident/asserting (9B)	47.12
	Unconventional/dissenting (10A)	73.62
	Dutiful/conforming (10B)	52.56
	Submissive/yielding (11A)	59.74
	Dominant/controlling (11B)	81.74
	Dissatisfied/complaining (12A)	54.88
	Cooperative/agreeing (12B)	50.82
Validity indices	Positive impression (PI)	6.42
	Negative impression (NI)	6.44
	Consistency (CO)	

The mean prevalence scores on Millon Index of personality styles found in the group of motivating styles, passively accommodating (2B) self indulging styles (3A). to be prevalent. Thought guided (6B) and feeling guided are the other patterns prevalent in the thinking style. Among the behaving styles most prevalent is anxious /hesitating (9A), unconventional dissenting and dominant / controlling (11B) (prevalence score >50).

and conforming had shown significant change after therapy ($P<.05$) (Table 10) on score of depression.

Discussion

The study in the domain of psychological aspects of amputees has largely addressed the specific concerns of adjustment after amputation. In the present study attempt has been made to analyze the personality parameters of amputees as well.

Decreased self esteem, distorted body image and increased dependency are few of the many reasons for the development of psychological mal-adaptation. Findings by Parkes [17] also found that in first year 25% amputees suffer from depression, feeling of insecurity, self consciousness and restlessness. Hence increasing self sufficiency by psychological intervention helps in ameliorating the distress [18].

Amputation means a loss and psychological reaction to loss is so much so that it is compared with the grief

Table 8**Trauma symptom inventory mean scores**

Categories	Mean scores
Atypical response (ATR)	64.86
Response level (RL)	65.42
Anxious arousal (AA)	55.9
Depression (D)	66.66
Anger/irritability (AI)	47.78
Intrusive experiences (IE)	55.8
Defensive avoidance (DA)	67.08
Dissociation (D)	58.08
Sexual concerns (SC)	49.94
Dysfunctional sexual Beh. (DSB)	52.96
Impaired self-reference (ISR)	54.08
Tension reduction behaviour (TRB)	54.92

The mean scores of RL determined the validity of the response pattern as it is below the cutoff of 70. Atypical responding is also not noted above the cut off of 70. However, marginal elevation is noted on scales of Defensive avoidance, dissociation, intrusive experiences and depression.

experienced by an individual when he loses his near and dear ones. These reactions are manifested in different forms at different stages following amputations. In the early stages, these can be in the form of disbelief, fear and panic, rage and anger, grief and despair. The late stage effects are in the form of depression, and anxiety. The duration after amputation is equally important in determining the reactions. In the present study duration after amputation, in 52% cases is six months and majority of them fall within a year. As a result, reaction is also intensified based on the limitation of perceived disability by amputees (Table 5). The consequence of the disability in the present case might have added to the anxiety [6]. The duration of amputation of three months is noted only in four cases (8%), therefore amelioration of distress is primarily not based alone on duration after amputation. Active intervention might have militated the negative effect of amputation. This conclusion is further strengthened by the observation that there was also a statistically significant reduction in the scores on the HADS Scale of anxiety and depression (Table 6) (Fig 1). Psychological problems may result from a failed adaptation process to the loss [19]. The study carried out by Seidel et al [20] on patients of amputation of a lower extremity found 27% of them to be having depression and 25% having increased anxiety scores. Findings also indicated poor acceptance of the prosthesis as an important predictive factor for the development of anxiety and depression. This is further confirmed by the findings of the present study wherein increased score on depression and anxiety reduced significantly after treatment (Table 6) ($p<.05$). The psychotherapy helps in accepting the body image thereby reducing the distress. This reinforces the need for psychological

Table 9**Personality styles and impact after therapy vis a vis HADS score (anxiety)**

