Assessment of patients' Knowledge and Functional Outcome Regarding Pott's Fracture at Aswan University Hospital

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ABSTRACT

Background: Pott's fracture is considered the most frequent type of ankle fractures and constitutes the most common complaint in the emergency department. **Aim:** to assess patients' knowledge and functional outcome regarding Pott's fracture at Aswan University Hospital. **Subjects and method:** This study utilized a descriptive research design. **Setting:** This study was executed at Aswan University Hospital's orthopedic department and outpatient clinics. **Subjects:** A purposive sample of 80 patients who fulfilled specific inclusion criteria. **Tools:** Tool I: Patients' health assessment questionnaire sheet. Tool II: Patients' knowledge questionnaire sheet. Tool III: Baird and Jackson Scoring System (BJSS) to assess physical activity and functional ability. **Results:** demonstrate that more than three-quarters of the participants had unsatisfactory total knowledge score regarding Pott's fractures. Furthermore, about ninety-one point three of the participants had poor functional outcome by using Baird and Jackson scoring scale. **Conclusion:** Study's findings highlighted that decreased knowledge about Pott's fracture patients lead to physical inactivity, functional disability and other complications. **Recommendation:** Educational guidelines should be encouraged and suggested to all patients with Pott's fracture in order to increase patients' education and functional outcomes.

***Keywords*:** Ankle fracture, Baird and Jackson scoring system, Functional outcome, Pott`s fracture.

INTRODUCTION

Ankle fractures typically involve damage to the distal fibula, medial tibia, and posterior tibia, sometimes known as malleoli. Fractures involving many sides are known as bimalleolar or trimalleolar. Pott's fracture is eponym of bimalleolar, Percival Pott's, who documented a fracture of the fibula 2-3 inches above the distal tip with an accompanying rupture of the medial ligaments and lateral displacement of talus, and hence carries his name (Walusinski & Poirier, 2022).

Foot eversion or an external rotation force is the most prevalent form of injury that destroys this ligament because of the strong medial strains produced by these forces. Furthermore, Pott's fractures are typically caused by a fall or a forceful strike to the leg, where too much power is applied to the bone, resulting in the fracture (Jones, 2018). Additionally, it arises from severe strains, abrupt twists, or physical trauma over the ankle and is linked to talus dislocation and subluxation. Pott's fractures are a common term for bone traumas and fractures associated with the ankle joint (Gola et al., 2022).

According to Pott’s fracture, there are a little chance of developing complications. Pott's fractures are complicated and challenging to manage. They are marked by pain and instability. If not properly treated, the injuries might cause long-term impairment and perhaps degenerative arthritis in its early stages (Jupiter et al., 2020). There are two ways for management of Pott's fracture; more stable injuries are sometimes treated conservatively with braces or close contact casts. While, almost require surgery in order to achieve optimal function and weight bearing on the affected limb. Anatomical reduction and rigid fixing lead to good union and early return to daily routine and job. Several studies showed that open reduction and internal fixation (ORIF) of bimalleolar fracture of ankle provides better outcomes (Patel et al., 2019).

Physical therapy, medication, educational materials, ankle immobilization in an ankle-foot orthosis, and orthopedic surgery for fracture repair were all used to improve the patient's functional ability and level of physical activity. Improving patients with self-care information and skills, preventing problems, promoting bone

healing, increasing physical activity, and improving functional capacity are considered a crucial role for nurses (Upadhyaya & Barman, 2020).

Significance of the study

Prevalence of malleolar fractures is expected to be 125/100,000 per year (Kakkar et al., 2019). Pott's fracture accounts approximately one fourth of patients with ankle injury (Patel et al., 2019). Pott's fracture patients experience a variety of issues for several months following conservative or surgical treatment, including physical inactivity, which leads to a rapid increase in non-communicable diseases. Physical inactivity is a leading cause of death worldwide, reducing life expectancy and quality of life. Furthermore, patients with Pott's fractures lose the ability of normal mobile function (Soyuer, 2021). So, this study was conducted to evaluate patients' knowledge and functional outcome concerning Pott's fracture.

