

Research Article

Depression in patients following limb reconstructive surgeries for trauma

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Received: 14 March 2016

Accepted: 22 April 2016

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ABSTRACT

Background: Psychological complications are common following physical trauma and its surgical treatment. Studies on trauma patients are mostly from the Western world and have focussed more on posttraumatic stress disorder and less on depression.

Methods: This study was conducted in a tertiary referral centre for trauma in South India. One hundred patients who had undergone limb reconstructive surgeries following trauma were included in the study. The major causes of trauma were occupational accidents and road traffic accidents. Beck depression inventory II was used to diagnose depression. The severity of trauma, impairment in joint motion and sensory impairment were also determined. Association between the variables was assessed using Chi -Square/ Fisher's exact test.

Results: The prevalence of depression was found to be 36% (95% CI: 26.6-45.4). Age between 41 and 60 years, unemployment, severe degree of injury, and the period between three months and one year of trauma were found to have significant association with depression.

Conclusions: Depression is common following physical trauma and its surgical treatment. Its early recognition and treatment is important to ensure faster recovery and better quality of life.

Key words: Depression, Trauma, Reconstructive surgery

INTRODUCTION

Injuries following physical trauma contribute significantly to morbidity and mortality. Around ten percent of deaths worldwide and 15 % of disability adjusted life years (DALYs) are attributed to injuries.¹

A major contributor of injury related morbidity and mortality are those sustained in the workplaces which contribute to 10 % of deaths due to injuries and 20 to 25 % of all injuries.² In India which has a fast growth of

vehicular population and road network, 13 to 18 % of total deaths are due to injuries.¹

As per the WHO estimates, road traffic injuries are the sixth leading cause of deaths in India. They also result in hospitalization and disabilities in the young and middle-aged population.³

Depressive disorders are common in the general population; with a lifetime prevalence of almost 16% and 12 month prevalence around 7%.⁴ Psychiatric complications particularly anxiety and mood disorders and posttraumatic stress disorder are common following

injuries.^{5,6} The patients work status, general health and satisfaction with recovery are found to depend on the mental health.⁷ Surgery is also a stressor which results in psychological complications which, if ineffectively managed could lead to delayed recuperation and return to work, poor compliance and dissatisfaction with the surgical outcome.⁸

This study was undertaken with the aim to detect depressive disorders among patients who have undergone limb reconstructive surgeries following trauma, and to determine the socio demographic and clinical factors associated with it. This was done keeping in mind the dearth of such studies from this part of the world. Moreover most of the studies on psychological complications in injured patients have focused on posttraumatic stress disorder (PTSD) and only a few have addressed the significant burden of depressive disorders.⁵

METHODS

The study participants were trauma patients who had undergone limb reconstructive surgery in the department of plastic, hand and reconstructive microsurgery and burns at Ganga hospital, Coimbatore, South India. It is a 450 bedded tertiary referral centre for trauma and spinal surgery, hand and microsurgery, reconstruction of severely injured limbs, re implantation of completely amputated parts, etc. The study was approved by the institute ethics committee of Pondicherry Institute of Medical Sciences. Consecutive patients who had undergone surgery following trauma were included. Patients with known psychiatric or neurological disorders, head injuries, and those who had not yet completed a month after the surgery were excluded from the study.

One hundred patients were eligible for the study. Written informed consent was obtained from the study participants. They were administered a questionnaire to collect information on socio demographic characteristics and details of the trauma. Beck depression inventory II (BDI II) was used to measure depression. The 21 symptoms of BDI II reflect the Diagnostic and Statistical Manual of Mental Disorders IV (DSM) diagnostic criteria for major depressive disorders. Each symptom is rated on a four point scale ranging from zero to three.

