Prevalence of Depression and Anxiety and Associated Factors among Patients Visiting Orthopedic Outpatient Clinic at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2017

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Abstract

Introduction: Orthopedic Trauma exerts a holistic influence on survivors' physical health including a range of mental health problems which interfere with survivors' recovery. Psychiatric disorders and behavioral disturbances are reported to be 3-5 times more common among people with injuries and are predictor of poor outcome and ongoing disability. Therefore, assessing depression and anxiety among orthopedic trauma patients play a vital role in implementing further interventions.

Methods: Institutional based cross-sectional study was conducted at Tikur Anbessa specialized hospital from May 29-June 30, 2017. Hospital anxiety and depression scale was used to assess anxiety and depression by using face to face interview. Systematic sampling technique was used to select a total of 407 participants. Data has been analyzed using SPSS 20. Bivariate and multivariate logistic regression was done to identify associated factors. Variables with p-value <0.05 have been considered as statistically significant.

Result: Prevalence of depression and anxiety were 36.1% and 39.8% respectively. Being female (AOR=2.3595%CI (1.48,3.72)), poor social support (AOR=2.5195%CI (1.30,4.85)), developing complication (AOR=1.9195%CI (1.07,3.52)), presence of amputation (AOR=3.6495%CI (1.60,8.24)) and having pain (AOR=2.0295%CI (1.24,3.30)) for depression and being female (AOR=1.9995%CI(1.11,3.57)), having chronic medical illness (AOR=3.0795%CI(1.36,6.92)), having family history of mental illness (AOR=2.24 95%CI (1.05,5.4.91)), lower extremity injury (AOR=2.93 95%CI (1.38,6.21)) and having severe pain (AOR=2.75 95%CI (1.32,5.74)) for anxiety had significant association at p–value <0.05.

Conclusion: prevalence of depression and anxiety were high. Being female, having poor social support, developing complication, presence of amputation and having pain for depression; and being female, having chronic medical illness, having family history of mental illness, lower extremity injury and having severe pain for anxiety were significantly associated factors. It is good if clinicians give emphasis for orthopedic patients especially for females and with chronic medical illness.

Keywords: Depression; Anxiety; Orthopedic trauma; Hospital anxiety; Depression scale

Introduction

Statement of the problem

Orthopedic trauma is defined as a severe injury to part of the musculoskeletal system such as bones, joints, or ligaments. Car accidents are a common cause of Orthopedic trauma, other causes of trauma includes slips, falls, and industrial accidents [1]. From worldwide reports Orthopedic traumatic injury accounts for 16% of the total burden of disease [2], this makes it the leading cause of morbidity. Most people with Orthopedic trauma injuries survive from their accident but resulted in a number of negative health outcomes [3]. Approximately 2.8 million people experience Orthopedic injuries annually in USA [4].

Orthopedic Trauma exerts a holistic influence on survivors' physical health including a range of mental health problems which interferes with survivors' recovery. It mainly affects the psychosocial status of affected people as well as their families and careers [1]. Psychiatric disorders and Behavioral disturbances are reported to be three to five times more common among people with injuries which are severe enough to require hospital admission [5]. Survivors commonly develop psychiatric problems like depression and anxiety disorders [6].

The psychological sequelae may continue long after physical injuries have been treated which leads to psychiatric illness [7].

The prevalence of psychological illnesses following traumatic injuries vary according to the instruments used for measurement, the timing of the assessment and types of trauma. Anxiety and Depression has been found in up to 40% and 42% of injury survivors respectively long years following injury in a study conducted at US [8]. Another study supporting this was conducted among 363 patients after a severe Orthopedic trauma and found that 15 and 14% of them had a mental disorder [6].

Different studies in different countries tried to show the magnitude

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of depression and anxiety among orthopedics trauma victims. Among this a study from Jordan among amputated patients in their lower extremity reported the magnitude of anxiety and depression to be 37% and 20% respectively as measured by hospital anxiety and depression scale (HADS) [9]. A cross sectional study conducted at Brazil to compare depression and anxiety in two separate samples i.e., clinical and Orthopedic trauma patients reported that magnitude of anxiety to be 35% and magnitude of depression to be 28% for the clinical sample and 44% and 33% for the Orthopedic trauma sample [10].

In a study done at UK to investigate the presence and rates of anxiety and depression in Orthopedic postsurgical patients using the HADS, depression and anxiety was found in 50% and 30.36% of patients respectively [11].

Despite the high burden of orthopedic trauma in Ethiopia, the psychiatric sequelae are almost unforeseen. This leads to an avoidable but unalleviated suffering to the survivors.

Therefore, this study described the prevalence of depression and anxiety and associated factors among orthopedic population in the study area. The results of this study serves as a source of direction for intervention by being an input in planning future services for those who develop psychological problems after sustaining orthopedic trauma.

Methods

Study setting and design

Institutional based cross sectional study was conducted from May 29-June 30, 2017 at Tikur Anbessa, specialized hospital.