AIM OF THE STUDY

To assess patients' knowledge and functional outcome regarding Pott's fracture at Aswan University Hospital.

Research questions

1. What is the patients' knowledge level regarding Pott's fracture?
2. What are the functional outcomes for Pott's fracture patients?
3. What is the correlation between knowledge and functional outcome?

SUBJECTS AND METHODS

1) Technical Design

Research design

This study utilized a descriptive research design.

Setting

The study was done in orthopedic department and outpatient clinics at Aswan University Hospital.

Subjects

A purposive sample of 80 adult patients, which met the following criteria:

Inclusion Criteria

- Aged 20-60 years old.
- Capable of communicating.

Exclusion Criteria

- Pathological fractures refer to another type of fracture.
- Cancer patients, particularly those with bone cancer.
- Neurological and psychiatric problems: quadriplegia, and some behavioral or cognitive issues (for example, aggressive conduct).

Sample size

The sample size was estimated using appropriate statistical equation after reviewing annual census about Pott's fracture patients who were attending in the previously mentioned setting. The sample was chosen using data from the literature **ELmetwaly et al., (2021)** with a 5% threshold of significance and an 80% power of investigation. The formula for calculating sample size is as follows:

$$n = \frac{100 \times 0.953\ (1-0.953)}{(100-1)x\left(\frac{0.021^2}{1.96^2}\right)+0.953(1-0.953)} = 79.8$$

Accordingly, the sample size required is 80.

Tools of data collection:

Tool I: Patients' health assessment questionnaire sheet: which was designed by the researchers based on a review of relevant literature **Mostafa &**

Osman, (2020) to collect data regarding personal characteristics, health relevant data, and life styles about Pott's fracture. It comprised of 29 questions and it translated in to Arabic and consisted of three parts:

Part 1: Personal characteristics: Include age, gender, domicile, marital status, degree of education.

Part 2: Health relevant data: which comprised of three sections; **section (1) past history:** previous fractures, where is the part of fracture? Previous surgery, previous physiotherapy, osteoporosis, lack of minerals in the body and the prevalence of chronic disorders. such as (diabetes, neuropathic disease and others). **Section (2) present history**; cause of fracture, duration of hospital stays, degree of pain. **Section (3) family history**; osteoporosis, diabetes, neuropathic disease and bone cancer.

Part 3: Life style; smoking, caffeine, perform a sporting activity, nature of sleeping, taking medication on time.

Tool II: Patients' knowledge questionnaire sheet; this tool was developed by the researchers after reviewing relevant literature **ELmetwaly et al., (2021)** to assess patients' knowledge level regarding Pott`s fracture. Which divided into two sections; **section (1):** knowledge about Pott`s fracture. **section (2):** knowledge about factors affecting bone healing and exercises.

Scoring system: each question included a group of answer points; correct answers were awarded one grade, while unknown, incorrect, or missed answers received zero. The overall score varied from 0 to 18. Then the total points were classified as:

- Satisfactory ≥ 70%
- Unsatisfactory <70%

Tool III: Baird and Jackson Scoring System (BJSS): This tool was adopted from **Motwani et al., (2015)** to determine physical activity and functional abilities in patients with Pott's fracture, subjective, objective, and radiological criteria were used. This scale included seven items: discomfort, ankle stability, patient's ability to move around, able to run, able to work, ankle movement, and radiological findings.

Scoring system: pain score, ankle stability, and walking ability were all scored on a scale of zero to fifteen. The scores for ability to run, ability to work, and ankle motion ranged from zero to ten, and the radiography results ranged from fifteen to twenty-five. The overall score varied from 0 to 100. The total scores were then transferred into the following as:

- Excellent 96–100.
- Good 91–95.
- Fair 81–90.
- Poor 0–80.

2) Operational Design

Content validity

It was designed by a panel of three experts from Medical Surgical Nursing who evaluated the tool's clarity, relevance, comprehensibility, understanding, and applicability. Minor adjustments were required.

