

Effect of Protocol of Nursing Care on Clinical Outcomes of Post Operative patients Tibial Plateau Fracture Internal Fixation Surgery

Doaa Ibrahim Mohammed El Fekey¹, AmanyLotfy Abdul-Aziz Ismail², Kamal Mohammed Hafez³,
Reda Abdel Salam Ibrahim⁴

¹Nursing Specialist, Tanta University Hospital, Egypt

²Professor, Medical- Surgical Nursing, Faculty of Medicine, Tanta University, Egypt.

³Professor, Orthopedic Surgery, Faculty of Medicine, Tanta University, Egypt.

⁴Assist. Professor, Medical- Surgical Nursing. Faculty of Nursing, Tanta University, Egypt.

Abstract

Background: Tibial plateau fractures are a complex group of periarticular fractures require careful evaluation and preoperative planning. Study aimed was to evaluate effect of protocol of nursing care on clinical outcomes of post operative patients tibial plateau fracture internal fixation surgery. **Subjects and Method:Subjects:**A convenient sample of (60) adult patients who are post operatively tibial plateau fracture internal fixation selected, divided randomly into two equal groups. **Two tools** used for data collection: Structured Interview Schedule tool, consisted of four parts as follow: patient's bio-socio demographic characteristic and medical data, patient's knowledge assessment sheet, immediately and post-operative patient's care, tool2: consisted of three parts as follow: post operative patient's complications, lab investigation and diagnostic test, and Daily Living Activities Scale. **Results** showed significance improvement in patient' knowledge level about tibial plateau fracture internal fixation. There was a statistically significant difference between the study group pre and post the intervention related to total knowledge and daily living activities level. **Study concluded** that patients showed an improvement in their knowledge level about tibial plateau fracture internal fixation, complication, lab investigation, and daily living activities. **Recommendation:**designed and implemented for patient at Orthopedic Department in hospitals to enhance their knowledge about tibial plateau fracture and improve their performance patient should be given information about tibial plateau fracture and working activities. Replication of study using a larger probability sample from different geographical areas, in order to generalize the results.

Keywords: Nursing Care, Clinical Outcomes, Post Operative patients, Tibial Plateau Fracture, Internal Fixation Surgery

Introduction:

The knee joint is a complex and most commonly injured joint now because of increased motor vehicle accidents and sports related injuries. As it is a superficial joint, it is more exposed to external forces and gets easily injured. Tibia plateau fractures with intra-articular extension are very difficult to manage. Age, skin conditions, Complex biomechanics of its weight bearing position and complex ligamentous stability and articular congruency are the main reason why these fractures are of concern to surgeon⁽¹⁾.

The fractures are divided into six groups: S-I to S-VI. Of these types, those involving both condyles (S-V) and those separating tibial metaphysis from diaphysis (S-VI) are the most challenging fractures for the Orthopedic Surgeon to treat not only for the osseous damage but for the restoration of the soft tissue envelope as well. The fractures encompass many and varied fracture configurations that involve the medial condyle (10-23%), lateral condyle (55-70%) or both (11-30%) with differing degrees of articular depression and displacement⁽²⁾.

Intra-articular fractures of the proximal end of the tibia, the so-called “plateau fractures”, are serious, complex injuries difficult to treat. The mechanism of injury is based on the presence of an initial axial load, which fractures the tibia articular surface resulting in impaction, but of the metaphysis as well. The medial compartment is split in a medio-lateral direction with a poster-medial main fragment, combined with various amounts of multi-fragmental lateral compartment depression⁽³⁾.

The ideal treatment of tibia plateau fractures is controversial. Open reduction and stable internal fixation help in maintaining the articular surface and restoration of the mechanical alignment which allows early mobilization of knee. Various other methods of treatment like hybrid fixation and now plate fixation using minimally invasive technique⁽⁴⁾.

Treatment plans for tibia plateau fractures rely on its classification. For minor fractures, medical treatment alternatives contain: Resting the knee, bracing the knee, weight-bearing restrictions so as not to harm the joint surface, taking analgesic, applying ice and resting the limb in an elevated position while the healing process occur. Surgical treatment through open reduction and internal fixation (ORIF), which involves exposing the fracture to direct view after that attaching the bone pieces into place with metal plates and screws⁽⁵⁾. Another technique is external fixation, where wires and pins are put into the bone around the fracture site to safe the fragments in place until they heal. External fixation can be combined with the use of little plates or screws to hold a portion of fracture parts in position; this is called hybrid fixation⁽⁶⁾. Helping the nurse is essential to alleviating pains and swellings as well as regaining mobility in the knee. Patient goals and psychological condition must be taken into consideration in order to lessen post-operative discomfort and enhance nursing care in a hospital environment. – During a hospital stay, this is very vital (3-5 days)⁽⁷⁾.

