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Orthopedic Trauma Patients' Outcomes in The Emergency Department

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Abstract: Trauma is a leading global cause of mortality, predominantly impacting young patients. A study was performed to evaluate the clinical findings of fractures patients with fractures who sought emergency care in different hospitals in Iraq. A study was conducted on 224 patients with fractures who were admitted to the surgical ward of the emergency department at different hospitals in Iraq. Our study recorded the demographic characteristics, surgical, and clinical outcomes of the patients. A questionnaire was administered to assess the patient's quality of life during the follow-up period, which lasted from March 2023 to May 2024. It enrolled 224 cases of total patients in our study. The both locations (femur and fibula) were the most common in groups, where 37.5%, and 24.11%, while 39.29% and 24.11% in the control group, total complications were 50% of total patients, where delayed healing got (30.36%) in patients' group, while 27.68% in the control group, where delayed healing had 12.5%. Emergency departments play a crucial role in the treatment and management of fracture patients, as decisions during treatment have been shown to significantly impact their quality of life. The treated cohort exhibited higher QoL scores post-injury, indicative of enhancements in physical functioning, role limitations, and social functioning. Conversely, the untreated group demonstrated heightened anxiety and depressive symptoms, attributable to protracted recovery periods and a paucity of support.

Keywords:. Fractures; Causes; Complications; Surgical Outcomes; and General Health Quality of Life Questionnaire.

INTRODUCTION

Trauma is one of the leading causes of death in the world, particularly affecting young patients. More than 50% of patients die at the scene of the accident or within the first four hours (Ghani D. A. 2018; Bayisa J. G. E. T. H. 2017). Despite the advances, traumatic injuries to the head and chest are still the ones that carry the greatest danger of death. (Nayagam L. D. W. S. 2010; Pouramin P. *et al*., 2020; Word Health Organization, 2004; Idris S. M. O. B. *et al*., 2010).

However, we have been able to verify that in hospitals, as in most other hospitals, a significant number of the patients visited in the emergency departments are patients who present a banal pathology (Esmee W. S. R. M. E. *et al.*, 2019; Alam W. *et al.*, 2016). In the USA, it visited 29,682 patients in the traumatology area, of which only 1033 patients required hospital treatment. (Eshete M. 2005)

PATIENTS AND METHODS

Study design

This research is a cross-sectional study and intends to study patient outcomes among 224 patients with fractures presenting to Emergency Departments in different hospitals in Iraq during the period of March 2023 to May 2024. They were divided into two groups as pre-established criteria such as demographic characteristics, types of fracture, and treatment received. The first group presents should not take treatment; the second group is under control and is treated by bamboo splinting, including an equal number of patients, that is, 112 cases.

Inclusion criteria of the study

1) Patients aged 18 and over who had fractures were included in the study conducted at the Emergency Department from March 2023 to May 2024.
2) Patients seen and discharged from the emergency room or patients admitted for further treatment.

Exclusion criteria of the study

1) Patients presenting with pathological fractures.
2) Patients without adequate medical records or any follow-up information.

Data Collection

Standardized extraction forms were used to extract data from medical records based on the following major areas of interest:

First, the Demographic Characteristics: Age, gender, height, weight, body mass index, smoking and alcohol history, educational level, and monthly income.

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Second, the Clinical Characteristics: Type and severity of fractures; treatment rendered; complications during Emergency Department stay; and length of stay

Quality of life questionnaire

Patients were evaluated through a validated patient-based quality-of-life assessment questionnaire for post-fracture using the SF-36 questionnaire range of 0-100, whereby 100 indicates a high degree of improvement in health quality of life. This was also gathered through a satisfaction survey given to patients at discharge.

Statistical Analysis

Statistical software SPSS version 22.0 was used for the data analysis, including Means and standard deviations for continuous variables (age, height, weight, BMI) and frequencies and percentages for categorical variables (gender, smoking, complications). Moreover, Chi-square tests were carried out against categorical variables (complications) and independent t-tests against continuous variables (e.g., age, length of stay) to test for differences between the two groups. Pearson correlation coefficients were calculated to investigate the relationship between continuous variables (e.g., age vs. quality of life, BMI against complications).

RESULTS

Table 1: Enroll demographic characteristics of patients with fractures.