Sub-categories	Pre-therapy anxiety below 50 P score	Pre-therapy anxiety above 50 P score	Post-therapy anxiety below 50 P score	Post-therapy anxiety above 50 P score	Below 50 P change between pre and post therapy on anxiety	Above 50 P change between pre and post therapy on anxiety	Significance
Pleasure-enhancing (1A)	6.823 (3.72)	7.969 (3.41)	4.23 (1.56)	4.60 (1.17)	2.58 (2.59)	3.36 (2.93)	0.362
Pain-avoiding (1B)	7.266 (3.19)	8.05 (3.30)	4.40 (1.10)	4.60 (1.60)	2.86 (2.97)	3.45 (2.60)	0.479
Actively modifying (2A)	8.142 (3.15)	7.361 (3.27)	4.64 (1.08)	4.41 (4.41)	3.50 (3.13)	2.94 (2.72)	0.537
Passively accommodating (2B)	8.00 (3.60)	7.48 (3.17)	4.88 (1.26)	4.39 (1.32)	3.11 (3.44)	3.09 (2.71)	0.98
Self-indulging (3A)	8.500 (4.12)	7.500 (3.18)	4.75 (.957)	4.45 (1.34)	3.75 (4.34)	3.04 (2.71)	0.636
Other-nurturing (3B)	7.56 (2.86)	7.60 (3.78)	4.60 (1.03)	4.30 (1.65)	2.97 (2.79)	3.30 (2.92)	0.686
Externally focused (4A)	7.575 (3.36)	7.588 (3.042)	4.48 (1.30)	4.47 (1.37)	3.09 (2.87)	3.11 (7.86)	0.975
Internally focused (4B)	9.57 (2.22)	7.255 (3.26)	5.14 (.899)	4.37 (1.34)	4.42 (2.50)	2.88 (2.83)	0.182
Realistic/sensing (5A)	7.70 (2.907)	7.55 (3.33)	35.70 (8.28)	35.35 (9.14)	3.30 (2.31)	3.05 (2.96)	0.851
Imaginative/intuiting (5B)	7.89 (3.63)	7.38 (2.99)	4.89 (1.24)	4.22 (1.30)	3.00 (3.17)	3.16 (2.63)	0.846
Thought-guided (6A)	64.00 (10.56)	58.27 (12.61)	4.48 (1.313)	*	*	*	*
Feeling-guided (6B)	7.058 (3.24)	8.78 (3.28)	4.588 (1.37)	4.42 (1.29)	2.47 (3.00)	3.42 (2.71)	0.262
Conservation-seeking (7A)	7.710 (2.750)	7.166 (4.549)	4.52 (1.03)	4.33 (2.01)	3.18 (2.80)	2.83 (2.97)	0.711
Innovation-seeking (7B)	8.80 (3.52)	9.10 (2.84)	4.56 (1.56)	4.35 (.812)	3.23 (3.03)	2.90 (2.53)	0.686
Asocial/withdrawing (8A)	6.950 (3.31)	8.00 (3.15)	4.50 (1.23)	4.46 (1.38)	2.45 (2.96)	3.53 (2.68)	0.186
Gregarious/outgoing (8B)	7.46 (2.71)	7.70 (3.75)	4.61 (.982)	4.33 (1.60)	2.84 (2.60)	3.37 (3.07)	0.513
Anxious/hesitating (9A)	7.00 (3.19)	7.93 (3.25)	4.73 (1.14)	4.32 (1.39)	2.26 (2.84)	3.61 (2.72)	0.101
Confident/asserting (9B)	8.72 (2.88)	6.67 (3.24)	4.72 (.984)	4.28 (1.51)	4.00 (3.10)	2.39 (2.40)	0.044
Unconventional/dissenting (10A)	10.00 (.000)	7.530 (3.241)	6.00(.000)	4.44 (1.30)	4.00 (.000)	3.08 (2.84)	0.751
Dutiful/conforming (10B)	7.81 (2.70)	7.39 (3.62)	4.50 (.963)	4.4 (1.55)	3.31 (2.74)	2.92 (2.91)	0.63
Submissive/yielding (11A)	6.545 (3.188)	8.392 (3.07)	6.54 (3.18)	8.39 (3.07)	2.18 (2.66)	3.82 (2.77)	0.04
Dominant/controlling (11B)	59.95 (14.29)	59.00 (10.84)	9.13 (2.86)	8.75 (3.55)	*	*	*
Dissatisfied/complaining (12A)	8.450 (2.98)	7.000 (3.30)	4.45 (1.05)	2.18 (1.47)	4.00 (2.99)	2.50 (2.58)	0.06
Cooperative/agreeing (12B)	7.37 (3.44)	7.76 (3.06)	4.29 (1.60)	4.65 (.977)	3.08 (2.55)	3.11 (3.10)	0.96

