RESEARCH ARTICLE

Psychological Impact of Orthopedic Trauma among Patients Attending Secondary Care Center in Al Majmaah, Saudi Arabia

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Abstract

Trauma is a great global health challenge as a leading cause of mortality and morbidity worldwide. The World Health Organization (WHO) estimated 9% of worldwide deaths are due to trauma and 100 million people are temporarily or permanently disabled every year. Objective: To estimate the prevalence of psychological distress among people who underwent orthopedic trauma and infer the association between orthopedic trauma and psychological distress to assess the socio-demographic determinants of trauma and the consequent psychological distress. *ASEAN Journal of Psychiatry, Vol. 23(9): September 2022:1-10.*

Keywords: Depression, Orthopedic Trauma, Stress Disorder

Introduction

Trauma is a great global health challenge as a leading cause of mortality and morbidity worldwide. The World Health Organization (WHO) estimated 9% of worldwide deaths are due to trauma and 100 million people are temporarily or permanently disabled every year [1]. According to the World Health Organization (WHO 2009), more than 1.5 million individuals sustain traumatic physical injuries each year globally A significant proportion of survivors develop serious mental health problems, such as Post Traumatic Stress Disorder (PTSD) and millions of orthopedic patients suffer from permanent or temporary disabilities and lose more years of work life than individuals with cancer or heart diseases combined [2].

Advances in research and health care advancements have reduced mortality and extended life expectancy in developed countries [3] we are living longer, but are we necessarily living better? Stress responses are increased during crises and are associated with long-term physical and mental health consequences. The results of one of the cohort studies revealed that patients in 2020 had more mental illness (43% *vs.* 26%) compared with the 2019 group and there were higher rates of alcohol dependence (n=27 *vs.* n=7), depressive disorder (n=47 *vs.* n=34), and anxiety disorder (n=21 *vs.* n=7) [4]. Psychological consequences of trauma have a leading role in the long-term recovery of patients. Previous studies revealed that almost half of patients with severe trauma screened positive for moderate to severe depression, post-traumatic stress disorder, and phobic anxiety disorder. Psychological distress causes a decline in physical functions [2].

Traumatic injuries contribute to 9% of global mortality. Survivors of traumatic injuries face the

physical, emotional, and financial impact that can affect their lives and their family lives as well. Victims of orthopedic trauma are extremely vulnerable to psychiatric disorders regardless of the severity of the injury and are the major causes of personal suffering, ongoing pain, disability, and economic and social costs [2].

Musculoskeletal injuries also contribute to a high number of in-patients and often contribute to persistent pain, opioid dependence, depression, anxiety, and symptoms of post-traumatic stress disorder [5]. A recent cohort has also identified that after an orthopedic trauma a large number of patients were at risk of psychological disorders. A review article from the American academy of orthopedic surgeons also revealed an association between orthopedic injuries and their psychological impacts. Nearly half of the patients with sustained severe lower limb injury, ad a psychological impact after three months and 42% had even after two years of injury [6]. Physical health is as important as psychological health, in orthopedic trauma care to improve overall the health of the patient.

Although the success of orthopedic procedures is overwhelming nowadays poor functional outcomes have been correlated due to poor emotional health, such as anxiety, depression, post-traumatic stress disorder, poor coping skills, and poor social support and it is independent of postoperative complications. Poor functional outcomes associated with psychological impact have been reported with different orthopedic specialties, including spine surgery, trauma care and fracture repair, sports-related surgery, and total, hip and total knee replacement surgery. In a study of 463 patients with severe lower extremities injury, depression, poor physical function, and greater pain were associated with lower patient satisfaction [7].

In Qatar and the entire region, Road Traffic Collisions (RTCs) are the most common reason for morbidity and mortality. Trauma is one of the leading causes of morbidity and mortality in Saudi Arabia. Preventable injuries are the second leading cause of death, for about a fifth of all reported mortalities in the country. Because Saudi Arabia is a relatively young country (40% of the population is 19 years old and younger), injuries can have significant implications on the country's health and prosperity. Traumatic injuries account for 22.6% of years of potential life lost in Saudi Arabia according to the Global Burden of Disease report [8].