Impairment in the range of joint motion was assessed with the assistance of a physiotherapist and graded from one to fifteen, with increasing scores indicating greater impairment in joint motion. Monofilament test was used for sensory assessment which was graded from one to five (one- normal, five-anaesthetic). The severity of injury was assessed using the Ganga hospital injury severity scoring. The scoring grades the severity of injury to the covering tissues, the bones and the functional tissues from one to five. Co morbid conditions which influence the treatment and prognosis are given a score of two each. A score of less than five was considered as

grade one, six to ten as grade two, and eleven to fifteen as grade three and sixteen or more as grade four.⁹

Categorical variables were summarised as frequencies with percentages. For the prevalence, 95% CI was calculated by Wald method. Association between the variables was assessed using Chi-square/ Fisher's exact test, as appropriate. A p value < 0.05 was assumed to be statistically significant. Statistical analysis was performed using the statistical package SPSS (Version 20.0).

RESULTS

A total of 100 patients were included in the study. The socio demographic data of the study participants are given in table 1. Majority of the study participants were male (73%). The age of the participants ranged from 10 to 70 years. Participants between 21 and 40 years constituted almost half of the study sample, followed by those between 10 and 20 years of age (28%). The educational level of 44% of the participants was below eighth grade. Semi-skilled occupation constituted the single largest occupational category (51%) and only 4% were unemployed. Sixty percent of the study participants belonged to middle socio economic status.

Table 1: Socio demographic data of the study participants.

Socio demographic variable	Number of participants	Percentage
Age		
10-20	28	28
21-40	48	48
41-60	20	20
61-70	4	4
Gender		
Male	73	73
Female	27	27
Education		
Below 8 th grade	44	44
8 th -12 th grade	35	35
College	20	20
Illiterate	1	1
Occupation		
Skilled	27	27
Semi-skilled	51	51
Unskilled	18	18
Unemployed	4	4
Socioeconomic status		
Upper	2	2
Middle	60	60
Lower	38	38

The causes of trauma in the participants were occupational accidents (56), road traffic accidents (33), assault (3) and other domestic accidents (8). Almost all the participants had sustained injuries to the upper limb

(94%) and the remaining had lower limb injuries. There were 30, 59 and 11 participants in trauma severity grades one, two and three respectively. None of the participants had grade four severities. Based on the degree of impairment in joint motion which was graded from one to fifteen, the participants were divided into three groups-

group one having one to five grades, group two having six to ten grades and the third group having 11 to 15 grades. Majority of the participants (77%) belonged to group one in the grade of joint motion. Maximum number of participants (31%) had sensory grade three, followed by grade four (26%).

Table 2: Association between socio demographic and clinical factors and depression.

Variables	Depression		Total (n=100)	P value
	Yes (n=36)	No (n= 64)		
Age group*				0.04
10 -20	6 (21.4)	22 (78.6)	28	
21 -40	16 (33.3)	32 (66.7)	48	
41-60	12 (60.0)	8 (40.0)	20	
61-70	2 (50.0)	2 (50.0)	4	
Gender*				0.55
Male	25 (34.2)	48 (65.8)	73	
Female	11 (40.7)	16 (59.3)	27	
Education*				0.33
Below 8th	19 (43.2)	25 (56.8)	44	
8 th – 12 th	9 (25.7)	26 (74.3)	35	
College	8 (40.0)	12 (60.0)	20	
Illiterate	0 (0.0)	1 (100.0)	1	
Occupation*				0.01
Skilled	13 (48.1)	14 (51.9)	27	
Semi skilled	13 (25.5)	38 (74.5)	51	
Unskilled	6 (33.3)	12 (66.7)	18	
Unemployed	4 (100.0)	0 (0.0)	4	
Socio economic status*				0.11
Lower	11 (28.9)	27 (71.1)	38	
Middle	23 (38.3)	37 (61.7)	60	
Upper	2 (100.0)	0 (0.0)	2	
Trauma degree*				0.01
Degree 1	5 (16.7)	25 (83.3)	30	
Degree 2	28 (47.5)	31 (52.5)	59	
Degree 3	3 (27.3)	8 (72.7)	11	
Time of Trauma*				0.05
0-3 months	6 (22.2)	21 (77.8)	27	
3 -6 months	7 (58.3)	5 (41.7)	12	
6 months-1 year	11 (52.4)	10 (47.6)	21	
>1 year	12 (30.0)	28 (70.0)	40	
Joint motion grade†				0.73
1-5	25 (32.5)	52 (67.5)	77	
5-10	3 (27.3)	8 (72.7)	11	
11-15	2 (66.7)	1(33.3)	3	
Sensory grade‡				0.18
1	1 (25.0)	3 (75.0)	4	
2	2 (14.3)	12 (85.7)	14	
3	8 (25.8)	23 (74.2)	31	
4	10 (38.5)	16 (61.5)	26	
5	8 (53.3)	7 (46.7)	15	

* Numbers within brackets are percentages, † Applicable to 91 participants only, ‡Applicable to 90 participants only.