The integral role of post-operative nursing protocol of care to the patient undergoing tibial fracture reconstruction includes, drainage tube management, elevation of the affected limb, anti-infection and pain-relieving therapies were delivered. All patients were required to cooperate with muscular contraction training, passive and active movement of knee joint. Patients were prohibited from full load within postoperative three months. X-ray of the knee joint was performed on the day and every month within three months after drainage tube removal. Appropriate weight-load exercise was gradually delivered according to the callus growth status until full-load activity. At postoperative follow-up of three month⁽⁸⁾.

Significance of the study

Tibia plateau fractures are notoriously difficult to manage, particularly when there is a medial or posteromedial component. The treatment for tibia plateau fractures aim to achieve anatomical reduction of the joint surface and stable osteosynthesis in order to enable early mobilization, so as to prevent complications such as joint stiffness and general post-operative complications such as deep vein thrombosis or pulmonary embolism⁽⁹⁾.

Proper technique for pin insertion and meticulous pin tract care, pin site infection may be the most common complication, occurring in 30% of patients. It varies from minor inflammation remedied by local wound care, to superficial infection requiring antibiotics, local wound care, occasional pin removal and osteomyelitis requiring sequestrectomy⁽¹⁰⁾.

Aim of the Study

Evaluate effect of protocol of nursing care on clinical outcomes of post-operative patients tibial plateau fracture internal fixation surgery.

Research Hypothesis:

1. Adult patients post-operative tibial plateau fracture internal fixation surgery is expected to have passive clinical outcomes.
2. Adult patients postoperative tibial plateau fracture internal fixation surgery is expected to have minimal post-operative complication.

Subjects and Method

Research Design:

Quasi-experimental research design was utilized in this study.

Setting of the study:

This study was conducted at Orthopedic Department at Tanta University Hospital which consists of (40 beds) and Orthopedic Outpatient Clinics for follow.

Subjects:

Based on Epi-info of both sexes⁽¹¹⁾ adult patients who had tibial plateau fracture internal fixation surgery post-operatively were chosen and assessed. Using a random sample of 30

patients, the researchers created two equal groups of 30 individuals each.

Group one:

Study group, 30 patients they received nursing care after implementation of protocol of care by researcher.

Group two:

Control group, 30 patient they received hospital routine of care only.

The sample size, power analysis was calculated by using Epi-info-7 software statistical package.

Inclusion criteria: The subjects were selected according to the following criteria

- Adult patient (21-55years)
- Patient have diagnosed tibial plateau fracture post operative internal fixation surgery.
- Agree to participate in the study.
- The length of stay expected more than 7 days.

Exclusion criteria: the subjects were not selected according to the following criteria:

- Chronic diseases such as D.M, hypertension, kidney, immune suppressed disease.
- Patients have infection, previous tibial surgery and external fixation

Tools of data collection:

Two tools were developed by the researcher and used to collect the data:

Tool I: Structured Interview Schedule⁽¹²⁾: was developed by the researcher after reviewing relevant literature to collect data it consisted of four parts as follow:

Part one: Patient's Bio-Socio demographic characteristic and medical data, it was including: Name, age, sex, marital status, educational level, occupation and residence, past and present medical history, diagnosis, date of admission.

Part two: Patient's Knowledge Assessment Sheet.

When the researcher reviewed relevant literature, they came up with a questionnaire for patients with tibial plateau fractures who had undergone internal fixation to test their understanding. When it comes to understanding the tibial bone

(definition; types; causes and clinical manifestations of tibial plateau fracture; immediately and post operative care; complications; self-care practice intervention; discharge instructions about pain; reporting unusual signs of infection; daily living activities and time to follow-up; diet, exercise and position).

Part three: Immediately and Post-operative Patient's Care: as respiratory exercises, early ambulation, turning and moving, vital signs measurement, put patients on correct position, medication administration, exercises, diet, reporting unusual signs and symptoms of hemorrhage and other complications as presence or absence of signs and symptoms of wound infection⁽¹³⁾.

Part four: Discharge Patient's Instruction; that was including discharge instruction about pain, reporting unusual signs and symptoms of wound infection as pus, pin loosening, daily living activities and time of follow-up, diet, exercise and position.

Scoring system:

The patient who was respond by " correct and complete answer " was given a score (two), "correct and incomplete answer" was given a score (one) and who was respond "wrong and not answer " was given a score (zero).

Total scoring system of patient's knowledge was calculated and equal 46, classified as the following:

The total score of patient's knowledge >75% indicated good.

The total score of patient's knowledge 60% -75% indicated fair.

The total score of patient's knowledge <60% indicated poor.