Reliability

The reliability of the developed tools was tested using Cronbach's alpha, which is 0.897 for the patients' knowledge and 0.903 for their Baird and Jackson rating scale.

Pilot Study

A pilot study was carried out at the end of October 2023 on eight patients, representing 10% of the total participants, to evaluate the clarity, applicability, and feasibility of the tools employed; those patients were enrolled in the main study because no changes were required to the study tool.

Ethical considerations

The study was permitted by the research ethics committee of the Faculty of Medicine at Aswan University for the study protocol with code (834) (5/09/2023) as

well as hospital authorities. After obtaining official requirements for carrying out this study, the subjects were informed to choose whether to participate or not, the nature and aim of the study were described, and patients had the ability to withdraw at any time. They also stated that the information acquired would be kept confidential and utilized merely for the purposes of the study, and their names would be coded for data input so that they could not be identified.

Fieldwork

This study was accomplished in three stages: interviewing and assessing, implementation, and evaluation, with data collecting lasting five months from the starting point of November 2023 to the finish of March 2024.

I: The interviewing and assessing stage

During this stage, the researchers discussed the study's aim and tool components. Each patient took between 30 and 40 minutes to complete the questionnaire.

II: The Implementation stage

In this stage, patients enrolled in the study were interviewed about three hours twice a week (afternoon or evening shift). Researchers performed individual interviews twice during the study period. The first interview was performed upon the patient's admission, and the second was conducted 6-8 weeks after the patient had routine hospital care.

The first interview

At the initial interview, the researchers identified themselves in order to establish a line of contact and assist the deployment of the tools. The patient was interviewed to get baseline data on personal traits, health related data, and knowledge. The interview was conducted at the patient's room in the hospital. It took about 20-25 minutes to use the tool **(I, II).**

The second interview

This interview was done after 6-8 weeks from routine hospital care. The researchers asked the patient to describe their discomfort, capability to work, running and walking abilities and ankle mobility before referring them to the Radiology Department to be evaluated for radiography findings, using tool **(III)** to gather these data. It took about 10-15 minutes.

III: Evaluation stage

This stage was focused on assessing and determining knowledge and functional outcome regarding Pott's fracture patients through a comparison of questionnaire items in both tool **II** and tool **III**.

3) Administrative Design

Before beginning the study, the Faculty of Nursing at Aswan University filed an official letter to the head of Aswan University Hospital seeking permission to conduct the study. After getting authorization from the director, the researchers sought permission from the head of the orthopedic department, met with the head nurse, and coordinated the study.

4) Statistical Design

After data collection, the raw data was coded and turned into coding sheets that could be fed into a computer. The data were then entered into the SPSS software version 20. For qualitative factors, data were provided as numbers and percentages of total. In contrast, the quantitative variable (age) was presented using mean and standard deviation. Significance of result was as following:

- When $p > 0.05$ there was no statistically significant differences.
- When $p \leq 0.05$ there was statistically significant differences.
- When $p \leq 0.001$ there was highly statistically significant differences.

RESULTS

Figure (1): Demonstrates that 88.8% of the studied sample exhibited unsatisfactory total knowledge score, while 11.2 % of them had satisfactory total knowledge score.

Figure (2): Illustrates total percentage of patients' functional outcome regarding Pott's fracture about 91.3% had poor functional outcome by using Baird and Jackson rating scale.

Table (1): Reveals that there was no significant association between personal variables like age, gender, marital status, levels of education and occupational status with total knowledge level where p-value (> 0.05).

Table (2): Shows that there were no statistically significant differences between personal variables such as: age, gender, marital status, levels of education and occupational status with Baird and Jackson scoring system at p-value (> 0.05).

Table (3): Illustrates that there were no association between medical history of the studied patients and total knowledge score where p-value (> 0.05).

Table (4): Presents that there were no statistically significant differences between medical history of the studied patients with Baird and Jackson scoring system at p-value (> 0.05).

Table (5): Demonstrates that there was no correlation between total knowledge level with Baird and Jackson level where p-value (> 0.05).