Study population

The study population includes orthopedic trauma patients visiting Tikur Anbessa specialized hospital during data collection period. Those Orthopedic trauma patients who are on follow up and aged 16-65 were tried to be included in the study and those orthopedic trauma patients who were severely sick and unable to communicate were excluded from the study.

Sample size determination

The sample size was calculated by using single population proportion formula, Considering the following assumptions; prevalence p=50% because no similar study done in our country among orthopedic population, 95% confidence interval, margin of error 5%, non-response rate 10%. Therefore the final sample size was 423. A systematic sampling technique was applied to select study units at orthopedic outpatient clinic during the study period. Sampling interval (k) was determined by dividing total study population during one month data collection period by a total sample size then the starting point was randomly selected.

Data collection

A structured interviewer administered questionnaire was used which has five sub sections: a socio-demographic questionnaire to assess the patients' background information. Hospital anxiety and depression scale (HADS) was applied to determine anxiety and depression. The HADS has two subscales: the anxiety subscale (HADS-A) and the depression subscale (HADS-D). Each subscale contains seven items for a total of 14 items in the HADS [12]. The reliability of HADS found to have cronbach's α for the total HADS, the HADS-A and HADS-D of 0.78, 0.73 and 0.76 respectively. It has cutoff point ≥ 8 for each subscale

to be positive for anxiety and depression [13]. Substance use history was assessed by yes/no answers of respondents and is operationalized according to different literatures. Similarly chronic medical illness and family mental illness were assessed by yes/no answers of respondents. Social support was measured by the Oslo-3 social support scale. It has the sum score ranging from 3–14 [14]. The numeric pain rating scale (NPRS) was used to measure intensity of pain. The scoring ranges from 0-10 and classified into four scales as no pain, mild pain, moderate and severe pain [15].

Data processing, analysis, interpretation and presentation

The completed data was entered using Epi-info 7 then it was exported to SPSS 20 version statistical software for analysis. Descriptive statistics, bivariate analysis and multivariate logistic regression were used. Bivariate analysis was used to see association between outcome and each independent variable and Variables whose p-values <0.2 were entered to multivariate logistic regression to control confounding factors. The significance was declared at p-value <0.05. Strength of association was described using adjusted odd ratio (AOR) with its respective 95% CI. Results are presented in the form of table and graphs using frequency and summary statistics such as mean and percentage to describe the study population in relation to relative variables and discussed with previous results.

Ethical consideration

Ethical clearance was obtained from both university of Gondar and Amanuel mental specialized hospital Ethical Review committee. Written Informed consent was obtained from participants aged 18 years and above. Written assent was also obtained for those who aged below 18 years from patients' caregiver coming with them. Each respondent was informed about the objective of the study that it will contribute necessary information for policy maker and other concerned body. Anyone who was not willing to participate in the study was not forced to participate. They were also informed that all data obtained from them would kept confidentially by using code instead of any personal identifier and is meant only for the purpose of study. For the participants who were found to be positive for anxiety and depression during the study, linkage to nearby psychiatric clinic were done in order to have further assessment on their condition and it was done for a total of 18 patients.

Results

Socio demographic characteristics

A total of 407 participants with a response rate of 96.21% were included in the study. Among this 260(63.9%) were males. The mean age of the participant's was 37 years (SD=±13.5 yrs) ranges from 16 to 65 years, more than one fourth 109(26.8%) were in age group of 26-35 years, 266 (65.4) were orthodox Christian religion followers, 227 (55.8%) were married, 257(63.1) reported as they have children which ranges from 1 to11, 162 (39.8%) were Amhara by ethnicity followed by Oromo accounted for 133 (32.7%) of participants (Table 1).

Clinical and substance related factors of participants

According to clinical factors, 99 (24.3%) of them have reported as they had comorbid medical illness among this half 49 (49.5%) of the participants were hypertension patients followed by diabetes mellitus patients which were 34 (34.3%) and 18 (18.2%) of them had other cardiac problems (Figure 1).

Variable		Frequency	Percent (%)
Sex	Male	243	59.7
	Female	164	40.3
Age	16-25	103	25.3
	26-35	109	26.8
	36-45	82	20.1
	46-55	69	17.0
	56-65	44	10.8
Religion	Orthodox	266	65.4
	Muslim	72	17.7
	Protestant	55	13.5
	Other*	14	3.4
Marital status	Married	227	55.8
	Single	121	29.7
	Divorced	31	7.6
	widowed/widower	28	6.9
have children	Yes	257	63.1
	No	150	36.9
No. of children	1-3 children	159	61.9
	≥ 4 children	98	38.1
Ethnicity	Amhara	162	39.8
	Oromo	133	32.7
	Tigre	46	11.3
	Gurage	41	10.1
	Welayita	14	3.4
	Other**	11	2.7
Residence	Rural	82	20.1
	Urban	325	79.9
Educational level	Can't read and write	53	13.0
	elementary school	111	27.3
	high school	109	26.8
	preparatory school	39	9.6
	college and above	95	23.3
Job	Employed	122	30
	Employed	285	70
Monthly income	Below poverty bench mark	189	46.4
	Above poverty bench mark	218	53.6

Note: *= Catholic, Adventist; **=Kefa, Siltie, Sidamo

Table 1: Distribution of orthopedic trauma patients visiting orthopedic unit of Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia, 2017 (n=407).