Trauma care is patient-centered, all providers involved in the care of trauma patients must be aware of the psychological as well as the physical manifestations of injury at admission and during recovery [2]. Improving positive factors such as resilience, social support, and self-efficacy has helped people to return to daily routines. Raising awareness of the psychological consequences of trauma could improve post-treatment planning, increase appropriate referrals and implement earlier effective interventions [6].

Material and Methods

A Cross-sectional study was conducted among the patients attending the orthopedics department in King Khalid hospital Al Majmaah KSA for a period of one year. Adult individuals who had consented to participate in the study and with a history of trauma in the past 1 year were included in the study. Individuals with a history of trauma prior to one year, Children, and non-consenting Individuals were excluded. The sample size was 152.

After obtaining informed consent, data were collected by using a standardized self-administered Questionnaire (Refer to Annexures 1 and 2*). Data collected was compiled and entered in a Microsoft excel sheet and analyzed using SPSS software version 21. Qualitative data were presented as frequency and percentages.

Continuous variables were presented as mean and standard deviation. Discrete variables were presented using a median and interquartile range. Comparison between groups was done by using the chi-square test and a p value <0.05 is considered significant.

In order to assess the variables that were significantly associated with DSM-5 Level 1 cross-cutting symptom measure–adult (DSM XC), scores, we used Analysis Of Variance (ANOVA) for ordinal variables and Pearson's correlations coefficient for continuous variables. Variables were found to be significantly associated with DSM XC score, and their relationship with the orthopedic diagnosis was examined. Linear regression analysis was used to examine the association between the total DSM XC score (dependent variable) and all the socio-demographic variables, site of injury, mode of injury, duration since the injury, and HRQOL score as independent variables.

Data were collected from 152 participants (response rate of 90.5%) 59 male and 93 female. The ethical approval was obtained from the central institutional review board ministry of health kingdom of Saudi Arabia Central IRB log No: 20-100E. The data was kept confidential and was utilized only for this study. The study participants belonged to the 16 to 60 years age group. A systematic random sampling technique was used to select the patients from the approximate sampling frame. The interval size of 03 was calculated by using the following formula. k=N/n Where, n=Sample size; N=Population size; k=Size for interval of selection c.

Based on random values every 3rd patient was selected to reach the sample size of 152. Patients were interviewed by a team of researchers and medical students who were trained in advance to understand the scales used. The questionnaire consisted of Demographics details, mode of injury, site of injury, and duration since the injury occurred in patients. The level of Functioning was assessed by applying a short form of health-related quality of life (SF36). The psychological impact was screened by applying the DSM-5 Self-Rated Cross-Cutting Symptom scale. Ethical approval was obtained from Majmaah University Ethics Committee. Consent from the participants was taken. They were briefed about the aims and objectives of the study and the advantage to them as well as to the community due to their participation. All information was kept confidential [9,10].

Measures

The self- and informant-reported versions of the DSM-5 CC Symptom measures were developed by the DSM-5 Task Force and Work Groups to serve as a “review of mental systems” in each patient who presents for mental health evaluation and treatment. The measures assess the presence and severity of 12-13 psychiatric symptom domains that cut across diagnostic boundaries. These include depression, anger, mania, anxiety, somatic symptoms, sleep disturbance, psychosis, obsessive thoughts and behaviors, suicidal thoughts and behaviors, substance use (e.g., alcohol, nicotine, prescription medication, and illicit substance use), personality functioning, dissociation, and cognition/memory problems in adults [11-13].

The DSM-5 CC Symptom measures are operationalized at two levels. Level 1 consists of a 23-item (adults) measure of the presence and severity of symptoms over the past two weeks. The items are rated on a 5-point scale (*i.e.*, 0=None/never; 1=Slight/rare; 2=Mild/several days; 3=Moderate/more than half the days; and 4=Severe/almost daily), with higher scores indicating the greater frequency of occurrence or greater degree of severity. This would enable clinicians to track the presence, frequency of occurrence, and severity of overall psychiatric symptomatology in their patients. The measures were field tested in the DSM-5 field trials and demonstrated mostly good-to-excellent test-retest

reliabilities and strong clinical utility from patient and clinician perspectives [14-18].

