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ORIGINAL ARTICLE

Psychosocial Impact of Prolonged Skeletal Traction of Lower Extremity Fractures in a Philippine Specialty Tertiary Government Hospital*

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ABSTRACT

Introduction. Skeletal traction for lower extremity injuries remains a preliminary treatment in managing lower extremity fractures in a Philippine tertiary orthopedic hospital. Studies have shown an increased prevalence of the development of depression and anxiety among those confined on skeletal traction before their definitive surgery.

Objective. This study associated variables present in the patient population to the development of depressive and/or anxiety symptoms while on skeletal traction before surgery for lower extremity fractures.

Methodology. Depression and anxiety symptoms were determined using the Hospital Anxiety and Depression Scale in Filipino Version (HADS-P), which is the validated Filipino language version. Clinical and social variables were gathered from patient interviews before the administration of the scoring tool. The HADS-P questionnaire was administered before skeletal traction and a day before definitive surgery.

Results. The study included fifty-four adult patients without prior psychiatric diagnoses and medications indicated for lower extremity skeletal traction before surgery. The results showed an increase in depressive and anxiety symptoms among the population. However, no significant difference was seen relative to the identified demographics. There was a minimum traction duration of 30 days and a maximum of 76 days.

Conclusion. All patients exhibited increased depressive symptoms, however, the longer the duration of traction, the more depressed they got however with less or retained anxiety symptoms. The incidence of these symptoms did not have a significant relationship to the number of days they were in traction nor with the identified patient demographics.

Keywords. skeletal traction, depression, anxiety, orthopedic surgery, days on skeletal traction

INTRODUCTION

In high-income countries, especially with socialized medical assistance, skeletal traction has been abandoned in favor of immediate surgery. Despite all the recommendations pointing to early fixation, the method is still extensively applied as a preliminary treatment in a government orthopedic specialist hospital because of logistic and economic reasons. Because of this, the patient is confined to the bed while waiting for their definitive surgery. In a descriptive study done in Malawi, Africa, patients with lower extremity fractures were primarily treated with eight to twelve weeks of skeletal traction. Aside from pin tract infection, malunion, nonunion, and mobility problems, there was a growing incidence of depression and anxiety among these patients.[1] The time confined in the hospital and the multitude of common complications of skeletal traction led to a growing functional and social handicap, especially among the productive population. Their psychiatric conditions typically outlast recovery from primary illness and hinder the patients from attaining the expected outcome and quality of life after the surgery.

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In a general hospital in Germany, 41.3% to 46.5% of in-patients suffered from a mental disorder, stemming from an organic mental illness, adjustment disorders with depressed mood, or drug dependence. While most of these needed psychiatric help, only 2.66% to 3.30% had consulted.[2] The Department of Health identified the incidence of depressive disorders in the Philippines at 5.3% each year. One in four women is likely to experience depression in her lifetime, with a 10–20% lifetime prevalence, compared to 5.0–10% for men. The average onset of the first depressive episode occurs in the mid 20's. The overall prevalence of psychiatric disorders among medically ill patients in the Philippines is higher (48%) compared to foreign literature.[3]

In 1978, 55% of patients aged 16–45 on skeletal traction for femoral shaft fractures admitted at the UCLA Orthopedic Service developed what was termed "Traction Intolerance Syndrome" after at least three weeks. This was defined as any behavioral or emotional reaction related to skeletal traction severe enough to require psychiatric consultation and/or the use of major psychiatric medication for prolonged periods in the absence of preexisting major psychiatric illness.[4]

The most common psychiatric disorders in hospitalized patients were depressive and anxiety disorders. They were common and frequently outlasted the primary illness, hampering the patients' quality of life post-intervention.[2,3,5-7]

The general objective of the study was to associate variables present in the Filipino patient population to the development of depressive and/or anxiety symptoms while on skeletal traction prior to surgery for lower extremity fractures. Specifically, the study aims to determine the prevalence of anxiety and depression using the Hospital Anxiety and Depression Scale – Pilipino (HADS-P) questionnaire, identify independent variables related to the development of depressive or anxiety symptoms, and determine the association between depression and anxiety and duration of skeletal traction.

Significance of the study

In a setting where most healthcare expenditure comes out-of-pocket, families often struggle to procure money to pay for expensive orthopedic implants. Patients in the lower economic strata frequently receive delayed treatment even in the face of devastating orthopedic trauma. In orthopedics, there is little evidence identifying the psychosocial effects of surgical interventions: specifically, prolonged immobility equated to loss of dignity, fear of permanent disability, anxiety about lacking the means to provide for their family, and regret and guilt for negatively affecting their families. We aimed to identify the deleterious psychiatric effects of delayed definitive surgery so that we can advocate for timely psychiatric referral, better support from their families and medical team, and expedited social services, ultimately leading to earlier definitive care.