Regarding current and lifetime substance use, 99 (24.3%) of them used khat in their lifetime and 25 (6.1%) of them used khat within the last 3 months, more than half 222 (54.5%) of the respondents were life time alcohol users, and 69 (17.0%) were current alcohol users. 43 (10.6%) of participants used tobacco products in their lifetime and 10 (2.5%) were current tobacco product users (Figure 2).

Psychosocial and trauma related factors of participants

From the total participants 167 (41.0%) had poor social support among this 68 of them were females, 164 (40.3%) had moderate social support and among this 62 of them were females and 76 (18.7%) had good social support in which females accounted for almost half \. According to trauma related factors of respondents 133 (32.7%) had upper extremity injury, 294 (72.2%) had lower extremity injury and 16 (3.9%) had injuries from both upper and lower extremity. Road traffic accident was the cause for injury in 174 (42.8%) of study participants followed by falling accident which was responsible for Orthopedic injury in 110 (27.0%) of participants.

Regarding the type of injury 290 (71.3%) were fractures among these closed fractures accounted almost half 143 (49.3%). 67 (16.5%) developed complication and among these 60 (89.6%) developed infection. A total of 36 (8.8%) have undergone amputation, in which 13 (34.2%) have undergone amputation in their upper extremity and 25(65.8%) have undergone amputation in their lower extremity. Pain was reported by 257 (63.1%) of study participants. The mean pain intensity score of was 4.51(SD=2.34) which ranges from 1-10, among those 110(27.0%) had mild pain, 83 (20.4%) of them has moderate pain and 64(15.7%) had severe pain within the past 12 hours (Table 2).

Prevalence of depression and anxiety

My study showed that prevalence of depression was 147 (36.1%) with 95% CI (31.4, 40.3) and prevalence of anxiety was 162 (39.8%) with 95% CI (35.1, 45.2). The prevalence rate was higher among females since 77/164 (52.4%) and 87/164(53.7%) females met the screening criteria for depression and anxiety respectively is higher when compared to 70/243(47.6%) and 75/243(46.3%) of males met the screening criteria for depression and anxiety respectively in the study.

Factors associated with depression and anxiety

Bivariate analysis of factors for depression revealed that independent variables; sex, monthly income, social support, chronic
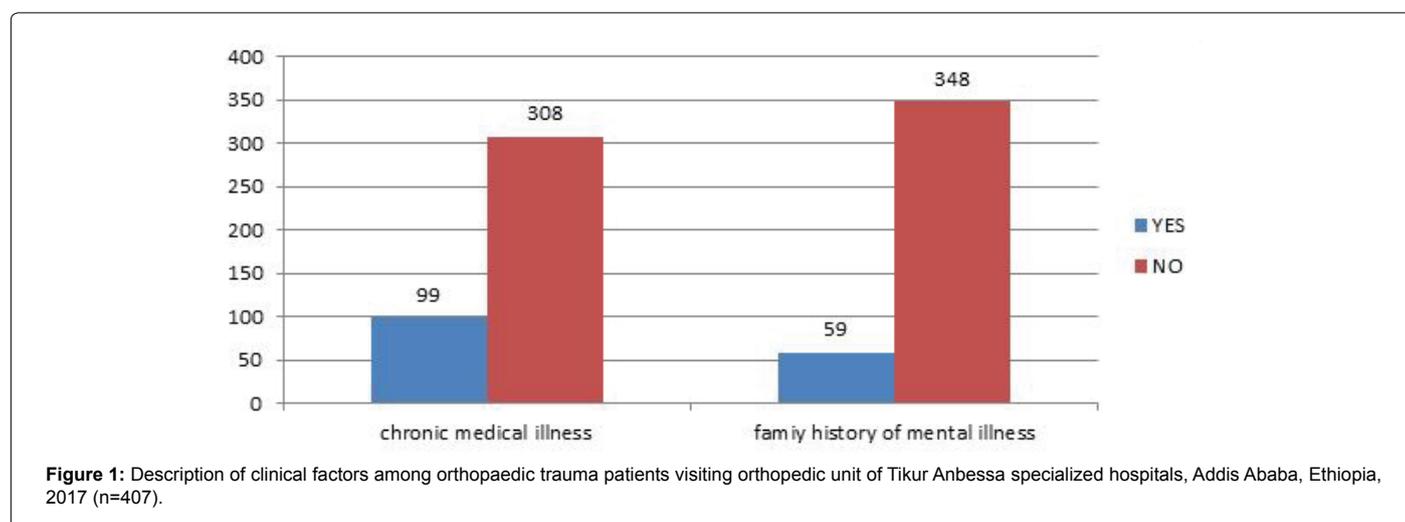