Tool (II): Patient's Clinical Outcome Monitoring Tool: It was developed by researcher after reviewing of relevant literature and consists of structured patient assessment interview questionnaire which included three parts.

Part one: Post-operative patient's complications assessment: Such as hemorrhage, infection, changes in skin color, skin warmth, and Erythema, warmth, drainage, possible pain.

Part two: Lab investigation and diagnostic test: Wound culture that was done for patient twice (pre and after) giving protocol of care.

Part three: Daily Living Activities Scale:⁽¹⁴⁾ (DLA) is a functional assessment, proven to be reliable and valid, designed to assess what daily living areas are impacted by mental illness or disability. The DLA is intended to be used by all disabilities and ages. And the DLA has six basic activity such as eating, bathing, dressing, toileting, transferring, maintaining continence.

The total score ranged from 0 to 4 , only the highest level of function receives a 1; in others, two or more levels have scores of 1 because each described competence that represents some minimal level of function⁽¹⁵⁾.

Method

1- Official permission was obtained from the Faculty of Nursing of Tanta University to the responsible authorities and the head Tanta University Hospital after explaining the aim of the study to facilitate the researcher implementation.

2-Ethical and legal considerations:

-Written consent was obtained from every patient included in the study after explanation of the aim of the study and assuring them of confidentiality of collected data.

-Anonymity and confidentiality were maintained by the use of code number instead of name and the right of withdrawal is reserved.

-Privacy of the studied patients was maintained. Study not produced harm full to the patient.

3-Tools validity: The tools of the study were tested for its content validity and reliability by nine experts in Medical-Surgical Nursing and emergency field professors necessary modifications was done. **Content validity index = 98.8%** and **AlphaCronbach's test (tool 1) =**

0.783, alpha Cronbach's test (tool 2) = 0.815, and alpha Cronbach's test (2 tools) = 0.802.

4-Pilot study: It was carried out on five patients undergoing tibia plateau fracture surgery to test the feasibility and applicability of the developed tools, accordingly, needed modification was done. Subject of pilot study was excluded from the original sample.

The study was conducted on three phases which including the following:

1- Assessment phase:

By using Researcher's tool (I) part 1, 2, 3, and 4 were used to evaluate inclusion criteria for study and control groups at the time of patient admission in order to gather data for patient data. Patient assistance was after the researcher introduced herself, stated the purpose of the study, and provided instructions for completing the questionnaire. Patients were asked to fill out a survey on their general knowledge by the study's author. The questionnaire was completed by each participant and returned to the researcher on the same day. Each phase of the research saw the distribution of a questionnaire sheet three times. Beginning in the first week of June of the following year, the first shipments will be made available.

By using a monitoring instrument, the researcher was able to track the patient's progress. During each step of the trial, each patient was monitored twice. A unique code was assigned to each item in the list. Morning shifts were used for the monitoring tool. Within 60 to 90 minutes, the observation was made. Over the course of two months, beginning in June 2020 and concluding in August 2020, the researcher watched 4 to 5 patients on a daily basis, three times each week.

2- Planning phase:

The researcher identified the training program's component based on an examination of the data collected during the evaluation phase and a study of relevant literature. After consulting with the nursing director and coordinating with the head of staff development, the timetable and location

for the programme were finalized. The data shows that the audiovisual aids have also been hired.

2. Implementation phase:

I) protocol of care for patient about nursing protocol of care provided for patients post-operative tibial plateau fracture surgery was developed and implemented by the researcher based on the patient's assessment sheet and literature review.

Content of the program

The program was consisted of four sessions, and duration of each session will be 30-40 minutes per day for three days two sessions will be theoretical and other will be practical .Session will be given to five groups (6) patient in each group.

3. Evaluation phase:

Effect of nursing care protocol on patient outcomes: as improve of patient daily living activity by using tool (II) part (I),(II),(III),knowledge, practice, and clinical outcome as absence of post-operative complications as wound infection ,decrease length of hospital stay.

Statistical Analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using number and percent. The Kolmogorov-Smirnov test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, standard deviation, median and interquartile range (IQR). Significance of the obtained results was judged at the 5% level.

Results

Table (1): Illustrates percent distribution of the studied patients according to their socio-demographic characteristics among the studied groups. It was observed that half of the study group (50.0%) their age from 40 to less than 50 years and 20.0% of them their age from 21 to less than 30 years and from 30 to less than 40

years for both. Regarding control group one third of them (33.33%) them their age from 30 to less than 40 years and from 40 to less than 50 years for both. Regards to gender, it was noticed that less than two thirds (63.33%) and 53.33% of the study and control groups respectively were male. Also, it shows that less than half (43.33%) of patients single in the study and control group both. Also, slightly more one third (36.67%) and 53.33% of the study and control group had secondary school education respectively. This table reveals that less than two thirds (63.33%) of the study live in rural areas and more than half (53.33%), of the control group live in urban areas.