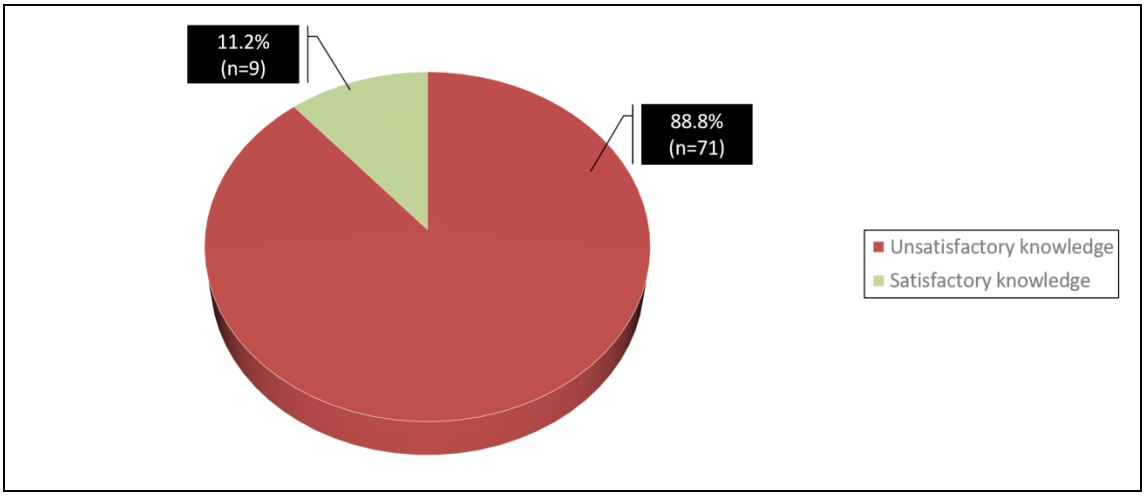

Figure 1. Patients' total knowledge about Pott's fracture

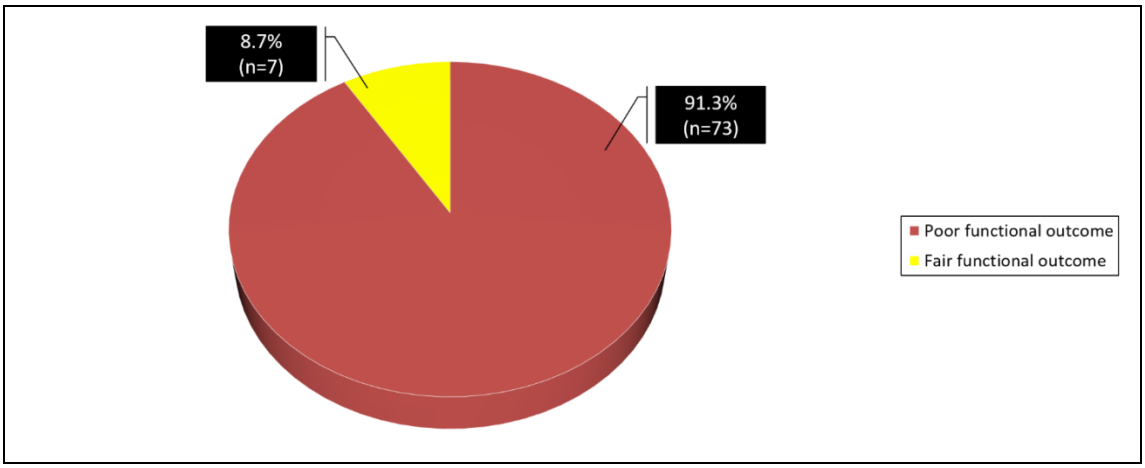

Figure 2. Distribution of the patients' functional outcome after Pott's fracture

Table (1): Association between patients'personal characteristics and total knowledge score about patients with Pott's fracture **(N=80).**