METHODOLOGY

This is an institutional cross-sectional study done using non-probability sampling of patients subjected to skeletal traction as part of the management of lower extremity fractures in a specialty orthopedic hospital in the Philippines. Patient recruitment was done in 6 months from July 2021 to January 2022.

A minimum of 50 subjects was set for recruitment based on a level of significance of 5% and a confidence interval of 10%. To account for a possible non-response/patient withdrawal, an additional 20% was suggested, hence placing the minimum to 60 patients. The study was reviewed and approved by the Ethics Review Board of the institution before recruiting the participants.

The researchers were able to recruit 58 Filipino adults aged 19–86 years old who were diagnosed with lower extremity fractures in need of skeletal traction before definitive surgical fixation. The participants were not previously diagnosed with a psychiatric ailment, were not taking any psychoactive medication, and were not taking prohibited substances before engaging in the study. Informed consent was taken prior to participation in the study. We documented the following demographic variables: age, sex, civil status, educational attainment, employment status, monthly income, and the American Society of Anesthesiologists (ASA) classification. Participants were then asked to answer the 14-item validated HADS-P[8] upon admission. The HADS-P was administered again a day prior to definitive surgery; also at this time, the duration of traction was computed and added to the datasheet. Questionnaires were given only twice in the study to eliminate cognitive bias (from recall of their previous answers) and fatigue (from being asked to answer too frequently). The questionnaires were then individually analyzed and scored accordingly. Data were processed using STATA version 15.0 (StataCorp SE, College Station, TX, USA) aided by a third-party statistician. The participants were informed that they could withdraw at any time without any repercussion to their plan of care.

Descriptive statistics including mean, standard deviation, median, and lower and upper quartiles were used to summarize demographic variables. Frequency and proportion were reported for categorical variables. Shapiro-Wilk was used to determine the normality distribution of continuous variables. Continuous quantitative data that did not meet the normality assumption was described using median and range.

The prevalence of depressive and anxiety symptoms was determined by calculating the percentage of patients with a score of 8.0 points or higher on the HADS-P. Logistic regression was used to determine the association of the clinical variables with depressive and anxiety symptoms, as measured by HADS-P Crude odds ratios, and its 95% confidence intervals were reported.

The null hypothesis was rejected at 0.05α-level of significance.

The HADS-P Questionnaire

Hospital Anxiety and Depression Scale – Pilipino (HADS-P) is the validated Filipino language version of HADS.[8,9] This was validated at the University of the Philippines – Philippine General Hospital to determine the prevalence of depressive and anxiety symptoms and determine an optimal cut-off score for Filipinos using the receiver operative characteristic curve. The validity of the HADS screening test was assessed through consideration of its sensitivity and specificity compared to a formal psychiatric interview. Anxiety was defined as an unpleasant state of inner turmoil, often accompanied by nervous behavior. Depression on the other hand was defined as a state of low mood and aversion to activity.[9]

We used the recommended high-sensitivity HADS cut-off score. A HADS score >8 had a sensitivity of 91%, specificity of 59%, and a PPV of 61% for detecting anxiety or depression; while a HADS-P of >11 had a sensitivity of 75%, specificity of 70%, and PPV of 75%. De Guzman concluded that this tool could serve as a guide for clinicians toward the diagnosis of depression and anxiety.[8]

RESULTS

The study analyzed data from 54 out of 58 enrolled patients with a median age of 49 years old (range 19–86), mostly young adults (42.59%), married (51.85%), attended at least secondary education (46.30%) and unemployed (55.56%) (Table 1). There was a dropout of 1.07% since 4 patients either died, did not undergo surgery during the same hospitalization period, or were sent home for other reasons. About half (51.85%) were classified as ASA I. The median duration of traction was 52 days (range 30–76).

On admission, the prevalence of depressive symptoms was 7.41% (95% CI 2.06-17.89) and the prevalence of anxiety symptoms was 29.63% (95% CI 17.98-43.61). On the day before surgery, the prevalence of depressive symptoms increased to 16.76% (95% CI 7.92-29.29) and the prevalence of anxiety symptoms increased to 48.15% (95% CI 34.34 -62.16) (Table 2). There was a significant increase in the prevalence of depressive and anxiety symptoms pre-traction and one day prior to surgery as shown by the p values <0.0001 and 0.002 derived from the Mc Nemar test respectively (Tables 6 and 7).