Out of the 100 participants, thirty six were found to have depressive disorder giving a prevalence rate of 36 % (95% CI: 26.6-45.4). The severity of depression was rated as mild in 22 patients. Nine patients had moderate depression and depression was rated as severe in five patients. Table 2 shows the association between socio demographic and clinical variables and depressive disorder. There was a significant association between age and depressive disorder (p value=0.04). Participants 41 to 60 years were found to have increased susceptibility to depressive disorder, with a prevalence of 60 %. Depressive disorder was also found to be more common among females (40.7%) than males (34.2%) but this difference was not statistically significant. A significant association was also found between employment and depression (p value=0.01). All the four unemployed participants and almost half of participants (48.1%) engaged in skilled labour were depressed. The other demographic variables such as education and socio economic status did not have any significant association with depression. The association between trauma severity and depression was found to be significant, with depression diagnosed in 47.5 % of degree two patients. There was borderline significance between time of trauma and depression (p value=0.05). The prevalence of depression was high among participants from three months to one year of trauma. The participants' grade of joint motion and sensory grade were also not found to be significantly associated with depression.

DISCUSSION

A number of studies have addressed the issue of psychological disturbances among patients with injuries. Most have been conducted in Western populations with a predominant focus on posttraumatic stress disorder. These studies clearly demonstrated that patients who have undergone injuries are at increased risk for certain psychiatric disorders, depression and PTSD being the most frequent diagnoses.^{5,10} Ninety five percent of plastic surgeons reported encountering depression among their patients.⁸ Phobic travel anxiety and general anxiety were also commonly seen in these individuals.^{6,11} Early recognition and treatment of these disorders is essential because the patient's general health and satisfaction with recovery have been found to depend on mental health.⁷

Majority of our study participants were males reflecting the causation of injuries due to occupational accidents or road accidents. The occupational accidents were sustained during employment in industries located in the study region of Coimbatore. In our study, the prevalence of depressive disorders among patients who have undergone reconstructive surgeries following trauma was found to be 36 %. This is more than five times the 12-month prevalence seen in the general population. A study by Mayou R et al. found that one third of emergency department attendees following a road traffic accident had at least one of the following disorders PTSD, anxiety disorder and depressive disorder.⁶

Another study found that ten % of participants who had undergone trauma, excluding head injuries, met criteria for major depressive disorder at twelve months.⁵ The increased prevalence in our study could be attributed to the physical, social, occupational and economic problems associated with trauma as well as its surgical treatment. The physical impairments due to these injuries are also significant determinants of the patients' future occupational functioning, especially the ones sustained in the work places. Another important contributor of the increased prevalence was the involvement of the upper limb in the majority of our study participants because depression is common following mutilating hand injuries.¹²

In the age group of 41 to 60 years, 12 out of 20 patients were depressed. This reflects the mean age of onset of major depressive disorder which is 40 years.¹³ Our study also found a significant association between employment status and depression. All the four unemployed patients had depression since unemployment is a well-known risk factor for depression.¹³ The increased prevalence in those involved in skilled jobs may be reflective of the high demands placed on these individuals. Depressive disorder does not have correlation with socio economic status and education and this was found in our study also.¹³ Prevalence of depression increased with increasing trauma severity, with 47.5% of participants with trauma degree two found to be depressed.

The low rates of depression within three months of trauma could be due to the good social and medical support including medications for sleep and pain.¹⁴ The gradual perception of the consequences of the trauma in many spheres of life may explain the high prevalence between three months and one year. The absence of any significant relationship between the range of joint motion, sensory grade and depression indicate that psychosocial factors play a more important role in the etio pathogenesis of depressive disorders following trauma than the physical impairments resulting from such injuries.