Items	Unsatisfactory		Satisfactory		Chi – square / fisher's exact test	
	n	%	n	%	X^2	P
Age						
20 < 40	26	36.6	2	22.2		
40 – 60	45	63.4	7	77.8	0.728	0.393
Gender						
Male	53	74.6	5	55.6		
Female	18	25.4	4	44.4	1.460	0.227
Marital status						
Single	24	33.8	1	11.1		
Married	47	66.2	8	88.9	1.914	0.166
Educational level						
Qualified (primary-preparatory- secondary)	27	38.0	1	11.1		
Read and write	30	42.3	4	44.4		
Illiterate	14	19.7	4	44.4	3.833	0.147
Occupational status						
Work	38	53.5	3	33.3		
Don't work	33	46.5	6	66.7	1.303	0.253

X^2: Chi square test : Non-significant difference at P > 0.05 *Statistically significant at p ≤ 0.05 p: p value for comparing between studied sample

Table (2): Association between personal characteristics with physical activity and functional ability for patients with Pott's fracture **(N=80).**

Items	Poor		Fair		Chi – square / fisher's exact test	
	n	%	n	%	X^2	P
Age						
20 – 40	24	32.9	4	57.1		
41 – 60	49	67.1	3	42.9	1.653	0.199
Gender						
Male	51	69.9	7	100.0		
Female	22	30.1	0	0.0	2.910	0.088
Marital status						
Single	23	31.5	2	28.6		
Married	50	68.5	5	71.4	0.026	0.873
Educational level						
Qualified (primary-preparatory-secondary)	24	32.9	4	57.1		
Read and write	31	42.5	3	42.9		
Illiterate	18	24.7	0	0.0	2.801	0.246
Occupational status						
Work	35	47.9	6	85.7		
Don't work	38	52.1	1	14.3	3.647	0.056

X^2: Chi square test : Non-significant difference at P > 0.05 *Statistically significant at p ≤ 0.05 p: p value for comparing between studied sample

Table (3): Association between medical history and total knowledge score of patients with Pott's fracture **(N=80).**

Items	Unsatisfactory		Satisfactory		Chi – square / fisher's exact test	
	n	%	n	%	X^2	P
- Cause of the fracture						
Falling	33	46.5	3	33.3		
Twisting	10	14.1	1	11.1		
Motor accident	28	39.4	5	55.6	0.861	0.650
- Length of hospital stay						
1 – 5	37	52.1	3	33.3		
6 – 10	30	42.3	6	66.7		
More than 10	4	5.6	0	0.0	2.128	0.345
- Degree of pain						
Light pain	18	25.4	1	11.1		
Moderate pain	35	49.3	4	44.4		
Severe pain	18	25.4	4	44.4	1.779	0.411
- Fracture before						
Yes	15	21.1	1	11.1		
No	56	78.9	8	88.9	0.501	0.479
- Suffering from any of the following conditions						
Lack of mineral	6	8.5	0	0.0	0.822	0.365
Neuropathic disease	8	11.3	0	0.0	1.127	0.288
Diabetes	16	22.5	1	11.1	0.623	0.430
- Orthopedic surgery before	13	18.3	1	11.1	0.287	0.592
- Physiotherapy before	19	26.8	1	11.1	1.043	0.307
- Family suffering from theses following conditions						
Osteoporosis	5	7.0	0	0.0	0.676	0.411
Lack of mineral	6	8.5	0	0.0	0.822	0.365
Bone cancer	3	4.2	0	0.0	0.395	0.530
Diabetes	38	53.5	5	55.6	0.013	0.908

X^2: Chi square test : Non-significant difference at $P > 0.05$ *Statistically significant at $p \leq 0.05$

p: p value for comparing between studied sample

Table (4): Association between medical history with physical activity and functional ability for patients with Pott's fracture **(N=80).**