* Thought-guided (6A) personality dimension had prevalence score of more than 50 distributed among the study group hence statistical evaluation based on less than 50 prevalence score was not carried out. On Dominant /Controlling (11B) dimension also post therapy scores had prevalence more than 50. P=Prevalence

Fig. 1 : Pre and post therapy scores for depression and anxiety.

assessment and intervention after the amputation to prevent psychological abnormalities. The role of interdisciplinary management is highlighted in the care of the patient.

The present study on personality parameter found patients to be having anxious (9A), dominant /controlling

(11B) (prevalence score >50) styles. In the group of motivating styles, passively accommodating (2B) self indulging styles (3A) were noted to be prevalent (Table 7). Thought guided (6B) and feeling guided were the other patterns prevalent in the thinking style. The constellation of these styles indicates accommodating tendencies and having internal orientation. This pattern has supposedly facilitated the post amputation adjustment since accommodating tendencies become facilitator for adjustment. The other important aspect revealed by the finding is in the behaving styles where amputees are found to be having strong indicator of dominant /controlling style (mean prevalence score of 81.74). People with this style are domineering and are strong willed. Probably, self-control helps in adjusting to trauma. The authors did not find much evidence from Indian literature on the subject.

In Trauma Symptom Inventory (Table 8) (Fig. 2) the

Table 10**Personality styles and impact after therapy vis a vis HADS score (depression)**

Sub-categories	Pre-therapy depression below 50 P score	Pre-therapy depression above 50 P score	Post-therapy depression below 50 P score	Post-therapy depression above 50 P score	Below 50 P change between pre and post therapy on depression	Above 50 P change between pre and post therapy on depression	Significance
Pleasure-enhancing (1A)	8.41 (3.64)	9.18 (3.04)	3.88 (1.57)	3.78 (1.19)	4.52 (3.22)	5.39 (2.70)	0.32
Pain-avoiding (1B)	9.10 (2.80)	8.65 (3.86)	3.70 (1.08)	4.00 (1.62)	5.40 (2.429)	4.65 (3.48)	0.373
Actively modifying (2A)	10.42 (2.40)	8.33 (3.36)	4.00 (1.30)	3.75 (1.33)	6.42 (2.44)	4.58 (2.98)	0.04
Passively accommodating (2B)	9.77 (2.22)	8.73 (3.42)	4.77 (.971)	3.60 (1.30)	5.00 (2.34)	5.12 (3.01)	0.91
Self-indulging (3A)	10.25 (3.09)	8.80 (3.26)	4.25 (1.25)	3.78 (1.33)	6.00 (2.94)	5.02 (2.90)	0.52
Other-nurturing (3B)	9.03 (2.98)	8.75 (3.66)	4.60 (1.03)	4.30 (1.65)	5.26 (2.85)	4.85 (2.99)	0.622
Externally focused (4A)	8.90 (3.39)	8.94 (3.03)	3.69 (1.28)	4.05 (1.39)	5.21 (3.06)	4.88 (2.57)	0.70
Internally focused (4B)	8.57 (2.99)	8.97 (3.31)	4.00 (1.15)	3.97 (1.35)	4.57 (2.43)	5.18 (2.97)	0.60
Realistic/sensing (5A)	8.70 (4.08)	8.97 (3.05)	4.30 (1.33)	3.70 (1.30)	4.40 (3.40)	5.27 (2.76)	0.39
Imaginative/intuiting (5B)	8.94 (2.71)	8.90 (3.57)	34.21 (10.06)	3.70 (1.33)	4.94 (2.43)	5.19 (3.16)	0.77
Feeling-guided (6B)	9.17 (3.24)	8.78 (3.28)	4.00 (1.27)	3.72 (1.35)	5.17 (2.72)	5.06 (3.00)	0.894
Conservation-seeking (7A)	9.05 (3.25)	8.50 (3.31)	3.92 (1.36)	3.50 (1.36)	5.13 (2.99)	5.00 (2.62)	0.89
Innovation-seeking (7B)	8.80 (3.52)	9.10 (2.84)	3.93 (1.28)	3.65 (1.38)	4.86 (2.93)	5.45 (2.85)	0.48
Asocial/withdrawing (8A)	8.50 (3.28)	9.20 (3.24)	3.95 (.998)	3.73 (1.50)	4.55 (3.06)	5.46 (2.75)	0.27
Gregarious/outgoing (8B)	9.38 (3.35)	8.41 (3.10)	3.80 (1.23)	3.83 (1.43)	5.57 (3.20)	4.58 (2.46)	0.22
Anxious/hesitating (9A)	10.10 (2.51)	8.19 (3.45)	4.15 (.898)	3.61 (1.49)	5.94 (2.36)	4.58 (3.08)	0.101
Confident/asserting (9B)	9.45 (2.52)	8.50 (3.70)	4.27 (1.20)	3.46 (1.31)	5.18 (2.51)	2.51 (3.19)	0.86
Unconventional/dissenting (10A)	10.00 (.000)	8.89 (3.27)	6.00 (.000)	4.44 (1.30)	5.00 (.000)	5.10 (2.91)	0.97
Dutiful/conforming (10B)	10.59 (2.90)	7.60 (2.91)	3.95 (1.52)	3.71 (1.15)	6.63 (2.40)	3.89 (2.68)	0.0005
Submissive/yielding (11A)	9.13 (2.86)	8.75 (3.55)	4.13 (1.20)	3.57 (1.37)	5.00 (2.50)	5.17 (3.19)	0.830
Dissatisfied/complaining (12A)	8.80 (2.70)	9.00 (3.60)	3.95 (1.05)	3.73 (1.48)	4.85 (2.25)	5.26 (3.26)	0.622
Cooperative/agreeing (12B)	8.62 (2.88)	9.19 (3.57)	3.66 (1.30)	3.96 (1.34)	4.95 (2.74)	5.23 (3.06)	0.74