Concerning occupation, it shows it presents that less than half (43.33%) and (40.0%) were workers of the study and control group respectively. Also, it presents 60.00 and more than three quarters (76.67%) were not smokers of the study and control group respectively. There was no statistically significant difference between the study and control group related to their socio–demographic characteristics.

Table (2): Presented distribution of the studied patients according to their medical data among the studied groups.it was clarifies that less than three quarters (73.33%) and two thirds (66.67%) of the control and study group had no previous hospitalization respectively. Also, the majority (93.33%) and (90.0%) of the control and study group had no previous surgical operation respectively.

Regarding to main complains, it was noticed that slightly more one third (36.67%) and half (56.67%) of the control and study group complain from swelling of the knee and soft tissue and ability to weight–bearing respectively. Regards to chronic disease, about one third (36.67%) and (30.0%) of the control and study group had renal disease respectively. In relation to regular medications, more than one third (40.0%) and (36.67%) of the study and control group had no regular medications respectively,

and also, slightly more than one third (36.67%) and one quarter (26.67%) of the study and control group take hypertensive drugs respectively. There was no statistically significant difference between the study and control group related to their medical data.

Table (3): Described the percent distribution of the studied patients according to their knowledge about tibial plateau fracture among the studied groups pre and post intervention. It was observed that less than three quarters (73.33%) of the study group had incorrect / no response about tibial plateau fracture pre the intervention, while 70.0% of them had complete correct answer post intervention. More than three quarters (76.67%) of the study group had incomplete correct response about types of fracture pre the intervention, while the most (80.0%) of them had complete correct answer post intervention the protocol of nursing care.

On the other hand, the majority (90.0%) of the study group had incorrect / no response about causes of fracture pre the intervention, while 73.33% of them had complete correct answer post intervention. Regarding symptoms of tibialplateau fracture, it was noticed that half of them (50.0%) and 30.0% of them had incomplete correct response pre and post intervention respectively. Regards to nursing care for the patient immediately after operation, the majority (93.33%) of the study group had incomplete correct response pre intervention compared by the most (80.0%) of them had complete correct response post intervention.

In relation to health teaching for the patient after operation, two thirds (66.67%) of them had incorrect / no response pre intervention compared by 66.7% of them had complete correct response post intervention. The most (83.33%) of them had incomplete correct response pre intervention about Complications occur after the internal fixation surgery for tibial plateau fracture, while 60.0% had complete correct response post intervention. As regards to

abnormal signs and symptoms indicate the presence of infection and then confirm the doctor, 73.33% of the study group had incorrect / no response pre intervention, while the majority (90.0%) of them had complete correct response post intervention.

Related to methods of relieving pain after discharge from the hospital, about two thirds (63.33%) of them had incorrect / no response pre intervention compared by the most (83.33%) of them had complete correct response post intervention. Also, two thirds (66.67%) of them had incorrect / no response about the methods to help carry out the activities of daily living pre intervention compared by 60.00% of them had complete correct response post intervention. Regarding appropriate time for follow-up after operation and rules of food taken after the operation to maintain the wound healing, less than two thirds (63.33%) and (60.0%) of the study group had incomplete correct response pre intervention respectively, while the most of them (80.0%) had complete correct response post intervention for both.

Regarding topatient their foods, drinks they should avoid and proper position of the knee after operation, 43.33%, 20.0%, and 63.33% of the study group had incomplete correct response pre intervention respectively, while 76.67% of them had complete correct response post intervention for all. There was a statistically significant difference between the study group pre and post the intervention related to knowledge about tibial plateau fracture, while (P value= 0.0001).

As regard to control group, about two thirds (66.7%), (63.3%), (63.3%), and (66.7%) had incorrect / no response about tibial plateau fracture, causes of fracture, appropriate time for follow-up after operation, and proper position of the knee after operation respectively. Related to types of fracture, nursing care for the patient immediately after operation, and methods to help

carry out the activities of daily living, half of them (50.0%) had incomplete correct response.

Table (4): Presented that distribution of the studied patients according to their total knowledge level about tibial plateau fracture internal fixation surgery among the studied groups pre and post intervention. It was clarifying that all (100.0%) control group had poor knowledge. Related to study group it was noticed that all (100.0%) of them had poor knowledge pre intervention compared by all (100.0%) of them had good knowledge post intervention, as presented in figure (9). There was a statistically significant difference between the study group pre and post the intervention related to total knowledge level about tibial plateau fracture internal fixation surgery, while (P value= 0.0001).