Items	Poor		Fair		Chi – square / fisher's exact test	
	n	%	n	%	X^2	P
- Cause of the fracture						
Falling	30	41.1	6	85.7		
Twisting	11	15.1	0	0.0		
Motor accident	32	43.8	1	14.3	5.233	0.073
- Length of hospital stay						
1 – 5	35	47.9	5	71.4		
6 – 10	34	46.6	2	28.6		
More than 10	4	5.5	0	0.0	1.548	0.461
- Degree of pain						
Light pain	18	24.7	1	14.3		
Moderate pain	33	45.2	6	85.7		
Severe pain	22	30.1	0	0.0	4.549	0.103
- Fracture before						
Yes	15	20.5	1	14.3		
No	58	79.5	6	85.7	0.157	0.692
- Suffering from any of the following conditions						
Lack of mineral	6	8.2	0	0.0	0.622	0.430
Neuropathic disease	8	11.0	0	0.0	0.852	0.356
Diabetes	16	21.9	1	14.3	0.222	0.637
- Orthopedic surgery before	14	19.2	0	0.0	1.627	0.202
- Physiotherapy before	18	24.7	2	28.6	0.052	0.819
- Family suffering from theses following conditions						
Osteoporosis	5	6.8	0	0.0	0.511	0.475
Lack of mineral	6	8.2	0	0.0	0.622	0.430
Bone cancer	3	4.1	0	0.0	0.299	0.585
Diabetes	37	50.7	6	85.7	3.153	0.076

X^2: Chi square test : Non-significant difference at $P > 0.05$ *Statistically significant at $p \leq 0.05$

p: p value for comparing between studied sample

Table (5): Correlation between knowledge level with functional outcome for patients with Pott's fracture **(N=80).**

Items	Knowledge level
Baird and Jackson level	
R – Value	0.045
P – Value	0.690

Spearman's correlation (Coefficient = rs Non-significant difference at P > 0.05 *Statistically significant correlation at P. value ≤ 0.05. p: p value for comparing between studied sample

DISCUSSION

Pott's fractures, which typically affect the tibia and fibula, frequently occur by declines, injuries from sports, and vehicular crashes, besides other things. Operative therapy is now the initial course of therapy in clinical practice. Nevertheless, due to the prolonged postoperatively healing duration of ankle fractures, postponed and inefficient rehabilitation programs will have a negative impact on Pott's fracture functional recovery **(Fang, 2024).**

The current study discovered that the majority of the studied sample had an inadequate total knowledge level, but the minority had a satisfactory total knowledge level. This finding is consistent with **Kalaventhan et al., (2018)** in Sri Lanka, who studied the knowledge of patients treated for fractures using open reduction and internal fixation. This study found a lack of information and incorrect beliefs, implying that education could help patients increase their knowledge and lessen their false beliefs. This finding contradicts **Kanakalakshmi et al., (2019)** who did a descriptive study in India and found that the majority of orthopedic patients had B grade knowledge, indicating high understanding.

In researchers' perspective, this might be due to lack of education and low health literacy; limited formal education can make it difficult for patients to understand medical terms, concepts, or instructions, inadequate skills in reading, writing, and understanding health-related information can hinder a patient's ability to acquire knowledge.

The present study showed that most of the participants had poor functional outcome by using BJSS. This result matches with **Motwani et al., (2015)**

who reported that scoring system of Baird and Jackson results indicated poor functional outcome. This might be due to poor compliance with physical therapy or lack of proper rehabilitation, this can hinder the recovery of strength, balance, and range of motion. Furthermore, immobilization during recovery or scar tissues formation can lead to stiffness, limiting functional use of the ankle. These results are contrary with **Badgire, (2017)** who emphasized that according to the Baird and Jackson scoring scale, the majority of their cases had good to excellent results, while the minority had fair and poor results, implying that highly functional outcomes are frequently achieved.

The current study showed no associations between personal traits and total knowledge score. This finding accepted with **Helmi et al., (2022)** who illustrated no statistically significant relations between socio demographic characteristics and overall knowledge for the study group. Also, **Ahmed et al., (2015)** reported that no statistically significant link between knowledge and age. With virtually the opposite line of results **Mohamed & Lavernia, (2014)** stated that there was a statistically significant correlation between knowledge and educational level, with greater knowledge coming from higher educational degrees. In addition, **Khan et al., (2017)** showed a substantial link between knowledge and age.