Figure 1: Description of clinical factors among orthopaedic trauma patients visiting orthopedic unit of Tikur Anbessa specialized hospitals, Addis Ababa, Ethiopia, 2017 (n=407).
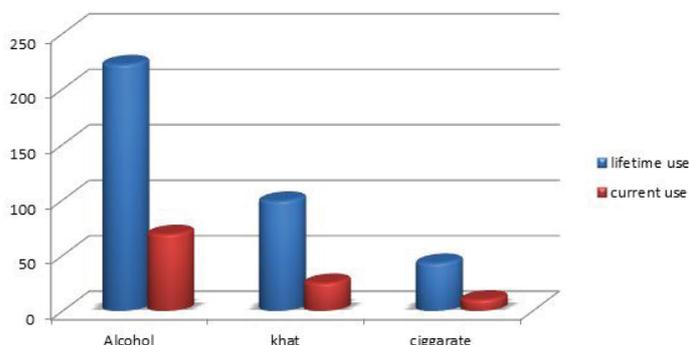
Figure 2: Substance related characteristics of orthopedic trauma patients visiting orthopedic unit of Tikur Anbessa specialized hospitals, Addis Ababa, Ethiopia, 2017 (n=407).

Variables		Frequency(N)	Percent (%)
Upper extremity injury	Yes	133	32.7
	No	274	67.3
lower extremity	Yes	294	72.2
	No	113	27.8
Multiple limb injury	Yes	16	3.9
	No	391	96.1
Cause for injury	Road traffic accident	174	42.8
	Fall	110	27.0
	Assault/blow	55	13.5
	Machine	5	1.2
	Crash	30	7.4
	Bullet/blast	16	3.9
	Other*	17	4.2
Type of injury	Fracture(yes)	290	71.3
	Closed	143	49.3
	Open	92	31.0
	Fracture and dislocation	57	19.7
	Dislocation and sprain (yes)	47	11.5
	Ligament injury	37	9.1
	Other**	40	9.8
Complication	Yes	67	16.5
	No	340	83.5
Type of complication	infection	60	89.6
	gangrene	5	7.4
	Other***	2	3.0
Duration since injured	≤ 3 month	141	34.6
	4-6 month	97	23.8
	>6 month	169	41.5
Pain	Yes	257	63.1
	No	150	36.9
Pain intensity	mild	110	42.8
	moderate	83	32.3
	severe	64	24.9

Note: *=medical illness (DM, cancer, muscle TB), chill, unknown cause; **=nerve injury, medical amputation; ***=sepsis, fibrosis

Table 2: Description of trauma related factors among orthopaedic trauma patients visiting orthopedic unit of Tikur Anbessa specialized hospitals, Addis Ababa, Ethiopia, 2017 (n=407).

Variables		Depression		COR(95% CI)	AOR (95 CI %)
		Yes	No		
Sex	Male	70	173	1	1
	Female	77	87	2.19(1.45, 3.31)	2.35(1.48, 3.72) ***
Income	Below poverty bench mark	78	111	1.52(1.01, 2.28)	1.30(0.83, 2.06)
	Above poverty bench mark	69	149	1	1
Social support	Poor	76	91	2.51(1.37, 4.57)	2.51(1.30, 4.85) **
	Moderate	52	112	1.39(.75, 2.58)	1.33(0.69, 2.56)
	Strong	19	57	1	1
Chronic medical illness	Yes	46	53	1.78(1.12, 2.82)	1.42(0.86, 2.36)
	No	101	207	1	1
lifetime tobacco use	Yes	20	23	1.62(0.86, 3.07)	1.67(0.82, 3.42)
	No	127	237	1	1
Multiple site injury upper extremity	Yes	11	10	2.02(0.84, 4.88)	1.58(0.59, 4.27)
	No	136	250	1	1
Complication	Yes	36	31	2.40(1.41, 4.08)	1.94 (1.07, 3.52) *
	No	111	229	1	1
Amputation	Yes	26	12	4.44(2.17, 9.10)	3.64(1.60, 8.24) **
	No	121	248	1	1
Pain	Yes	104	153	1.69(1.10, 2.61)	2.02 (1.24, 3.30) **
	No	43	107	1	1
Total		147	260		

Note: α = 0.05* P-value<0.05; ** P-value< 0.01; *** P-value<0.001

Model fitness

Hosmer and Lemeshow Test			
Step	Chi-square	df	Sig.
1	14.374	8	0.073

Table 3: Bivariate and multivariable analysis of factors associated with depression among orthopaedic trauma patients visiting orthopedic unit of Tikur Anbessa specialized hospitals, Addis Ababa, Ethiopia, 2017 (n=407).

medical illness, use of tobacco products in a life time, multiple site injury in the upper extremity, developing complication, presence of amputation and having pain were found to have p-value <0.2 (Table 3). On the other hand Bivariate analysis of factors for anxiety depicted that independent variables; sex, educational status, chronic medical illness, family history of mental illness, lower extremity injury, multiple site injury in the lower extremity, developing complication, presence of amputation, site of amputation and pain intensity were found to have p-value <0.2 (Table 4).