Our study is one of the very few from South India which have addressed the issue of depressive disorders among patients who have undergone reconstructive surgeries following trauma. An important limitation of our study was the cross sectional assessment of participants because of which conclusions about temporal relationships cannot be made. Other important risk factors for depressive disorders such as past, family history of mood disorders, medical co morbidities and substance use disorders were also not looked into.

CONCLUSION

In summary, our study found a high prevalence of depression among trauma patients who have undergone limb reconstructive surgeries. This highlights the need for a detailed psychological assessment of trauma patients

and the adoption of a bio-psychosocial approach by physicians involved in trauma care. This will result in early detection and appropriate management of psychiatric disorders leading to faster recovery and better quality of life in these patients.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Gururaj G. Road traffic deaths, injuries and disabilities in India: Current scenario. *Natl Med J India*. 2008;21(1):14-20.
2. Gururaj G. Injuries in India: A national perspective. In: *Burden of disease in India*. New Delhi: National Commission on Macroeconomics and Health, Ministry of Health and Family Welfare, Government of India; 2005: 341-65.
3. Ministry of Health and Family Welfare. Integrated Disease Surveillance Project: Project Implementation Plan 2004-09. New Delhi: Government of India. 2004;1-18.
4. Kessler RC, Berglund P, Demler O, Jin R, Koretz D, Merikangas KR, et al. The epidemiology of major depressive disorder: results From the National Comorbidity Survey Replication (NCS-R). *JAMA*. 2003;289(23):3095-105.
5. O' Donnell ML, Creamer M, Pattison P, Atkin C. Psychiatric morbidity following injury. *Am J Psychiatry* 2004; 161 (3): 507-14
6. Mayou R, Bryant B. Outcome in consecutive emergency department attenders following a road traffic accident. *Br J Psychiatry*. 2001;179(6):528-34.
7. Michaels AJ, Michaels CE, Smith JS, Moon CH, Peterson C, Long WB. Outcome from injury: general health, work status, and satisfaction 12 months after trauma. *J Trauma*. 2000;48(5):841-50.
8. Borah G, Rankin M, Wey P. Psychological complications in 281 plastic surgery practices. *Plast Reconstr Surg*. 1999; 104 (5): 1241-6.
9. Rajasekaran S, Babu NJ, Dheenadhayalan J, Shetty AP, Sundararajan SR, Kumar M, Rajasabapathy S. A score for predicting salvage and outcome in Gustilo type- IIIA and type- IIIB open tibial fractures. *J Bone Joint Surg Br*. 2006;88(10):1351-60.
10. Zatzick D, Jurkovich GJ, Rivara FP, Wang J, Fan MY, Joesch J, et al. A national US Study of posttraumatic stress disorder, depression and work and functional outcomes after hospitalization for traumatic injury. *Ann Surg*. 2008;248(3):429-37.
11. Blaszczynski A, Gordon K, Silove D, Sloane D, Hillman K, Panasetis P. Psychiatric morbidity following motor vehicle accidents: a review of methodological issues. *Compr Psychiatry*. 1998;39(3):111-21.
12. Grob M, Papadopoulos NA, Zimmermann A, Biemer E, Kovacs L. The psychological impact of severe hand injury. *J Hand Surg Eur*. 2008;33(3):358-62.
13. Sadock BJ, Sadock VA, Ruiz P. Kaplan and Sadock's Synopsis of Psychiatry: Behavioral Sciences/ Clinical Psychiatry. 11th ed. Philadelphia, Pa: Wolters Kluwer. 2015;347-80.
14. Grieger TA, Cozza SJ, Ursano RJ, Hoge C, Martinez PE, Engel CC, et al. Posttraumatic stress disorder and depression in battle-injured soldiers. *Am J Psychiatry*. 2006;163(10):1777-83.

Cite this article as: Ramanthan S, Solomon S, Sabapathy SR, Ravichadran K. Depression in patients following limb reconstructive surgeries for trauma. *Int J Res Med Sci* 2016;4:1954-8.