Table (5): Presented that distribution of the studied patients according to lab investigation and diagnostic test among the studied groups pre and post intervention. Regard to control group, more than half (56.7%) had wound culture, mean score of CRP was 23.73 ± 7.772 , and ESR was 21.60 ± 3.430 for first hour and 41.57 ± 3.720 for second hour

In relation to the study group, less than half of them (40.0%) had wound culture pre intervention compared by 16.67% of them post intervention, with a statistically significant difference while (P value = 0.042). Regarding to mean score of CRP was 26.33 ± 4.397 and 8.87 ± 2.460 pre and post intervention respectively, with a statistically significant difference while (P value = 0.0001).

On the other hand, mean score of ESR for first hour was 23.13 ± 3.115 and 8.87 ± 2.460 pre and post intervention respectively, with a statistically significant difference while (P value = 0.0001), and also, for second hour, was 41.17 ± 2.972 and 25.97 ± 3.528 pre and post intervention respectively, with a statistically significant difference while (P value = 0.0001).

Table (1): Percent distribution of the studied patients according to their socio–demographic characteristics among the studied groups

Characteristics	The studied patients (n=60)				χ^2 P
	Control group(n=30)		Study group(n=30)		
	No	%	No	%	
<u>Age (in years)</u>					
▪ (21-<30)	3	10.00	6	20.00	4.601 0.204
▪ (30-<40)	10	33.33	6	20.00	
▪ (40-<50)	10	33.33	15	50.00	
▪ (50-60)	7	23.33	3	10.00	
<u>Gender</u>					
▪ Male	16	53.33	19	63.33	FE 0.601
▪ Female	14	46.67	11	36.67	
<u>Marital status</u>					
▪ Married	6	20.00	11	36.67	2.971 0.369
▪ Single	13	43.33	13	43.33	
▪ Divorced	6	20.00	3	10.00	
▪ Widow	5	16.67	3	10.00	
<u>Educational level</u>					
▪ Illiterate	5	16.67	5	16.67	3.199 0.362
▪ Read and write	3	10.00	8	26.67	
▪ Secondary school	16	53.33	11	36.67	
▪ University	6	20.00	6	20.00	
<u>Place of residence</u>					
▪ Rural	14	46.67	19	63.33	FE 0.299
▪ Urban	16	53.33	11	36.67	
<u>Occupation</u>					
▪ Employee	5	16.67	6	20.00	1.674 0.643
▪ Worker	12	40.00	13	43.33	
▪ Free work	9	30.00	5	16.67	
▪ Other	4	13.33	6	20.00	
<u>Smoking</u>					
▪ Yes	7	23.33	12	40.00	FE 0.267
▪ No	23	76.67	18	60.00	
<u>Duration of smoking (in years)</u>					
▪ None	23	76.67	18	60.00	2.610 0.456
▪ <5	3	10.00	3	10.00	
▪ (5-10)	1	3.33	3	10.00	
▪ >10	3	10.00	6	20.00	
<u>Numbers of packs /day</u>					
▪ None	23	76.67	18	60.00	2.533 0.282
▪ 2 times	3	10.00	3	10.00	
▪ 3 times	4	13.33	9	30.00	

Table (2): Percent distribution of the studied patients according to their medical data among the studied groups

Medical data					
<u>Previous hospitalization</u>					
▪ Yes					
▪ No					
<u>Duration of hospitalization</u>					
▪ None					
▪ <5					
▪ (5-10)					
▪ > 10					
<u>Previous surgical operation</u>					
▪ No					
▪ Yes					
<u>Main complains</u>					
▪ Swelling of the knee and soft tissue					
▪ ability to weight–bearing					
▪ All of the above					
▪ Don't know					
<u>Chronic disease</u>					
▪ None					
▪ Renal disease					
▪ Hepatitis B					
▪ Hypertensive disease					
▪ Cardiac disease					
<u>Regular medications</u>					
▪ None					
▪ Diabetes					
▪ Hepatic					
▪ Hypertension					
▪ Cardiac					

FE: Fisher's Exact test

Table (3): Percent distribution of the studied patients according to their knowledge about tibial plateau fracture among the studied groups pre and post intervention