These factors were entered into multivariate logistic regression for

Variables		Anxiety		COR(95% CI)	AOR (95 CI %)
		Yes	No		
Sex	Male	75	168	1	1
	Female	87	77	2.53(1.68, 3.81)	1.99(1.11, 3.57)*
Educational status	Can't read and write	24	29	1.49(0.75, 2.94)	1.26 (0.47, 3.40)
	Elementary	38	73	0.93(0.53, 1.66)	0.76(0.34, 1.71)
	high school	53	56	1.70(0.97, 2. 98)	1.65(0.76, 3.59)
	preparatory school	13	26	0.90(0.41, 1. 97)	1.49(0.52, 4.28)
	College and above	34	61	1	1
Chronic medical illness	Yes	54	45	2.22(1.40, 3.52)	3.07 (1.36, 6.92)**
	No	108	200	1	1
Family history of mental illness	yes	34	25	2.34(1.34, 4.09)	2.24(1.05, 4.91)*
	no	128	220	1	1
Lower extremity injury	yes	130	164	2.01(1.36, 3.21)	2.93(1.38, 6.21)**
	no	32	81	1	1
Multiple site injury lower extremity	yes	17	10	2.76(1.23, 6.18)	1.90(0.70, 5.18)
	no	145	235	1	1
Complication	yes	35	32	1.83(1.08, 3.11)	1.69(0.81, 3.51)
	no	127	213	1	1
Amputation	yes	23	15	2.54(1.28, 5.03)	2.72 (0.86, 8.66)
	no	139	230	1	1
pain intensity	Mild	41	72	1	1
	Moderate	36	49	1.29(0.73, 2.30)	1.15(0.60, 2.19)
	Severe	34	25	2.39(1.26, 4.54)	2.75(1.32, 5.74)**
Total		162	245		

Note: α = 0.05; * P-value<0.05; ** P-value<0.01; *** P-value<0.001

Model fitness

Hosmer and Lemeshow Test			
Step	Chi-square	df	Sig.
1	3.598	8	0.891

Table 4: Bivariate and multivariable analysis of factors associated with anxiety among orthopaedic trauma patients visiting orthopedic unit of Tikur Anbessa specialized hospitals, Addis Ababa, Ethiopia, 2017 (n=407).

further analysis in order to control confounding effects except site of amputation for anxiety which is found to have co linearity with lower extremity injury and dropped(Pearson correlation coefficient=1.00, p-value=0.000). As a result being female, poor social support, developing complication, presence of amputation and having pain are found to be statistically significant for depression. On the other hand being female, having chronic medical illness, having family history of mental illness, lower extremity injury and severe pain are found to be statistically significant for anxiety.

Females were 2.35 times more likely to develop depression than males (AOR=2.35,95% CI:1.48,3.72), those who had poor social support were 2.51 times more likely to develop depression as compared those who had good social support (AOR=2.51,95% CI: 1.30,4.85),the odds of developing depression among those who developed complication were1.94 times higher as compared to those who didn't develop complication(AOR=1.94, 95% CI: 1.07, 3.52), the odds of developing depression among those who undergo amputation were 3.64 times higher as compared to those who didn't undergo amputation(AOR=3.64, 95% CI: 1.60,8.24) and Participants who had pain within 24 hours were 2.02 times more likely to develop depression than participants who didn't have pain (AOR= 2.02, 95% CI: 1.24, 3.30) (Table 3).

Females were 1.99 times more likely to develop anxiety than males (AOR=1.99,95% CI:1.11,3.57), those who had chronic medical illness were 3.07 times more likely to develop anxiety as compared to those who didn't have chronic medical illness (AOR=3.07,95% CI:1.36,6.92),the

odds of developing anxiety among those who had family history of mental illness were 2.24 times higher as compared to those who didn't have family history of mental illness (AOR=2.24, 95% CI: 1.05,4.91), the odds of developing anxiety among those who had lower extremity injury were 2.90 times higher as compared to those who didn't have lower extremity injury (AOR=2.93, 95% CI: 1.38, 6.21) and the odds of developing anxiety among those who had severe pain within the last 24 hours were 2.75 times more likely to develop anxiety when compared those who had mild pain within the last 24 hours (AOR=2.75, 95% CI: 1.32,5.74) (Table 4).

Discussion

Discussion on prevalence of depression and anxiety

The study revealed that the prevalence of depression was 36.1%. This result was in line with studies conducted at US 32% among long-term limb amputation patients [16], Brazil 33% among orthopedic patients [10] and India 38% [17]. However, the current study finding for depression was higher than the studies conducted Jordan 20% [9]. The reason for the above difference might be due to difference in sample size which was only 54 patients in Jordan [9], study population who were unilateral lower limb amputated patients from both inpatient and outpatient at Jordan [9].

On the other hand the finding of this study on prevalence of depression was lower than a study conducted at US 42% [18] and another study in US 45% [19] in UK 50% [11] and in India 87.6% [20].

This difference might be attributed to time point the studies conducted which was a long-term study after injury in US [18], measurement tool which was beck depression inventory(BDI) used in US [19], study subjects who were post-operative patients in a study conducted at UK [11] and indoor orthopedic patients in a study conducted at India [20].