On the other hand, there were no relations between personal variables with Bird and Jackson scoring scale. This result is in accordance with **Çelik & Goncu, (2013)** who found no significant associations between pain intensity as a BJSS item and age, gender, or marital status. The study disagreed with **Kumar & Gopal, (2019)** who found that young and middle-aged patients had better outcomes than elderly patients.

The current study presented that there were no associations between medical history with total knowledge score and Bird Jackson scoring system. These results are supported by **Mostafa & Osman, (2020)** who stated that there were no associations between medical history and knowledge for patients with ankle surgery (open reduction and internal fixation). In the researchers' point of view, having certain medical conditions or experiences does not necessarily make someone more knowledgeable about those conditions or about medical topics in general, this could

imply that knowledge is influenced more by education, access to information, or personal interest rather than by personal medical experiences.

The present study clarified that there was no statistically significant correlation between total knowledge level with Bird and Jackson scoring scale. This result is similarly with **ELmetwaly et al., (2021)** who revealed that no statistically significant correlation between total knowledge score and BJSS before or after intervention.

CONCLUSION

The present study demonstrated that the majority of the participants had unsatisfactory total knowledge score. Furthermore, most of the patients had poor functional outcome by using BJSS. decreased knowledge, physical exercises, awareness, and rehabilitation for Pott's fracture patients leading to physical inactivity, functional disability and other complications.

RECOMMENDATIONS

- Replicate this study using large probability sample and different hospitals in different geographic regions to assess knowledge and functional outcomes regarding Pott's fracture.
- Educational guidelines should be encouraged and suggested to all patients with Pott's fracture to improve knowledge and functional outcome.
- More research is required to produce more accurate and realistic ways for increasing knowledge, functional ability and physical activity.

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تقييم معرفة المرضى والنتائج الوظيفية فيما يتعلق بكسر بوت في مستشفى جامعة أسوان

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الخلاصة

الخلفية: يعتبر كسرالكاحل (كسر بوت) هو النوع الأكثر شيوعا من كسور الكاحل ويشكل الشكوى الأكثر شيوعا في قسم الطوارئ. **الهدف**: تقييم معرفة المرضى والنتائج الوظيفية فيما يتعلق بكسر بوت. **طرق البحث:** تم استخدام تصميم البحث الوصفي في هذه الدراسة. **مكان الدراسة:** أجريت هذه الدراسة في قسم العظام والعيادات الخارجية بمستشفى جامعة أسوان. **العينة**: عينة مستهدفة من 80 مريضا استوفوا معايير الاشتمال المحددة. **الأدوات**: الأداة الأولى: ورقة استبيان التقييم. الأداة الثانية: ورقة تقييم المعرفة. الأداة الثالثة: نظام تسجيل بيرد وجاكسون. **النتائج**: كشفت النتائج أن أكثر من ثلاثة أرباع المشاركين حصلوا على درجة معرفة إجمالية غير مرضية فيما يتعلق بكسور بوت ويفتقرون إلى الوعي حول حالات طبية محددة ما لم يتم تعليمهم بشكل محدد. علاوة على ذلك، كان لدى حوالي 91.3% من المشاركين نتائج وظيفية سيئة باستخدام نظام تسجيل بيرد وجاكسون. **الاستنتاج**: أبرزت نتائج الدراسة أن انخفاض المعرفة والتمارين البدنية والوعي وإعادة التأهيل لمرضى كسور بوت يؤدي إلى الخمول البدني والإعاقة الوظيفية ومضاعفات أخرى. **التوصية**: ينبغي التوصية بالمبادئ التوجيهية التعليمية واقتراحها لجميع مقدمي الرعاية الصحية من أجل زيادة فهم المرضى للنتائج الوظيفية في حالة كسر بوت.

الكلمات المفتاحية: كسر الكاحل، نظام تسجيل بيرد وجاكسون، النتائج الوظيفية، كسر بوت