Knowledge about tibial plateau fracture	The studied patients (n=60)						χ^2 P
	Control group (n=30)		Study group (n=30)				
			Pre		Post		
	No.	%	No.	%	No.	%	
Tibial plateau fracture <ul style="list-style-type: none"> ▪ Incorrect/No response ▪ Incomplete correct ▪ complete correct 							
Types of fractures <ul style="list-style-type: none"> ▪ Incorrect/No response ▪ Incomplete correct ▪ complete correct 							
Causes of the fracture <ul style="list-style-type: none"> ▪ Incorrect/No response ▪ Incomplete correct ▪ complete correct 							
Symptoms of tibial plateau fracture <ul style="list-style-type: none"> ▪ Incorrect/No response ▪ Incomplete correct ▪ complete correct 							
Nursing care for the patient immediately after operation <ul style="list-style-type: none"> ▪ Incorrect/No response ▪ Incomplete correct ▪ complete correct 							
Health teaching for the patient after operation <ul style="list-style-type: none"> ▪ Incorrect/No response ▪ Incomplete correct ▪ complete correct 							
Complications occur after the internal fixation surgery for tibial plateau fracture <ul style="list-style-type: none"> ▪ Incorrect/No response ▪ Incomplete correct ▪ complete correct 							
Abnormal signs and symptoms indicate the presence of infection and then confirm the doctor <ul style="list-style-type: none"> ▪ Incorrect/No response ▪ Incomplete correct ▪ complete correct 							
Methods of relieving pain after discharge from the hospital <ul style="list-style-type: none"> ▪ Incorrect/No response ▪ Incomplete correct ▪ complete correct 							

Methods to help carry out the activities of daily living <ul style="list-style-type: none"> ▪ Incorrect/No response ▪ Incomplete correct ▪ complete correct 							
Appropriate time for follow-up after operation <ul style="list-style-type: none"> ▪ Incorrect/No response ▪ Incomplete correct ▪ complete correct 							
Rules of food taken after the operation to maintain the wound healing <ul style="list-style-type: none"> ▪ Incorrect/No response ▪ Incomplete correct ▪ complete correct 							
foods should avoid after operation <ul style="list-style-type: none"> ▪ Incorrect/No response ▪ Incomplete correct ▪ complete correct 							
Drinks should avoid after operation <ul style="list-style-type: none"> ▪ Incorrect/No response ▪ Incomplete correct ▪ complete correct 							
Proper position of the knee after the operation <ul style="list-style-type: none"> ▪ Incorrect/No response ▪ Incomplete correct ▪ complete correct 							

(*) Statistically significant difference at level $P < 0.05$.

Table (4): Percent distribution of the studied patients according to their total knowledge level about tibial plateau fracture internal fixation surgery among the studied groups pre and post intervention

Total Knowledge Level	The studied patients (n=60)						FE P
	Control group (n=30)		Study group (n=30)				
			Pre		Post		
	No.	%	No.	%	No.	%	
▪ Poor							
▪ Good							

>75% Good

(60-75) % Fair

< 60% Poor

FE: Fisher's Exact test

(*) Statistically significant difference at level $P < 0.05$.

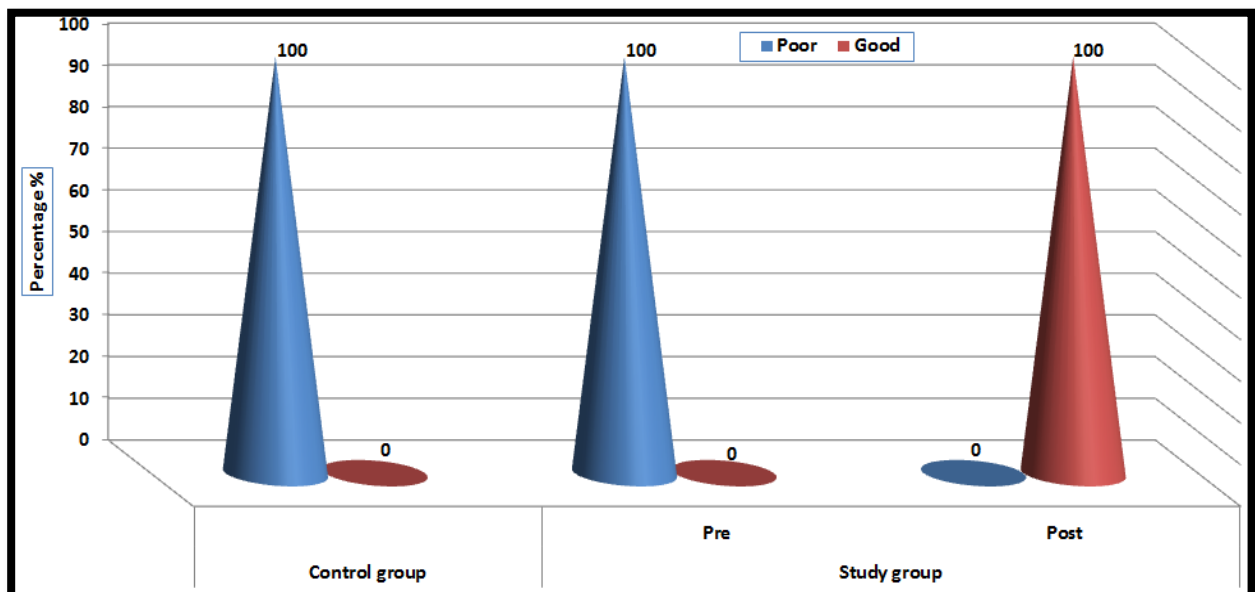


Figure (1): Percent distribution of the studied patients according to their total knowledge level about tibial plateau fracture internal fixation surgery among the studied groups pre and post intervention