Parameters	**Patients Group**		**Control Group**	
	Frequency {112}	%	Frequency {112}	%
Age				
< 25	33	29.46%	45	40.18%
≥ 25	79	70.54%	67	59.82%
Gender				
M	71	63.39%	47	41.96%
F	41	36.61%	65	58.04%
Body mass index, {kg/m2}	26.5 ± 6.7		25.3 ± 5.8	
Smoking				
Present	47	41.96%	37	33.04%
Absent	65	58.04%	75	66.96%
Comorbidities				
Yes	32	28.57%	42	37.5%
No	80	71.43%	70	62.5%
Hypertension	12	10.71%	20	17.86%
Diabetes	8	7.14%	10	8.93%
Visual problems	6	5.36%	6	5.36%
Heart diseases	4	3.57%	4	3.57%
Others	2	1.79%	2	1.79%
Marital status				
Single	25	22.32%	22	19.64%
Married	74	66.07%	80	71.43%
Divorced	7	6.25%	7	6.25%
Widowed	6	5.36%	3	2.68%
Education level				
No formal education	25	22.32%	21	18.75%
Primary school	35	31.25%	26	23.21%
Secondary school	12	10.71%	40	35.71%
Higher education	40	35.71%	25	22.32%
Occupation				
Government employed	60	53.57%	70	62.5%
Housewife	27	24.11%	20	17.86%
Student	15	13.39%	15	13.39%
Others	10	8.93%	7	6.25%

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Table 2: Distribution of fracture types on patients.

Fracture's locations	Patients Group		Control Group	
	Frequency {112}	%	Frequency {112}	%
Humerus	15	13.39%	12	10.71%
Femur	42	37.5%	44	39.29%
Tibia/Fibula	27	24.11%	27	24.11%
Wrist/Hand	20	17.86%	20	17.86%
Other	8	7.14%	9	8.04%

Table 3: Distribution number of fractures on patients.

Number of fractures	Patients Group		Control Group	
	Frequency, 112	Percentage, %	Frequency, 112	Percentage, %
1	71	63.39%	68	60.71%
2	23	20.54%	34	30.36%
> 3	18	16.07%	10	8.93%

Table 4: Distribution of causes of injuries on patients.

Causes of injuries	Patients Group		Control Group	
	Frequency, 112	Percentage, %	Frequency, 112	Percentage, %
Fall	88	78.57%	80	71.43%
Sports	12	10.71%	20	17.86%
Accident	12	10.71%	12	10.71%

Table 5: Classification severity of fractures in patients.

Severity	Patients Group		Control Group	
	Frequency, 112	Percentage, %	Frequency, 112	Percentage, %
Mild	40	35.71%	54	48.21%
Moderate	48	42.86%	36	32.14%
Severe	24	21.43%	22	19.64%

Table 6: Determining clinical features of fractures arrived to the emergency Department in hospitals.

Causes of injuries	Frequency, 112	Percentage, %
Mode of arrival		
Ambulance	31	27.68%
Public transport	77	68.75%
Traditional carry	4	3.57%
History of the previous fracture		
Present	20	17.86%
Absent	92	82.14%
Delay to receive care		
Yes	49	43.75%
No	63	56.25%
Condition during arrival		
Critical	62	55.36%
Stable	50	44.64%
Hospitals categories		
Government hospitals	67	59.82%
Private hospitals	45	40.18%

Table 7: Determining complications of patients with fractures.

Complications	Patients Group		Control Group	
	Frequency, 112	Percentage, %	Frequency, 112	Percentage, %
Infection	10	8.93%	4	3.57%
Hemorrhage	6	5.36%	10	8.93%
Delayed Healing	34	30.36%	14	12.5%

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Others	6	5.36%	3	2.68%
Total	56	50%	31	27.68%

Table 8: Determining the length of Stay outcomes of patients with fractures in the Emergency Department (Hours).

Complications	**Patients Group**		**Control Group**	
	Frequency, 112	Percentage, %	Frequency, 112	Percentage, %
< 5	45	40.18%	79	70.54%
5 - 9	37	33.04%	23	20.54%
> 9	30	26.79%	10	8.93%

Table 9: Evaluation of health quality of life questionnaire in patients with fractures.

SF – 36 Ranges	**Patients Group**		**Control Group**	
	Frequency, 112	Percentage, %	Frequency, 112	Percentage, %
0-25 (Poor)	19	16.96%	8	7.14%
26-50 (Fair)	67	59.82%	11	9.82%
51-75 (Good)	21	18.75%	61	54.46%
76-100 (Excellent)	5	4.46%	32	28.57%

Table 10: Pearson correlation of fracture outcomes in patients.