The study also revealed prevalence of anxiety to be 39.8%. This result was in line with studies conducted at US 40% among 1560 traumatic brain injury patients [21], Jordan 37% among lower limb amputation patients [9] and Brazil 44% among orthopedic patients [10]. However, the current study finding on prevalence of anxiety was higher than studies conducted at US 16% [22] and another study at US 34% [16] and UK 30.36% [11]. This difference might be due to difference in study population which was only MVC patients at US [22], only lower limb amputation patients in another US study [16] and only post-surgical patients at UK [11].

The other reason for such deference might be a type of study design in which US study applied cohort study design [22]. It might be also due to point of time a study is conducted in which a US study conducted on long-term lower limb amputation patients [16] and deference in sample size which was 56 in UK [11]. On the contrary the result of current study is lower than a study conducted in US university of Florida which reported elevated level of anxiety in each participant [23]. This difference might be due to difference in sample size since only 50 orthopedic patients were studied and difference in study design which was a cohort study [23].

Discussion on factors associated with depression and anxiety

Discussion on factors associated with depression: This study revealed that variables like being female, having poor social support, those who develop complication, amputation and having pain were found to be statistically significant for depression. Females were 2.35 times more likely to develop depression than males. This study was in line with a study conducted in china (AOR=2.62) [24]. This study was supported by studies conducted in US, UK, Korea, Jordan, Hong Kong Pakistan and India [9,20,25-29].

The odds of developing depression among those who have poor social support were 2.51 times higher when compared to those who have strong social support social support. This may be due to the negative psychological effects that patients have after sustaining orthopedic trauma which lead to poor mental health, since positive social support appears to increase victims coping capacity for such events [30]. The current study was supported by studies conducted at US and Pakistan [23,25].

Those who developed complication after orthopedic injury were 1.94 times more likely to develop depression than those who didn't developed complication. This may be due to a reduction in functional independence and long term survival time after developing complication of orthopedic trauma injury pre or post-surgical procedures [31] which appears to undermine the victim's mental wellness and increases patients' susceptibility for mental health problems. This may also be due to immunity suppression and neurotransmitter disturbances after development of complications which are the major causes of morbidity including mental health problems, depression [32,33].

The odds of developing depression among those who undergo amputation were 3.64 times higher as compared to those who didn't undergo amputation. This may be attributed to adjustment reactions to the new event and lose of sense of independence and having to rely on others for some of the most common everyday needs after losing of one or more limbs [34], because victims may come up with difficulties in carry out daily activities as well as other tasks and it affects their recovery after orthopedic injury. This may result in increased chance of physical and psychological disabilities which are major causes of emotional distress [1,34,35]. This may also be due to the fact that distortion of the patients' body image and decreased self-esteem after amputation which sets a series of emotional, perceptual and psychological reactions [36]. This was supported by a study conducted at Jordan [9].

Those who had pain within the last 24 hours were 2.02 times more likely to develop depression than those who didn't have pain within the last 24 hours. This may be due to increased discomfort on patients which leads to increased emotional distress. It may also be due to the fact that pain is shown to cause altered synaptic connectivity at the prefrontal cortex and hippocampus [37], as well as altered dopamine signaling from the ventral tegmental area [38], these changes have been known to trigger negative symptoms of depression [39]. This was supported by studies conducted in UK and Korea [26-28].

Factors associated with anxiety: The study also revealed that independent variables; being female, having family history of mental illness, lower extremity injury and severe pain were found to be significantly associated with anxiety. Females were 1.99 times more likely to develop anxiety than males. This was in line with a study conducted at china (AOR=2.74) [24]. This study was supported by studies conducted in Jordan, Hong Kong, Pakistan and India [9,20,25,29].

The odds of developing anxiety among those who had chronic medical illness were 3.07 times higher when compared to those who didn't have chronic medical illness. This may be due to distressing or disabling chronic medical illness challenges effective coping skills of survivors [40] and life style changes after injury which may leads to increased morbidity and immune suppression since chronic stress has a significant effect on the immune system that ultimately manifest an illness by raising catecholamine and suppressor T cells levels, which suppress the immune system [41].

The odds of developing anxiety among those who had family history of mental illness were 2.24 times higher when compared to those who didn't have family history of mental illness. This may be due to the roles of genetic predisposition in making victims susceptible for anxiety when it combines with environmental factors i.e. orthopedic trauma [42]. As far as my knowledge the significant association of having family history of mental illness with anxiety was not seen in another study among orthopedic population.

The odds of developing anxiety among those who had lower extremity injury were 2.93 times higher when compared to those who didn't have lower extremity injury. This may be due to increased negative psychological effects that may arise from getting physical disability, catastrophic reactions for the event and life style changes after injury [43]. This result was supported by a study conducted at Jordan [9] and UK [44].

The odds of developing anxiety among those orthopedic patients who had severe pain within 24 hours were 2.75 times higher when compared to those orthopedic patients who had mild pain within 24 hours. This may be due to increased discomfort which leads to increased distress and decreased patients' satisfaction and delayed ambulation which leads to increased morbidity [45-47]. This was supported by a study conducted in UK and Korea [26,28].