Table (5): Percent distribution of the studied patients according to lab investigation and diagnostic test among the studied groups pre and post intervention

Lab investigation and diagnostic test	The studied patients (n=60)						FE P
	Control group (n=30)		Study group(n=30)				
	No.	%	Pre		Post		
	No.	%	No.	%	No.	%	
1. Wound culture							
2. <u>CRP</u>							
3. <u>ESR</u>							
▪ First hour							
▪ Secondhour							

FE: Fisher's Exact test

(*) Statistically significant difference at level $P < 0.05$

Discussion

Tibial plateau fractures (TPFs) are common and difficult to-manage injuries that can be due to high or low energy trauma and can affect young adults or third-age patients. Both high or low energy trauma can cause TPFs. Usually, surrounding soft-tissue involvement is to be expected even in low energy fractures. This suggests that every single fracture has to be carefully evaluated in order to identify the exact pattern⁽¹⁶⁾.

The purpose of this research was to determine the impact of a nursing care protocol on the clinical outcomes of patients who had tibial plateau fracture internal fixation surgery at Tanta University Hospital and its Orthopedic Outpatient Clinics after undergoing surgery. Half of the participants in the study were between the ages of 40 and 50, whereas one-third of the people in the control group were between the ages of 30 and 40, with an average age of 40. Tibial plateau fractures are more common in those over the age of 40. Fractures are more likely to occur as we become older, and bone healing is less effective as we get older.

This finding is matched with the results of the study from **Mohamed et al. (2019)**⁽¹⁷⁾ who observed in their study that represent the mean values of age and sex between groups A and B. The mean of age for were 33.40 ± 4.35 year and 33.50 ± 3.70 year, for groups A and B, respectively. Also, **Arnold et al. (2018)**⁽¹⁸⁾, agreed with the present study who stated that the mean age of 45.1 years (range 20.8–72 years).

Less than two-thirds of the participants in the study were men, but more than half of those in the control group were. Males are more likely than females to suffer from these types of fractures. There were 53 people who were questioned, and roughly two thirds of them were men, according to the findings of the study by

Nigri and colleagues⁽¹⁹⁾. This is also in line with the findings of Antonova et al.

Knowledge deficits for many aspects of patients about tibial plateau fracture internal fixation surgery before the protocol of nursing care for control and study group, as evidenced by the low mean score, all of study had poor knowledge pre intervention compared by all of them had good knowledge post intervention. There was a statistically significant difference between the study group pre and post the intervention related to total knowledge level about tibial plateau fracture internal fixation surgery.

Who mentioned that there was high statistically significance regarding the total knowledge score about the skeletal system, fracture, orthopedic fixator, and self-care at pre, post and after (one month) implementation of health educational guidelines. Also similar to the present study finding, a study conducted by **Khorais et al. (2018)**⁽²⁰⁾. A study conducted by found statistically significant differences in the knowledge of the external fixation device, pin site care, principles of device protection, pain management strategies, nutrition, and self-care programme implementation in the three phases of the study (pre, immediately post, and follow-up programme implementation).

Comparable to those of a previous one done in Hong Kong with Chinese seniors 65 and older. Only 1.4 percent of male individuals and 1.7 percent of female subjects in Hong Kong were unable to execute ADLs, according to a research that employed the Katz ADL questionnaire⁽²¹⁾. significant difference. It means that patients with tibial plateau fracture internal fixation surgery become more powerful in dealing with their physical limitations and methods of overcoming pain and fatigue after the intervention. It is also indicated that there is an improvement in the results of lab investigation in study group.

Conclusion

Based on the findings of the present study, it can be concluded that patients showed an improvement in their knowledge level about tibial plateau fracture internal fixation surgery, complication, lab investigation results, and daily living activities. There was a statistically significant difference between the study group pre and post the intervention related to total knowledge mean score and daily living activities level. There was a positive highly statistically significant difference between knowledge level and level of daily living activities scale among the study group pre and post intervention.

Recommendations Based on the findings of the present study, the following recommendations are suggested:

Recommendation for patients:

They should be given information about tibial plateau fracture and levels of sport and working activities.

