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Original Article

Severity of Hand Injury: An Association Between Severity of Hand Injury, Anxiety and Depression

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ABSTRACT

Objective: To investigate the relationship between the severity of hand injury with anxiety and depression.
Study design: Cross-sectional study
Place and Duration of Study: Departments of Psychiatry and Plastic Surgery, Combined Military Hospital, Multan Pakistan, from Jul 2021 to May 2022.
***Methodology*:** We consecutively included 104 patients. The patients were given a specifically designed proforma to assess the parameters. Hand injury severity was assessed using the Hands injury severity scoring system. In contrast, the presence of anxiety and depression was assessed using the Hospital Anxiety and Depression Scale.
Results: The mean age of the patients was 33.19±4.14 years; 97(93.3%) were males, and 95(91.3%) were married. 44 patients (42.3%) belonged to the wood trade, 25 farmers (24%), building trade 23(22.1%), and 10(9.6%) belonged to the metal trade. 68(65.4%) sustained a combination type of injury, 15(14.4%) had injury and 14(13.5%) had crush injuries. Of 53(51.0%), axe was the cause, 21(20.2%) was due to saw, and 16(15.4%) were due to metal when the severity of hand injury was compared for correlation with anxiety levels (p=0.188) and level of depression (p=0.413).
Conclusion: Results of this study highlight that the presence of anxiety is more than depression after hand injury but not significantly correlated.

Keywords: Anxiety, Hand injury, Hand injury severity scoring system, Hospital Anxiety and Depression Scale.

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INTRODUCTION

A severe hand injury may have physical, psychological, social and economic implications with long-term consequences. Loss or mutilation of the hand gives a blow to the person`s inner image that reverberates through their entire psyche, altering the victim`s whole view of himself and his place in the world.[1,2] This worsens if the individual has an identity heavily determined by body image. Here, the psychological impact may outweigh the functional loss.[3] Although the main goal is to restore function, the appearance of the hands may be of greater psychological importance to these patients.[4] Mutating hand injuries can be associated with stress, anxiety disorders, and major depression. The psychological impact after a severe hand injury is at its worst in the few months following the trauma.[5] Many patients have ongoing psychological difficulties 18 months after the injury.[6,7] Patients who have undergone trauma to their hand in the work setting seem to be particularly vulnerable to the development of significant anxiety.[8] Additionally, because the work setting is often a major source of positive satisfaction and social interaction, the traumatic effect is compounded when this source of self-esteem is lost. The severity of the injury would be the most important factor in the patient`s psychological and occupational adjustment to that injury. [9]

Hand surgeons are advised to consider the psychological characteristics of the individual before embarking on active management.[10] Many international studies on the subject exist, but there is barely any local data that correlates with the local social and cultural context. This study was designed to assess the psychological impact of hand injury among a local patient population.

METHODOLOGY

After approval of the Ethical Review Committee (ERC NO.32/2022 dated 5 July 2022), the cross-sectional study was conducted at the Departments of Psychiatry and Plastic Surgery, Combined Military Hospital, Multan Pakistan from July 2021 to May 2022. The sample size was estimated using Epi tools epidemiological calculator based on the results of a study conducted by Yannascoli, which has shown that

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postoperatively, 43.3% of participants exhibited anxiety. In comparison, 39.2% had depression, with a total burden of 82.5% of psychological impact after hand injury.[11]

Inclusion Criteria: Patients of either gender, aged >15 years with hand injuries distal to the carpus, patients with no pre-injury chronic upper limb condition, and patients with no other chronic medical diseases were included.

Exclusion Criteria: Patients with Body Dysmorphic Disorders and Hepatitis C/Hepatitis B+Ve were excluded.

We consecutively sampled 104 subjects using a convenience non-probability sampling technique. Information was gathered on the patients` de-mographics, i.e. age, gender, marital status and education, type of injury, handedness and mechanisms of injury.

Hand Injury Severity Scoring System (HISS) was used to grade the severity and likely outcome of hand injury. A HISS score of ≤20 is labelled as minor severity, scores between 21 and 50 as moderate, and scores between 51 and 100 as severe, and≥ 101 were labelled as injuries of major intensity.[12] Hospital Anxiety and Depression Score (HADS) is a brief self-assessment mood questionnaire that assesses the symptom severity and probability (caseness) of anxiety and depression. The HADS scale consists of 14 items (7 for each subscale of anxiety and depression). The scale can be completed in under 10 minutes. All items are scored on a 4-4-point scale from 0-3. Therefore, the maximum sum score for each subscale is 21; scores of 0-7 are taken as normal, 8-10 borderline, 11-14 probable (caseness), and scores ≥ 15 are taken as severe.[13]

Data was analyzed using Statistical Package for the Social Sciences (SPSS) version 23.00 and MS Excel 2016 software. Mean±SD was calculated for continuous variables. Frequency and percentage were calculated for categorical variables. Chi-square was used for inferential statistics; the *p*-value of ≤0.05 was considered significant.