Conclusion and Recommendation

In the current study the prevalence of depression and anxiety were high. Being Female, having poor social support, developing complication, presence of amputation and having pain were significantly associated with depression. On the other hand being Female, having chronic medical illness, having family history of mental illness, lower extremity injury and having severe pain within the last 24 hours were significantly associated with anxiety. It is good if clinicians working at orthopedic clinics give emphasis for patients' psychological state during evaluating especially for females, those having comorbid medical illness, develop complication, patients who undergo amputation and those with severe pain. It is also good if other researchers conduct prospective cohort study to investigate temporal relationship between factors such as comorbid medical illness and amputation, and depression and anxiety.

Acknowledgements

Authors' Contributions

MS participated in the conception and design of the study, wrote the proposal, participated in data collection, analysis and write up of this manuscript. Niguse Yigizaw, Tolesa Fanta, Dawit Assefa and Enguday Tirfeneh participated in the design of the study, wrote the proposal, analysis and write up and edition of this manuscript. All authors read and approved the final manuscript.

Competing Interests

The authors declare that they have no competing interest.

References

1. Woolf AD, Pfleger B (2003) Burden of major musculoskeletal conditions. Bull World Health Organ 81: 646-656.

2. WHO (2004) Guidelines for essential trauma care. World Health Organization, Geneva.

3. Bhandari M, Busse JW, Hanson BP, Leece P, Ayeni OR, et al. (2008) Psychological distress and quality of life after orthopaedic trauma: an observational study. Can J Surg 51: 15-22.

4. Hall MJ, DeFrances CJ, Williams SN, Golosinskiy A, Schwartzman A (2010) National Hospital Discharge Survey: 2007 Summary. Natl Health Stat Report 29: 1-20.

5. Kuhn WF, Bell RA, Netscher RE, Seligson D, Kuhn SJ (1990) Psychiatric assessment of leg fracture patients: A pilot study. Int J Psychiatry Med 19: 145-154.

6. O'donnell ML, Creamer M, Elliott P, Atkin C, Kossmann T (2005) Determinants of quality of life and role-related disability after injury: impact of acute psychological responses. J Trauma 59: 1328-1335.

7. Shapland J, Willmore J, Duff P (1985) Victims in the criminal justice system.

8. Zatzick D, Jurkovich GJ, Rivara FP, Wang J, Fan MY, et al. (2008) A national US study of posttraumatic stress disorder, depression, and work and functional outcomes after hospitalization for traumatic injury. Ann Surg 248: 429-437.

9. Hawamdeh ZM, YS Othman, AI Ibrahim (2008) Assessment of anxiety and depression after lower limb amputation in Jordanian patients. Neuropsychiatr Dis Treat 4: 627.

10. de Moraes VY, Jorge MR, Faloppa F, Belloti JC (2010) Anxiety and depression in Brazilian orthopaedics inpatients: a cross sectional study with a clinical sample comparison. J Clin Psychol Med Settings 17: 31-37.

11. Nickinson RS, Board TN, Kay PR (2009) Post-operative anxiety and depression levels in orthopaedic surgery: a study of 56 patients undergoing hip or knee arthroplasty. J Eval Clin Pract 15: 307-310.

12. Zigmond AS, Snaith RP (1983) The hospital anxiety and depression scale. Acta Psychiatr Scand 67: 361-370.

13. Reda AA (2011) Reliability and validity of the Ethiopian version of the hospital anxiety and depression scale (HADS) in HIV infected patients. PLoS One 6: e16049.

14. Abiola T, Udofia O, Zakari M (2013) Psychometric properties of the 3-item oslo social support scale among clinical students of Bayero University Kano, Nigeria. Malaysian Journal of Psychiatry 22: 32-41.

15. Mintken PE, Glynn P, Cleland JE (2009) Psychometric properties of the shortened disabilities of the arm, shoulder, and hand questionnaire (QuickDASH) and numeric pain rating scale in patients with shoulder pain. J Shoulder Elbow Surg 18: 920-926.

16. Desmond DM, MacLachlan M (2006) Affective distress and amputation-related pain among older men with long-term, traumatic limb amputations. J Pain Symptom Manage 31: 362-368.

17. Malik P, Garg R, Sidhu BS, Sharma KC, Gulia AD (2012) Psychiatric Morbidity in Post Traumatic Orthopedically Handicapped Patients. Delhi Psychiatry Journal 15: 130-135.

18. Amstadter AB, Vernon LL (2008) Emotional reactions during and after trauma: A comparison of trauma types. J Aggress Maltreat Trauma 16: 391-408.

19. Crichlow R, Andres PL, Morrison SM, Haley SM, Vrahas MS (2007) Depression in orthopaedic trauma patients. Prevalence and severity. J Bone Joint Surg Am 37: 1927-1933.

20. Jain R, Rishi R, Sharma B, Kiyawat V (2015) Role of depression and its associating factors in indoor orthopaedic patients. Asian Journal of Medical Sciences 6: 70-76.