Recommendation for future research:

Replication of the study using a larger probability sample from different geographical areas, in order to generalize the results

References

1. Van Dreumel R, Van Wunnik B, Janssen L, Simons P, Janzing. Mid- to long-term functional outcome after open reduction and internal fixation of tibial plateau fractures injury. 2018; 46(8): 1608–1612.
2. Timmers T, Van Der Ven D, De Vries L, Van Olden G. Functional outcome after tibial plateau fracture osteosynthesis: A mean follow-up of 6 years. *Knee*. 2018; 21: 1210–1215.
3. Mattiassich G, Foltin E, Scheurecker G, Schneiderbauer A, Kröpfl A, Fischmeister M. Radiographic and clinical results after surgically treated tibial plateau fractures at three and twenty two years postsurgery. *Int Orthop*. 2019; 38(3): 587–594.
4. Jiwanlal A, Jeray K. Outcome of Posterior Tibial Plateau Fixation. *J Knee Surg*. 2019; 29(1): 34–39.
5. Yang G, Zhai Q, Zhu Y, Sun H, Putnis S, Luo C. The incidence of posterior tibial plateau fracture: An investigation of 525 fractures by using a CT-based classification system. *Arch Orthop Trauma Surg*. 2017; 133(7): 929–934.
6. Wang Y, Luo C, Zhu Y. Updated three-column concept in surgical treatment for tibial plateau fractures — a prospective cohort study of 287 patients. *Injury*. 2019; 47(7): 1488–1496.
7. Luo C-F, Sun H, Zhang B, Zeng B-F. Three-column fixation for complex tibial plateau fractures. *J. Orthop Trauma*. 2018; 24(11): 683 – 692.
8. Hoekstra H, Kempnaers K, Nijs S. A revised 3-column classification approach for the surgical planning of extended lateral tibial plateau fractures. *Eur J Trauma Emerg Surg*. 2019; 18(4): 569-514.
9. Lin W, Su Y, Lin C. The application of a three-column internal fixation system with anatomical locking plates on comminuted fractures of the tibial plateau. *Int Orthop*. 2020; 40(7): 1509–1514.
10. de Groot I, Favejee M, Reijman M, Verhaar J, Terwee C. The Dutch version of the Knee Injury and Osteoarthritis Outcome Score: A validation study. *Health Qual Life Outcomes*. 2018; 6: 16.
11. Schmidt A. Acute compartment syndrome. *Injury*. 2018; 48(1): S22-SS5.
12. Vallier HA, Cureton BA, Patterson BM. Factors influencing functional outcomes after Distal Tibia Shaft Fractures. *J Orthop Trauma*. 2011; 28: 6-8.
13. Krappinger, D, Irenberger. Treatment of large posttraumatic tibial bone defects using the Ilizarov method: A subjective outcome

assessment. *Arch. Orthop. Trauma Surg.* 2013; 133: 789–795.

14.Elsoe R, Larsen P, Petruskevicius J, Kold S. Complex tibial fractures are associated with lower social classes and predict early exit from employment and worse patient-reported QOL: A prospective observational study of 46 complex tibial fractures treated with a ring fixator. *Strategies in Trauma and Limb Reconstruction.* 2018; 13(1): 25-33.

15.Wasserstein D, Henry P, Paterson J, Kreder H, Jenkinson R. Risk of total knee arthroplasty after operatively treated tibia plateau fracture: A matched-population-based cohort study. *J Bone Joint Surg Am.* 2018; 96(2): 144–150.

16.Borrelli J. Management of soft tissue injuries associated with tibial plateau fractures. *J Knee Surg.* 2014; 27: 5-9.

17.Mohamed M, Khedr A, Zaki L, Khaled S, Balbaa A. Effect of introducing early weight bearing training in rehabilitating patient with tibial plateau fracture fixed with open reduction internal fixation. *Bioscience Research.* 2019; 16(2): 1232-1242.

18.Arnold J, Tu C, Phan T, Rickman M, Varghese V, Thewlis D, Characteristics of postoperative weight bearing and management protocols for tibial plateau fractures: Findings from a scoping review. *Injury.* 2018; 48(12): 2634-2642.

19.Black E, Antoci V, Lee T. Role of preoperative computed tomography scans in operative planning for malleolar ankle fractures. *Foot & ankle international* , American Orthopaedic Foot and Ankle Society [and] Swiss Foot and Ankle Society. 2013; 34: 697–704.

20.Morsy R, Sheta H, Mohamed R. Effectiveness of nursing guidelines regarding self-care strategies for patients with external skeletal fixation. *Journal of Nursing Science - Benha University.* 2021; 2(2): 526 – 545.

21.Yu R, Wong M, Chang B, Lai X, Lum C.M., Auyeung T.W, et al. Trends in activities of daily living disability in a large sample of community-dwelling Chinese older adults in Hong Kong: An age-period-cohort analysis. *BMJ Open.* 2016; 6: 1–9.