Results

Distribution of psychological symptoms among study subjects (n=152)

Table 1 shows that the majority of the individuals *i.e.*, 72.4% reported somatic symptoms, and the least prevalent symptoms found in our study were memory related *i.e.*, 28.9%. The majority of the study subjects were slightly symptomatic across all the variables. 12.5% of patients with somatic symptoms showed the highest prevalence of severity of symptoms.

Table 1: Distribution of psychological symptoms among study subjects (n=152)

Variable	Scores									
	0 (None)		1 (Slight)		2 (Mild)		3 (Moderate)		4 (Severe)	
	n	%	n	%	N	%	N	%	n	%
Depression	50	32.9	34	22.4	31	20.4	19	12.5	18	11.8
Anger	59	38.8	36	23.7	32	21.1	12	7.1	13	8.6
Mania	47	30.9	45	29.6	33	21.7	16	10.5	11	7.2
Anxiety	53	34.9	32	21.1	25	16.4	24	15.8	18	11.8
Somatic symptoms	42	27.6	48	31.6	24	15.8	19	12.5	19	12.5
Suicidal intentions	92	60.5	40	26.3	8	5.3	5	3.3	7	4.6
Psychosis	91	59.9	35	23	14	9.2	6	3.9	6	3.9
Sleep problems	89	58.6	30	19.7	25	16.4	4	2.6	4	2.6
Memory	108	71.1	24	15.8	7	4.6	6	3.9	7	4.6
Repetitive thoughts and behaviour	87	57.2	27	17.8	18	11.8	9	5.9	11	7.2
Dissociation	99	65.1	29	19.1	14	9.2	6	3.9	4	2.6
Personality functioning	89	58.6	29	19.1	20	13.2	5	3.3	9	5.9
Substance abuse	101	66.4	13	8.6	16	10.5	8	5.3	4	9.2

Association of DSM 5 scores with respect to nationality of study participants

DSM 5 scores across all the domains were similar except for substance abuse where the score was more for non-Saudi compared to Saudi patients. It was found that nationality was not significantly associated with all the domains of the DSM 5 scale.

Association of DSM 5 scores with respect to gender of study participants

DSM 5 scores were similar in both males and females across most of the domains like mania, suicidal intentions, psychosis, memory, personality functioning, and substance abuse but, in some domains; it was higher in males when compared with females. Male gender was significantly associated with anger (p value 0.002), mania (p value 0.012), anxiety (p value 0.000,) and somatic symptoms (p value 0.000).

Association of DSM 5 scores with respect to age of study participants

DSM 5 scores were higher for somatic symptoms where it was more in the 51-60 years old age group, psychosis was more in the 31-40 years age group. Age was not significantly associated with all the domains.

Association of DSM 5 scores with respect to occupation of study participants

DSM 5 scores were almost similar across all the domains. The occupation was not significantly associated with all the domains. Education was not significantly associated with all the domains except substance abuse (p-value 0.007) in postgraduates. The site of injury was not significantly associated with all the domains in Table 2.

Table 2: Association of DSM 5 scores with respect to site of injury among study participants

	Site of Injury								
	Lower limb n=52		Spine n=24		Sprain n=34		Upper limb n=42		P value
DSM 5 DOMAINS	Range	Median	Range	Median	Range	Median	Range	Median	
Depression	4	1	4	1	4	1	4	1	0.303
Anger	4	1	3	1	4	0	4	1	0.23
Mania	4	1	4	1.5	4	1	4	1	0.727
Anxiety	4	1	4	1.5	4	1	4	1	0.253
Somatic symptoms	4	1	4	2	4	1	4	1	0.542
Suicidal intentions	4	0	4	1	4	0	4	0	0.895
Psychosis	4	0	4	1	4	0	4	0	0.697
Sleep problems	4	0	3	1	4	0	4	0	0.592
Memory	4	0	4	0	4	0	4	0	0.716
Repetitive thoughts and behaviour	4	0	4	1	4	0	4	0	0.943
Dissociation	4	0	4	0	4	0	4	0	0.901
Personality functioning	4	0	4	0	4	0	4	1	0.916
Substance abuse	4	0	4	0	4	0	4	0	0.92

In Table 3 Mode of injury was significantly associated with depression (P value 0.016) suicidal intentions (P value 0.045), sleep problems (P value 0.013), and dissociation (P value 0.021).