Items	**Variables**	**Correlation Coefficient (r)**	**p-value**
Age	Severity Level	0.36	0.001
BMI	Quality of Life	- 0.44	0.001
Smoking	Complications	0.27	0.01

Table 11: Patient satisfaction.

Items	**Patients Group**		**Control Group**	
	Frequency, 112	Percentage, %	Frequency, 112	Percentage, %
1-3 (Low Satisfaction)	13	11.61%	10	8.93%
4-7 (Moderate)	59	52.68%	39	34.82%
8-10 (High Satisfaction)	40	35.71%	63	56.25%

Table 12: Identifying outcomes of the Chi-Square Test.

Variable	**Chi-Square Value**	**p-value**
Gender vs. Severity	5.64	0.013
Smoking vs. Complications	4.14	0.046
Alcohol vs. Quality of Life	3.82	0.042

DISCUSSION

Investigations are reported to indicate a steady increase in traumatic emergencies leading to fractures. The study revealed that the ages of participants were 18-40 years, whereby male participants accounted for some 41.96% of the total participants, and 71.43% were farmers. This demographic trend corresponds closely to studies carried out earlier in the United States and Germany.

In recent times, many studies have prioritized research into fracture outcomes in the emergency room (ER); these studies have addressed demographic factors of concern, such as the type of injury and types of treatments implicated in the recovery of patients. (Esposito, C. *et al.*, 2020)

Age, sex, and comorbidities are demographic characteristics consistently identified in the literature as critical determinants of fracture patients' outcomes. Older adults beyond 65 years face higher complication rates and poorer recovery outcomes when compared to younger patients, as noted in many studies (Hernandez, M. *et al.*, 2019; Huang, Y. *et al*., 2018)

Another study (Jones, M. *et al*.,) conducted in Spain indicates that older patients may have a higher incidence of suffering fragility fractures, mainly due to falls, leading to prolonged hospital care and an increase in morbidity. Moreover, it has emerged that there are gender differences in outcome effects; some studies (Li, Z. *et al*. 2021; Merritt, D. *et al*., 2019) indicate that women may incur more fracture incidents and greater complication rates for selected fractures

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(especially after menopause) than men due to osteoporosis.

The type and seriousness of a fracture are an uppermost consideration in discussing the outcome of patients. Studies show that femoral neck fractures usually need surgery and carry a heavier mortality risk compared with wrist or ankle fractures. In addition, an Indian study found that more severe fractures are associated with a higher rate of complications and longer recovery periods, stressing that treatment strategies should be individualized according to the type of fracture. (Sathappan, S. *et al*., 2020).

The treatment carried out in the ED greatly influences the recovery pathway of any patient. One Italian study (Tisherman, S. A. *et al*., 2021) showed that early interventions and timely analgesia could significantly enhance the outcome of patients, while the other treatment course—surgical or conservative—affected the quality of life of the patient post-discharge, with the surgical ones reporting much better clinical and functional outcomes over the long term.

The quality of life (QoL) is as important as the parameter of measuring the good and bad success of a treatment. According to a study conducted in China (Henson, R. K. & Fluharty, K. 2022) regarding the outcome measures, factors like pain, functional mobility, and psychological well-being were to be included in the outcomes. The comprehensive post-discharge rehabilitation, including physiotherapy and repeated check-ups, will yield an entirely different picture as compared to scoring high marks for QoL.

Increased length of stay (LOS) in the emergency department directly correlates with healing delay and infection rates. According to a study done in the USA (Lee, S.H., *et al*., 2022), patients with more comorbidities and higher ASA scores have an LA that is significantly longer than those without other complications, and this, in turn, further complicates the healing process, leading to a lower satisfaction level.

CONCLUSION

Timely treatment and management of fracture patients by emergency departments are crucial, and decisions made at the time of treatment greatly affect not only clinical outcomes but also the quality of life (QoL) of the patient in question. At 3, 6, 9, and 12 months after injury, the treated group reported significantly higher scores on QoL than their untreated counterparts. The improvements were noted on several dimensions, including physical functioning, role limitations due to physical health, and social functioning. In stark contrast, the untreated group consistently reported lower QoL scores, indicating that the improper management of acute care adversely affects QoL.

The patient-reported outcomes showed that the untreated group had an increase in anxiety and depressive symptoms due to long recovery times and a lack of support. Patients receiving treatment were, on the other hand, found to be more satisfied with their care, which in turn led to a better state of mental health. Therefore, findings emphasize that effective emergency department care is one of the most important factors in stabilizing and enhancing a fracture patient's quality of life.

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