There was no statistically significant association between the patient's age, sex, civil status, educational attainment, employment status, monthly income, ASA classification, and duration of traction, with the occurrence of depressive and anxiety symptoms (Table 3).

DISCUSSION

We hypothesized that patients on prolonged skeletal traction would become more anxious and/or depressed compared to the healthy population. Increased anxiety symptoms are seen in orthopedic surgical patients based on the Patient-Reported

Table 1. Demographic profile of patients (n = 54)

	Median (Range); Frequency (%)
Age, years	49 (19–86)
Young adults	23 (42.59)
Adults	15 (27.78)
Elderly	7 (12.96)
Octogenarians	9 (16.67)
Sex	
Male	29 (53.7)
Female	25 (46.3)
Civil status	
Single	16 (29.63)
Married	28 (51.85)
Divorced/Separated	5 (9.26)
Widowed	5 (9.26)
Highest education attained	
No formal education	5 (9.26)
Grade school	13 (24.07)
High school	25 (46.3)
College	10 (18.52)
Postgraduate	1 (1.85)
Employment status	
Unemployed	30 (55.56)
Employed	19 (35.19)
Self-employed	5 (9.26)
Monthly income (money at hand)	2850 (0–25000)
<5000	29 (53.70)
≥5000	25 (46.30)
ASA classification	
I	28 (51.85)
II	22 (40.74)
III	4 (7.41)
Duration of traction, days	52 (30–76)

ASA – American Society of Anesthesiologists

Table 2. HADS-P results on admission and one day prior to surgery

	n	Prevalence (95% CI)
On admission		
Depression		
Normal	41	75.93 (62.36–86.51)
Borderline abnormal (borderline case)	9	16.67 (7.92–29.29)
Abnormal (case)	4	7.41 (2.06–17.89)
Anxiety		
Normal	24	44.44 (30.92–58.60)
Borderline abnormal (borderline case)	14	25.93 (14.96–39.65)
Abnormal (case)	16	29.63 (17.98–43.61)
One day prior to surgery		
Depression		
Normal	21	38.89 (25.92–53.12)
Borderline abnormal (borderline case)	24	44.44 (30.92–58.60)
Abnormal (case)	9	16.67 (7.92–29.29)
Anxiety		
Normal	13	24.07 (13.49–37.64)
Borderline abnormal (borderline case)	15	27.78 (16.46–41.64)
Abnormal (case)	26	48.15 (34.34–62.16)

Outcomes in Surgery – Anxiety and Depression, computer adaptive tests (PROMIS – Anxiety and Depression CAT) even in first world countries.[10] We documented increasing anxiety levels that the surgeon may alleviate through reassurance and empathy. While the PROMIS CAT scoring tool has been applied in surgery, it lacks validation for a Filipino population, hence its exclusion from this study; validation and a further follow-up study using the PROMIS CAT may prove promising.

Anxiety symptoms were more prevalent than depressive symptoms before the application of skeletal traction, regardless of demographic profile. Participants were generally still conscious of their appearance, with an intact sense of humor and a generally positive outlook. During their stay, more participants developed depressive symptoms. There was still no statistically significant association with regard to the demographics and development of symptoms.

Table 3. Association of patient profile with depression and anxiety

	Borderline to case Crude OR (95% CI) and *p*			
	Depression		Anxiety	
Age	0.98 (0.96–1.01)	0.271	1.004 (0.97–1.03)	0.810
Young adults/Adults	Reference	-	Reference	-
Elderly/Octogenarians	0.931 (0.24-3.61)	0.918	0.931 (0.24-3.61)	0.918
Female sex (Reference: Male)	1.255 (0.42–3.78)	0.686	1.524 (0.43–5.45)	0.517
Civil status (Reference: Single)				
Married	0.702 (0.19–2.58)	0.595	3.373 (0.89–12.80)	0.074
Divorced/Separated	0.303 (0.04–2.42)	0.260	8.684 (0.41–183.23)	0.165
Widowed	0.682 (0.09–5.45)	0.718	2.368 (0.30–18.98)	0.417
Married civil status (Reference: Single/ Divorced/ Separated/ Widowed)	0.966 (0.32–2.89)	0.951	2.044 (0.57–7.33)	0.272
Highest education attained (Reference: No formal education)				
Grade school	5.000 (0.55–45.39)	0.153	3.667 (0.35–38.03)	0.276
High school	1.909 (0.27–13.50)	0.517	1.714 (0.23–12.55)	0.596
College/Postgraduate	2.625 (0.30–23.00)	0.383	3.000 (0.28–31.63)	0.361
Employment status (Reference: Unemployed)				
Employed	1.896 (0.57–6.32)	0.298	2.415 (0.61–9.53)	0.208
Self-employed	3.5 (0.35–35.11)	0.287	5.634 (0.28–111.9)	0.257
ASA classification (Reference: I)				
II	0.568 (0.18–1.80)	0.338	0.727 (0.20–2.67)	0.632
III	0.474 (0.06–3.92)	0.489	0.819 (0.07–9.35)	0.872
Duration of traction, days	0.993 (0.95–1.04)	0.745	1.012 (0.96–1.07)	0.633