* Thought-guided (6A) and dominant /controlling (11B) personality dimension had prevalence score of more than 50; hence the categorization in to two group was not possible. P=Prevalence

Fig. 2 : Mean scores on trauma symptom inventory

mean scores of RL determined the validity of the response pattern as it is below the cut-off of 70. Atypical responding items are characterized by bizarre response pattern and they are noted to be below cut off of 70. These scores below cut off are implicated for non-psychotic response pattern, therefore validity is not affected. In the present finding marginal elevation is

noted on scales of defensive avoidance and depression. Defensive avoidance is indicated by post traumatic avoidance both cognitive and behavioural. Clinical scale elevation on depression represents dysphoric mood states as encountered by those experiencing significant psychological trauma. Cluster of finding indicates symptoms depression and avoidance being present on current assessment though the elevation on score is marginal. The avoidance of memories is noted in cases with accidental injuries. However, patients did not meet the criteria for Post Traumatic Stress Disorder. This is a heartening fact of the findings, however PTSD is more frequently noted in upper limb amputations and with previous history of trauma [21]. In the present sample majority of patients are lower limb amputations without history of previous trauma hence finding can be qualified in the background of absence of previous trauma [22]. The personality pattern of confident asserting (Table 9) had influenced significant change after therapy as indicated by prevalence score of more than 50 and less than 50, on anxiety parameter ($p < .05$). Similarly

submissive yielding also had influence on therapeutic outcome in prevalence score before and after therapy. After therapy scores on dimension of anxiety reduced significantly ($p < 0.05$).

Comprehensive management inclusive of psychological aspects restores patients confidence in handling day-to-day life. In the present study, treatment by psychotropic drugs apart from the regular psychotherapy was required in 8% of the patients who developed anxiety and depression. Since the percentage is small separate details are not reflected in the paper.