RESULTS

In this study of 104 patients, the mean age was 33.19±4.14 years. 97(93.3%) patients were male, 7(6.7%) were female, 95(91.3 %) patients were married, 6(5.8%) were single, and 3(2.9%) were widowed. 2(1.9%) patients belonged to Armed forces, 23(22.11%) were building traders, 10(9.6%) metal traders, 25(24.03%) farmers, 44(42.3%) were wood traders. 100(96.2%) patients were right-handed, 4(3.8%) were left-handed, 46(44.2%) injured their dominant hand, 56(53.8%) injured non-dominant hand, and 2(1.9%) injured both hands. 15(14.4%) had clean-cut injuries, 14(13.5%) sustained crush injuries, 6(5.8%) had avulsion, 68(65.4%) suffered a combination of injuries, and 1(1%) patient sustained burns. Injuries due to saw as in 21(20.2%) patients, 53(51.0%) injuries due to axe, 16(15.4%) due to metal, 7(6.7%) due to machine, 5(4.8%) due to glass, 1(1.0%) due to electricity while 1 (1.0%) patients sustained hand injury due to concrete (Table-I).

Table-I:Descriptive Statisticsof the Patients(n=104)

Parameters		**n(%)**
Age(Years)Mean±SD		33.19±4.14
Gender	Male	97(93.3)
	Female	7(6.7)
MaritalStatus	Married	95(91.3)
	Single	6(5.8)
	widow	3(2.9)
EducationalStatus	Uneducated	1(1)
	Primary	67(64.4)
	Matric	20(19.2)
	Undergraduate	11(10.6)
	Graduate	5(4.8)
Employment	ArmedForces	2(1.9)
	Buildingtrade	23(22.1)
	Metaltrade	10(9.6)
	Farmer	25(24.0)
	Woodtrade	44(42.3)
Handedness/Dominanthand	Righthand	100(96.2)
	Lefthand	4(3.8)
SiteofInjury		
Dominanthand		46(44.2)
Nondominanthand		56(53.8)
Bothhands		2(1.9)
TypeofInjury		
Cleancut		15(14.4)
Crush		14(13.5)
Avulsion		6(5.8)
Burn		1(1.0)
combination		68(65.4)
CauseofInjury		
Saw		21(20.2)
Axe		53(51.0)
Metal		16(15.4)
Machine		7(6.7)
Glass		5(4.8)
Concrete		1(1.0)
Electricity		1(1.0)

The severity of hand injury on the hand injury severity scoring system, the mean score was 2.56±0.84. Scores for Anxiety on HADS revealed that 50(48.1%)

patients were without anxiety and considered normal, 10(9.6%) had borderline anxiety, 43(41.3%) patients had probable anxiety, and 1(1.0%) had severe anxiety. Findings on the depression component show that 83(79.8%) had no depression, 3(2.9%) patients had borderline depression, 18(17.3%) had probable depression, and 3(2.5%) patients had severe depression (Table-II).

Table-II:Severity of Hand Injury, Anxiety and Depression(n=104)

Parameters	n(%)
HISSScoresMean±SD2.56μ±0.84s	
<20points	13(12.5)
21-50	30(28.8)
51-100	50(48.1)
>100	11(10.6)
HADSAnxietyScoresMean±SD1.38μ±0.74s	
Normal	50(48.1)
Borderline	10(9.6)
Probable/caseness	43(41.3)
severe	1(1.0)
HADSDepressionScoreMean±SD1.34μ±0.73s	
Normal	83(79.8)
Borderline	3(2.9)
Probable/caseness	18(17.3)
Severe	0(0)

When the severity of hand injury was compared for correlation with the site of injury (p=0.571), type of injury (p=0.897), cause of injury (p=0.073), handedness (p=0.714), anxiety levels (p=0.188), and depression level (p=0.413), there was no marked significance or correlation (Table-III).

DISCUSSION

Our study endeavoured to investigate how hand injury affects the patient psychologically. The mean age of participants in this study was 33.19±4.14 years, however, the ratio of male participants was higher than females, and most patients were married. Most of the participants in this study had primary education or had done matric, with only five per cent of participants being graduates. In other studies such as by Stemn *et al*. participants mostly belonged to the metal trade or trade dealing with mechanical machines [14] as compared to our study in which forty per cent of participants belonged to the wood trade followed by farmers (twenty-four per cent) and building trade (twenty-two per cent). It was not a surprise to note that ninety-six per cent of participants were right-handed. Results of another study by

Table-III:HISS Scores Correlation Statistics (n=104)