Table 4. Hospital anxiety and depression scale item responses on hospital admission

	0	1	2	3
	Frequency (%)			
1. I feel tense or 'wound up' (A)	14 (25.93)	**32 (59.26)**	5 (9.26)	3 (5.56)
2. I feel as if I am slowed down (D)	16 (29.63)	**26 (48.15)**	6 (11.11)	6 (11.11)
3. I still enjoy the things I used to enjoy (D)	**33 (61.11)**	13 (24.07)	7 (12.96)	1 (1.85)
4. I get a sort of frightened feeling like 'butterflies' in the stomach (A)	14 (25.93)	**28 (51.85)**	10 (18.52)	2 (3.7)
5. I get a sort of frightened feeling as if something awful is about to happen (A)	15 (27.78)	**27 (50)**	11 (20.37)	1 (1.85)
6. I have lost interest in my appearance (D)	**48 (88.89)**	2 (3.7)	3 (5.56)	1 (1.85)
7. I can laugh and see the funny side of things (D)	**30 (55.56)**	9 (16.67)	15 (27.78)	0 (0)
8. I feel restless as I have to be on the move (A)	10 (18.52)	10 (18.52)	**21 (38.89)**	13 (24.07)
9. Worrying thoughts go through my mind (A)	15 (27.78)	**22 (40.74)**	11 (20.37)	6 (11.11)
10. I look forward with enjoyment to things (D)	19 (35.19)	**24 (44.44)**	6 (11.11)	5 (9.26)
11. I feel cheerful (D)	12 (22.22)	**32 (59.26)**	6 (11.11)	4 (7.41)
12. I get sudden feelings of panic (A)	19 (35.19)	**20 (37.04)**	12 (22.22)	3 (5.56)
13. I can sit at ease and feel relaxed (A)	**14 (25.93)**	12 (22.22)	19 (35.19)	9 (16.67)
14. I can enjoy a good book or radio or TV program (D)	**23 (42.59)**	17 (31.48)	12 (22.22)	2 (3.7)

*Items in bold represent responses with the highest frequency

Other studies have identified certain demographics that predispose to mood disorders: these include younger age, female gender, prolonged hospitalization, bad family relationships, low income, low educational attainment, widowed or divorced, and retired individuals.[11-13]

All the respondents had a length of traction more than the established timeframe (3 or more weeks) of the development of traction intolerance syndrome.[4] Our study design only administered the HADS-P at the start and end of their traction period. Because of this, we could not pinpoint the time when depressive and anxiety symptoms developed. However, we have concluded a definite increase in the development of these symptoms during their hospital stay of at least 30 days with a median range of 54 days. The incidence of these symptoms does not have a direct relationship to the number of days they were in traction.

In a similar study which also aimed to identify predictors of mood disorders in surgical patients, they identified that 2 weeks of hospitalization had a significant increase in depressive and anxiety symptoms.[11] Another study found that longer hospital stays conversely were not associated with the incidence of depression in young patients with aortic aneurysms or occlusive diseases.[12]

Poor postoperative outcomes and patient dissatisfaction were more likely to occur when psychiatric symptoms were present before orthopedic surgery.[6,10,11,13,14] These patients fared poorly due to poor motivation to mobilize postoperatively. Hence, proper identification of risk factors, anticipation of prolonged hospital stays, and constant patient communication can help orthopedic surgeons prepare the patient holistically for better outcomes.