21. Horner MD (2008) Predictors of psychological symptoms 1 year after traumatic brain injury: A population-based, epidemiological study. The Journal of Head Trauma Rehabilitation 23: 74-83.

22. Mayou R, Bryant B (2002) Outcome 3 years after a road traffic accident. Psychol Med 32: 671.

23. Barnes RT (2013) Psychological distress in patients with orthopaedic trauma injuries.

24. Wu H, Zhang F, Cheng W, Lin Y, Wang Q (2017) Factors related to acute anxiety and depression in inpatients with accidental orthopaedic injuries. Shanghai Arch Psychiatry 29: 77-84.

25. Husain N, Humail SM, Chaudhary IB, Rahman R, Robinson H, et al. (2010) Psychological distress among patients of an orthopaedic outpatient clinic: a study from a low-income country. Ann Gen Psychiatry 9: 9.

26. Wood RL, Maclean L, Pallister I (2011) Psychological factors contributing to perceptions pain intensity after acute orthopaedic injury. Injury 42: 1214-1218.

27. Gong HS, Lee JO, Huh JK, Oh JH, Kim SH, et al. (2011) Comparison of depressive symptoms during the early recovery period in patients with a distal radius fracture treated by volar plating and cast immobilisation. Injury 42: 1266-1270.

28. Podeszwa DA, Richard HM, Nguyen DC, De La Rocha A, Shapiro EL (2015) Preoperative psychological findings in adolescents undergoing hip preservation surgery. J Paediatr Orthop 35: 253-257.

29. Lam K, Chan SW, Lam SC (2011) Level of psychological distress and social support among patients with limb fractures in Hong Kong. J Clin Nurs 20: 784-793.

30. Gariépy G, Honkaniemi H, Quesnel VA (2016) Social support and protection from depression: systematic review of current findings in Western countries. Br J Psychiatry 209: 284-293.

31. Grocott M, Pearse R (2010) Prognostic studies of perioperative risk: robust methodology is needed. Br J Anaesth 105: 243-245.

32. Bufalino C, Hepgul N, Aguglia E, Pariante CM (2013) The role of immune genes in the association between depression and inflammation: a review of recent clinical studies. Brain Behav Immun 31: 31-47.

33. Marik PE, Flemmer M (2012) The immune response to surgery and trauma: Implications for treatment. J Trauma Acute Care Surg 73: 801-808.

34. Bhuvaneswar CG, Epstein LA, Stern TA (2007) Reactions to amputation: recognition and treatment. Prim Care Companion J Clin Psychiatry 9: 303-308.

35. Crichlow RJ, Andres PL, Morrison SM, Haley SM, Vrahas MS (2006) Depression in orthopaedic trauma patients. J Bone Joint Surg Am 88: 1927-1933.

36. Srivastava K, Saldanha D, Chaudhury S, Ryali V, Goyal S (2010) A study of psychological correlates after amputation. Med J Armed Forces India 66: 367-373.

37. Geha PY, Baliki MN, Harden RN, Bauer W, Parrish TB (2008) The brain in chronic CRPS pain: abnormal grey-white matter interactions in emotional and autonomic regions. Neuron 60: 570-581.

38. Wood PB (2006) Mesolimbic dopaminergic mechanisms and pain control. Pain 120: 230-234.

39. Krishnan V, Nestler EJ (2011) Animal models of depression: molecular perspectives, in Molecular and Functional Models in Neuropsychiatry. Curr Top Behav Neurosci 7: 121-147.

40. Falcone T, Dickstein L, Sieke EH, Franco KN (2014) Coping with chronic medical illness. Cleveland Clinic.

41. Salleh MR (2008) Life event, stress and illness. Malays J Med Sci 15: 9-18.

42. Merikangas KR, Pine D (2002) Genetic and other vulnerability factors for anxiety and stress disorders. Neuropsychopharmacology: The fifth generation of progress, pp: 867-882.

43. Thomas AA, D'silva F (2015) Pain, anxiety & functional status of patients with lower limb fracture and dislocation after open reduction. Nitte University Journal of Health Science 5: 26.

44. McCarthy ML, MacKenzie EJ, Edwin D, Bosse MJ, Castillo RC, et al. (2003) Psychological distress associated with severe lower-limb injury. J Bone Joint Surg Am 85: 1689-1697.

45. Gerbershagen HJ, Aduckathil S, van Wijck AJ, Peelen LM, Kalkman CJ, et al. (2013) Pain Intensity on the First Day after Surgery: A Prospective Cohort Study Comparing 179 Surgical Procedures. Anesthesiology 118: 934-944.

46. Joshi GP, Schug SA, Kehlet H (2013) Postoperative pain management: Number-needed-to-treat approach versus procedure-specific pain management approach. Pain 154: 178-179.

47. De Cosmo G, Congedo E, Lai C, Primieri P, Dottarelli A, et al. (2008) Preoperative psychologic and demographic predictors of pain perception and tramadol consumption using intravenous patient-controlled analgesia. Clin J Pain 24: 399-405.