Conclusion

Studies highlighting the importance of psychological correlates of amputation and intervention are sparse, especially in Indian context. Findings of the present study indicate important area of personality implicated in management after amputation. Personality pattern of accommodating and internal thinking was noted as the most prevalent style of personality among the study group, further personality pattern of actively modifying and conforming are noted as facilitator in coping with distress. In view of the high levels of anxiety and depression among amputees, it is suggested that psychological evaluation and intervention should form a part of the overall management of amputees. The study has further emphasized the role of mental health professionals, clinical psychologist and psychiatrist as a part of the team in managing the cases. Further attempts may be made to evaluate patients with long term follow up.

Conflicts of Interest

None identified

Intellectual Contribution of Authors

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References

- Kolb LC. Disturbances in Body Image : In Arielis. Reiser MF, eds: American Handbook of Psychiatry, New York, Basic Books 1975; 4: 810-37.
- Newell R. Body Image Disturbance; Cognitive Behavioral formulation and Intervention. Journal of Adv. Nurs 1991; 16: 1400-5.
- Kashani JH, Frank RG, Kashani SR, Wonderlich SA, Reid JC. Depression among amputees. Journal of Clinical Psychiatry 1983; 44: 256-8.
- Friedmann LW. Acquired Amputation and Prosthesis before the Sixteenth Century. The Journal of Vascular Disease 1987; 10: 350-7.
- Plastica N, Devecerski G. Types of psychological reactions in patients with lower-extremity amputations. Med Pregl 2006; 59: 149-54.
- Shukla GD, Sahu SC, Tripathi RP, Gupta DK. A psychiatric study of amputees: British Journal of Psychiatry. 1982; 141: 50-3.
- Liliana EP, Timothy RD, Ellen JM. Rehabilitation and long term outcomes of persons with Trauma related amputations. Archives of Physical Medical Rehabilitation 2000; 81: 292-300.
- Freierson RL, Lippmann SB. Psychiatric consultation for acute amputees. Psychosomatics 1987; 28: 183-9.
- Friedmann LW. The Psychological Rehabilitation of the Amputee. Springfield Ill, Charles C Thomas Publishers 1978; 17-67.
- Parkes CM. Determinants of disablement after loss of a limb, in Krueger DW (ed): Emotional Rehabilitation of Physical Trauma and Disability. New York, SP Medical and Scientific Books 1984: 105-111.
- Sherman RA, Sherman CJ, Bruno GM. Psychological factors influencing chronic phantom limb pain: An analysis of the literature. Pain 1987; 28: 285-95.
- Sherman RA. Stump and phantom limb pain. Neurol Clin 1989; 7: 249-62.
- Desmond DM, Mac Lachlan M. Coping strategies as predictors of psychosocial adaptation in a sample of elderly veterans with acquired lower limb amputations. Soc Sci Med 2006; 62: 208-16.
- John Briere. Trauma Symptom Inventory (TSI). Professional Manual, 1995: Psychological Assessment Resources (PAR).
- Millon Theodore. Manual of Millon Index of personality revised 2004, Pearson Assessments.
- Snaith RP, Zigmond AS. Manual of Hospital Anxiety Scale 1994.
- Parkes CM. The psychological reaction to loss of a limb. The first year after amputation. Modern perspectives in psychiatric aspects of surgery, New York, Brenner / Mazel 1976; 515-53.
- Frank RG, Kashani JH, Kashani SR, Wonderlich SA, Reid SA, Umlauf RL et al. Psychological response to amputation as a function of age and time amputation . British Journal of Psychiatry 1984; 144: 493-7.
- Desmond DM, MacLachlan M. Coping strategies as predictors of psychosocial adaptation in a sample of elderly veterans with acquired lower limb amputations. Soc Sci Med 2006; 62: 208-16.
- Seidel E, Lange C, Wetz HH, Heuft G. Anxiety and depression after loss of a lower limb. Orthopade 2006; 35: 1154-8.
- Cheung E, Alvaro R, Colotla VA. Psychological distress in workers with traumatic upper or lower-limb amputations following industrial injuries. Rehabilitation Psychology 2003; 48: 109-12.
- Martz E, Cook DW. Physical impairments as risk factors for the development of posttraumatic stress disorder. Rehabilitation Counseling Bulletin 2001; 44: 217-21.