Table 5. Hospital anxiety and depression scale item responses prior to definite surgery

	0	1	2	3
	Frequency (%)			
1. I feel tense or 'wound up' (A)	5 (9.26)	**28 (51.85)**	17 (31.48)	4 (7.41)
2. I feel as if I am slowed down (D)	8 (14.81)	**30 (55.56)**	13 (24.07)	3 (5.56)
3. I still enjoy the things I used to enjoy (D)	13 (24.07)	18 (33.33)	**22 (40.74)**	1 (1.85)
4. I get a sort of frightened feeling like 'butterflies' in the stomach (A)	4 (7.41)	**28 (51.85)**	20 (37.04)	2 (3.7)
5. I get a sort of frightened feeling as if something awful is about to happen (A)	6 (11.11)	21 (38.89)	**25 (46.3)**	2 (3.7)
6. I have lost interest in my appearance (D)	**18 (33.33)**	**18 (33.33)**	16 (29.63)	2 (3.7)
7. I can laugh and see the funny side of things (D)	12 (22.22)	**20 (37.04)**	**20 (37.04)**	2 (3.7)
8. I feel restless as I have to be on the move (A)	3 (5.56)	14 (25.93)	**24 (44.44)**	13 (24.07)
9. Worrying thoughts go through my mind (A)	9 (16.67)	**25 (46.3)**	16 (29.63)	4 (7.41)
10. I look forward with enjoyment to things (D)	8 (14.81)	**26 (48.15)**	17 (31.48)	3 (5.56)
11. I feel cheerful (D)	11 (20.37)	**28 (51.85)**	11 (20.37)	4 (7.41)
12. I get sudden feelings of panic (A)	9 (16.67)	**24 (44.44)**	18 (33.33)	3 (5.56)
13. I can sit at ease and feel relaxed (A)	8 (14.81)	16 (29.63)	**20 (37.04)**	10 (18.52)
14. I can enjoy a good book or radio or TV program (D)	20 (37.04)	**22 (40.74)**	10 (18.52)	2 (3.7)

*Items in bold represent responses with the highest frequency

Table 6. Comparison of the depression scores pre-traction and one day prior to surgery

Pre-traction	One day prior to surgery			Total	*p*
	Normal	Borderline	Abnormal		
Normal	20 (48.9%)	19 (46.3%)	2 (4.8%)	41	<0.0001* (S)
Borderline	1 (11.1%)	5 (55.6%)	3 (33.3%)	9	
Abnormal	0	0	4 (100%)	4	
Total	21	24	9	54	

**p*-value is significant

Table 7. Comparison of the anxiety scores pre-traction and one day prior to surgery

Pre-traction	One day prior to surgery			Total	*p*
	Normal	Borderline	Abnormal		
Normal	12 (50.0%)	9 (37.5%)	3 (12.5%)	24	0.002* (S)
Borderline	1 (7.1%)	5 (35.7%)	8 (57.1%)	14	
Abnormal	0	1 (6.2%)	15 (93.8%)	16	
Total	13	15	26	54	

**p*-value is significant

Our limitations include variables such as cultural aspects, personal experiences, and coping mechanisms which could have affected our results. Likewise, the trauma itself could have directly affected the anxiety and depression scores. As of writing, there is no objective tool to our knowledge that isolates the effects of injury on the psyche while investigating the effects of prolonged hospital stay or immobility due to skeletal traction. Our population was also relatively homogenous in terms of monthly income, educational status, and level of employment contrary to the heterogenous population in other studies.

CONCLUSION

Skeletal traction has generally fallen out of favor among orthopedic surgeons. Hospitals in low-resource settings, however, need to make do with skeletal traction as temporary stabilization before surgery. It was clear that morbidity in the form of depressive and anxiety symptoms became more prevalent in these patients.

We recommend that patients be screened on admission with the HADS-P to identify those at risk and refer them for psychosocial management to maximize recovery and satisfaction. We also recommend that patients be counseled on the benefits of expediting surgery, to hasten logistical procurement.

We encourage that this study design be repeated in a multi-center study to ensure more population variety and discuss the different social services of other government hospitals. Prolonged financial procurement forced the patients to stay in the hospital more than indicated for their injuries. This was the main reason why patients needed to undergo traction before definitive surgery. Furthermore, future research should delve into validating a Filipino translation of the PROMIS CAT so that we can use a more specific tool to identify depressive and anxiety symptoms in patients at multiple time-frames without cognitive bias.

Finally, discussions with hospital management and the country's leaders are needed to lessen the overall psychosocial impact of delays in orthopedic injury management to patients and their families.

STATEMENT OF AUTHORSHIP

All authors certified fulfillment of ICMJE authorship criteria.

AUTHORS DISCLOSURE

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