Table 3: Association of DSM 5 scores with respect to mode of injury among study participants

	Mode of Injury						P value
	Fall down n=90		Road traffic accident n=19		Sports Injury n=43		
DSM 5 DOMAINS	Range	Median	Range	Median	Range	Median	
Depression	4	1	4	2	4	1	0.016
Anger	4	1	4	1	4	0	0.069
Mania	4	1	4	2	4	1	0.202
Anxiety	4	1	4	2	4	1	0.147
Somatic symptoms	4	1	4	2	4	1	0.214
Suicidal intentions	4	0	4	0	4	0	0.045
Psychosis	4	0	4	0	4	0	0.075
Sleep problems	4	0	4	0	4	0	0.013
Memory	4	0	4	0	4	0	0.059

Repetitive thoughts and behaviour	4	0	4	0	4	0	0.643
Dissociation	4	0	4	0	4	0	0.021
Personality functioning	4	0	4	0	4	0	0.191
Substance abuse	4	0	4	0	4	0	0.164

Duration since injury is significantly associated with mania (P value 0.046), suicidal intentions (P value 0.018), psychosis (P value 0.000), and substance abuse (P value 0.024) (Table 4).

Table 4: Association of DSM 5 scores with respect to number of months since injury among study participants

	Number of months since injury												
	1-4		**5-8**		**9-12**		**13-16**		**17-20**		**21-24**		
	n=90		**n=20**		**n=32**		**n=4**		**n=3**		**n=3**		
DSM 5 Domains	**Range**	**Median**	**Range**	**Median**	**Range**	**Median**	**Range**	**Median**	**Range**	**Median**	**Range**	**Median**	**P value**
Depression	4	1	4	1	4	1	1	2	0	2	1	0.5	0.13
Anger	4	1	4	1	4	1	1	1	1	1.5	0	0	0.08
Mania	4	1	4	1	2	0.5	0	2	1	1.5	1	1.5	0.05
Anxiety	4	1	4	1	4	0.5	1	2	0	2	2	1	0.25
Somatic symptoms	4	1	4	1	4	1	1	1	2	3	0	1	0.09
Suicidal intentions	4	0	4	0	4	0	1	1	2	2	0	0	0.02
Psychosis	3	0	4	0	4	0	1	1	1	0.5	1	0.5	0
Sleep problems	4	0	4	1	2	0	1	0	1	0	1	0.5	0.34
Memory	4	0	4	0	4	0	1	1	1	0.5	0	0	0.14
Repetitive thoughts and behaviour	4	0	4	0	4	0	2	1	0	0	0	0	0.52
Dissociation	4	0	4	0	3	0	1	0	1	0.5	0	0	0.38
Personality functioning	4	0	4	0	4	0	1	1	0	0	1	0.5	0.99
Substance abuse	4	0	4	0	4	0	0	0	1	2.5	1	0.5	0.02

Discussion

The prevalence of depression in our sample was high *i.e.*, around 40% by using DSM 5 CCS score, 20.4% for mild depression and 12.5% for moderate depression, and 11.8% for severe depression, the results are almost similar to the study of N. Husain which reported depression in 45.6% of men and 76.1% of women. These proportions are almost identical to those reported in a similar consecutive sample of patients attending medical clinics at the same hospital (47% of men and 63% of women) [19].

Our results are consistent with studies from the West, in which the prevalence of psychological disorders after physical trauma was 23% to 41%, much higher than found in the general population. Patients with medically unexplained musculoskeletal pains experience great psychological distress and it is more common in patients with arthritis, backache, and other bone pathology [19]. Another study from Riyadh Saudi Arabia reported a prevalence of the depressive disorder in primary care between 17-46% with a global prevalence of up to 13% [20].