Parameters		Handsinjuryseverityscores					*p*-value
		<20 Points n(%)	21-50 Points n(%)	51-100 Points n(%)	>100 Points n(%)	Total n(%)	
Siteofinjury	Dominan thand	6(13.04)	14(30.4)	22(47.8)	4(8.6)	46(44.2)	0.571
	Non dominan thand	7(12.5)	15(26.7)	28(50)	6(10.7)	5653.8)	
	Bothhands	0(0)	1(50)	0(0)	1(50)	2(1.9)	
Typeofinjury	Clearcut	2(13.3)	4(26.6)	9(60)	0(0)	15(14.4)	0.897
	crush	1(7.14)	5(35.7)	5(35.7)	3(21.4)	14(13.5)	
	Avulsion	1(16.6)	2(33.3)	2(33.3)	1(16.6)	6(5.8)	
	Burn	0(0)	0(0)	1(100)	0(0)	1(1.0)	
	Combination	9(13.2)	19(27.9)	33(48.5)	7(10.2)	68(65.4)	
Causeofinjury	Saw	2(9.5)	8(38.0)	10(47.6)	1(4.7)	21(20.2)	0.073
	Axe	7(13.20)	12(22.6)	28(52.8)	6(11.3)	53(51.0)	
	Metal	2(12.5)	7(43.7)	4(25)	3(18.7)	16(15.4)	
	Machine	0(0)	3(42.8)	3(42.8)	1(14.2)	7(6.7)	
	Glass	0(0)	0(0)	5(100)	0(0)	5(4.8)	
	Concrete	1(100)	0(0)	0(0)	0(0)	1(1.0)	
	Electricity	1(100)	0(0)	0(0)	0(0)	1(1.0)	
Handedness	Righthanded	13(13)	29(29)	48(48)	10(10)	100(96.2)	0.714
	Lefthanded	0(0)	1(25)	2(50)	1(25)	4(3.8)	
Anxiety	Normal	6(12)	13(26)	28(56)	3(6)	50(48.1)	0.188
	Borderline	2(20)	4(40)	3(30)	1(10)	10(9.6)	
	Caseness	5(11.6)	13(30.2)	19(44.1)	6(13.9)	43(41.3)	
	Severe	0(0)	0(0)	0(0)	1(100)	1(1.0)	
Depression	Normal	10(12.0)	22(26.5)	42(50.6)	9(10.8)	83(79.8)	0.413
	Borderline	1(33.3)	0(0)	1(33.3)	1(33.3)	3(2.9)	
	Caseness	2(11.1)	8(44.4)	7(38.8)	1(5.5)	18(17.3)	
	Severe	0(0)	0(0)	0(0)	0(0)	0(0)	

Tamanna *et al*. showed that in most cases, injury occurred to the dominant hand;[15] on the contrary, our study has noted that the non-dominant hand got injured in fifty-three per cent of participants. The results of our study show that sixty-five per cent suffered a combined type of injury while fourteen per cent had a clear-cut injury, and thirteen per cent sustained a crush injury. However, in our study, the axe was the culprit for causing injury to the hand in fifty-one per cent, followed by twenty per cent who saw injuries, while injuries to the hand due to the machine were present in only six per cent of participants. This difference can be attributed to the fact that participants of this study mainly belonged to wood traders, who comprised forty-two percent of the study group.

When hand injury severity scores of this study were compared with other studies, it was noted that in other studies, the majority had severity scores below twenty or between twenty-one and fifty.[16] However, in our study, forty-eight per cent had hand injury severity scores between fifty-one and hundred, and twenty-eight per cent scored between twenty-one and fifty. In comparison, only twelve per cent scored below twenty. These different results can be explained by the fact that the majority of the participants in this study sustained a combination of injuries and were severe.

To assess the psychological impact of hand injury when anxiety levels on HADS scores of this study were compared with other studies, it was noted by Jin H that the majority of participants after hand injury had normal anxiety levels [17] as compared to our study, where fifty-three per cent of participants exhibited more than normal level of anxiety (combined scores of borderline and probable). These results, with notable anxiety in the majority of participants, can be attributed to apprehension and threats faced by participants regarding their future employment status. Depression levels on the HADS score were similar to those of other studies, as noted by Chen *et al*. in their study. [18] It was noted that seventy-nine per cent of participants had a normal level of depression, and only seventeen per cent had probable depression. In this study, we tried to establish the correlation between severity of hand injury with site of injury (p=0.571), type of injury to hand (p=0.897), cause of injury to hand (p=0.073), handedness of the patient (p=0.714), level of anxiety (p=0.188) and level of depression (p=0.413) in order to see if there is any significance. No remarkably significant correlation was observed between the severity of hand injury and other variables of this study as compared to the study done by Grob et al. in which it was noted that depression was significantly related to hand injury but not to anxiety.[19]

Although no significant correlation could be established between hand injury and the development of anxiety and depression, the results of this study point out the need for further studies to establish the causes of why the majority of the cases had more anxiety than depression levels in this study as compared to other studies.[20] Based on this local data, plastic surgeons are recommended to cater for the psychological distress after a hand injury.

LIMITATION OF STUDY

The authors acknowledge the limitations of this study. The cross sectional design of this study did not help in determining the reasons why a high number of participants in this study had anxiety more than normal levels as compared to other international studies showing a level of depression to be high.

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CONCLUSION

Results of this study do highlight that anxiety is more frequent as compared to depression after hand injury, which can have an impact on the outcome of management. Plastic surgeons need to remain more vigilant regarding the psychological impact of hand injury for early identification and addressing the problem at an early stage of psychological distress.

Conflict of Interest: None.

Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

GA & SAK: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

MT & HR: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

TMA & SAA: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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