The patients included in our study showed a high proportion of suicidal ideations *i.e.*, 13% compared to 5% in one population-based study [21]. The high proportion of suicidal ideations predicts a very high level of distress and probable depressive disorder experienced by many of these patients. Thus, many of these patients need treatment for depression.

In one study from Riyadh, Saudi Arabia Traffic-related injuries were more prevalent (52%) than other orthopedic trauma. However, a study from Indonesia reported 80% of injuries due to RTA, while India reported 39.2%, Iran 31.9%, and Oman (29.6%) [22]. The reason behind less percentage of injuries due to RTA in our study is that we have collected data from OPD and in data mentioned in the other study was from the emergency dept.

P-value was significant with the male gender in domains of anger, anxiety, and somatic symptoms. These symptoms indicate that the presence of orthopedic trauma probably prevented them from earning a living or doing their usual occupational functioning and other tasks and leading them towards psychiatric disorders.
It is possible that physical symptoms could have inflated the DSM 5 CSS scores even if controlled for severity of pain and level of physical disability. We found that the Mode of injury *i.e.*, road traffic injury was significantly associated with an increased score of depression, suicidal ideation (P value 0.045), and sleep disturbance (0.013). There was no difference between Saudi and other nationalities, age, education, and occupation with respect to DSM 5 scores.

In this study, we found that 25% of them were substance abusers and this was significantly associated only with a level of education *i.e.*, post-graduation (P-value 0.007) rather than with gender, occupation, or nationality. Substance use in patients having orthopedic trauma was high, with tobacco smoking and hazardous drinking when compared with the general population.

In other studies, the overall incidence of drugs was 56%, out of which 22% of patients tested positive for two or more drugs, and 9% for three or more drugs. Alcohol (25%) was the most commonly detected drug, followed by cocaine (22%) and marijuana (21%). The highest incidence of drug use was found in males and in those aged 31-40 years [23]. Studies showed that drug-using patients had more severe orthopedic injuries and required longer hospitalizations consistent with our study where the P value (0.024) was significantly associated with substance abuse and duration of injury, but not associated with mode of injury, or site of injury.

Regarding mode of injury road traffic accidents were significantly associated with depression, suicidal intentions, sleep problems, and dissociation. 12.5% of individuals in our study came with RTA while the majority *i.e.*, 59% came with a history of falls followed by sports injury *i.e.*, 28%. The main strength of the present study is the high response rate, as it is a cross-sectional study,

Conclusion

Depressive disorder is very common in post-orthopedic trauma patients. The prevalence of depression in our sample was also high. The majority of our study subjects were slightly symptomatic across all the variables but most individuals scored high on somatic symptoms.

They have a high proportion of suicidal ideations and the male gender was prone to anger and anxiety because of unmet financial needs due to trauma, while, postgraduates were more into substance abuse behavior. Road traffic accident victims were having depression, suicidal intentions, sleep problems, and dissociation. This study has mentioned the massive unmet mental health needs in developed countries as well, and immediate actions are required.

Limitations

The main limitation of this study is the fact that we did not perform second-stage interviews for diagnosing definite psychiatric illnesses. We cannot establish with certainty the level of distress among patients before their current illness; it is possible that they were depressed prior to their injury.

Recommendations

Orthopedic surgeons may need methods of screening for common mental health disorders either by using a questionnaire or by asking pertinent questions. Patients who screen positive can be treated immediately with antidepressants and/or referred for further assessment and treatment by mental health professionals. We need to develop ways to achieve success in screening and treatment methods in a manner that is compatible with the brief time available to orthopedic surgeons in outpatient clinics.

Acknowledgment

We would like to thank the Deanship of Scientific Research, Majmaah University, Majmaah for supporting this study with project number R-2022-309.

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Received: 21 September 2022**, Manuscript No.** AJOPY-22-75604**; Editor assigned:** 23 September**, PreQC No.** AJOPY-22-75604 **(PQ); Reviewed:** 03 October 2022**, QC No** AJOPY-22-75604**; Revised:** 10 October 2022**, Manuscript No.** AJOPY-22-75604 **(R); Published:** 17 October 2022**, DOI:** 10.54615/2231-7805.47351**.**