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RESEARCH ARTICLE

Impact of Nursing Instructions and Exercises Training on Functional Outcomes for Patients with Pelvic Fixation Surgery

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ARTICLE INFO	ABSTRACT
	Pelvic fracture is one of the most complicated cases in trauma care, occurring in 3% of bone injuries. Pelvic fracture is a disruption to the bony structure of the pelvis. The purpose of this study was to evaluate the impact of nursing instructions and exercises training on functional outcomes for patients with pelvic fixation surgery. A quasi-experimental research design was utilized. Setting: The study was carried out at the trauma unit in Assiut University Hospitals, Egypt. Subjects: A sample of sixty patients (Male and female) their ages were between 18 and 65 years old who attend the trauma unit with pelvic fractures. Those patients underwent open reduction and internal fixation surgery, and thirty patients were randomly assigned to the study and control group. Tools: (I) Patient assessment sheet and (II) Majeed Pelvic Score (MPS). There was a statistically significant difference (p. value = 0.001) in the total knowledge score between the study and control groups at three and six months after surgery. Providing nursing instructions and exercises training significantly improved patient's knowledge and functional outcomes. All patients undergoing pelvic fixation surgery should have access to a discharge planning and education booklet, which can be provided in the trauma unit. Patients who cannot read and write should be given illustrated pamphlets.

INTRODUCTION

Pelvic fracture involves damage to the bone structure that forms the pelvic ring including the hipbone, sacrum, or coccyx (tailbone). The pelvis is an extremely sturdy structure because of the ring's intrinsic mechanical and structural integrity. As a result, pelvic fractures typically result from severe trauma and are frequently linked to other fractures or injuries to other parts of the body. Because major blood arteries, nerves, and organs can be damaged in pelvic fractures, there is a large risk of patient morbidity and death. As such, these injuries require meticulous examination (Ferede, et al., 2021).

High-energy trauma usually results in pelvic fractures, which are serious and sometimes deadly orthopedic injuries with a 19–31% estimated death rate. Additionally, the majority of patients experience polytrauma, which is connected with additional injuries to other body areas and hemorrhage due to the rupture of venous and arterial vessels in the pelvis. The morbidity and mortality rates for those with pelvic fractures have fallen during the last decade. as a result of improvements in diagnostic technology and the effectiveness of acute trauma care (Nana et al., 2022).

Pelvic fractures are rare and typically result from falls from considerable heights or high-speed collisions, such as motorcycles or vehicles. In patients with bone-weakening conditions like osteoporosis, pelvic fractures can also happen following minor falls. Avulsion fractures, another type of pelvic fracture that mostly affects adolescents, occur most frequently when a muscle contracts abruptly, causing a little fragment of bone to come out of the ischium where the hamstring connects (Ghosh et al., 2019).

Pelvic fractures are categorized by the pelvic ring's stability to stable fractures heal without implications, while unstable fractures result in pelvic ring abnormalities that cause serious consequences. The most frequent injuries with pelvic fractures are bleeding retroperitoneal, hematoma, and intra-abdominal and urogenital injuries. Other complications include chronic pain, impaired mobility, and sexual dysfunction. To minimize the consequences of fractures, it is advised to use stable fixation techniques as soon as possible after the injury. Future advancements in the surgical management of pelvic fracture will be directed toward reducing implant failure and further soft tissue damage (Chan et al., 2023).

Pelvic fractures have long-term effects on functional outcomes. Many individuals who survive pelvic fractures may experience temporary or permanent problems that impair their ability to perform daily tasks. Those patients do not return to their pre-injury activities. Numerous studies have discovered that pelvic injuries can result in long-term, permanent limits that impair everyday functioning in addition to major short-term effects. These limitations include irregular gait and persistent back and pelvic pain, all of which can affect the patient's function (Banierink et al., 2022).

The nurse is typically the member of the interdisciplinary healthcare team that spends the most time with the patient and plays a significant role in the patient's preoperative evaluation and planning. The pelvic fracture patient, like all patients, requires thorough preoperative training, which includes breathing and coughing exercises and leg exercises. Additionally, the nurse plays a crucial part in the patient's postoperative assessment and surveillance to recognize any changes or deterioration in the patient's condition that calls for immediate attention (Lovrencic and Rotim, 2019).

An exercise regimen is crucial to the recovery process for pelvic fractures, whether they are high-energy or low-energy. Through the improvement of functional skills, self-care abilities, pain level, strength, flexibility, and hip, spine, and leg motion, the exercise allows the patient to return to optimal function. Reducing the amount of time needed to resume activity and sports is another crucial objective. After one or two days of bed rest, physical therapy for patients undergoing surgery begins with passive hip and leg motions before moving on to active activities (Piccione et al., 2021).

Significance of the study

The incidence of pelvic fixation surgery (Open reduction and internal fixation) in the trauma unit at Assiut University Hospital was 205 patients during the period between 2021- 2022 (Assiut University Hospital records, 2021-2022). The estimated mortality rate for unstable pelvic fractures is between 19 and 31%, making them grave and potentially fatal orthopedic injuries. Most patients who survive a pelvic fracture may experience a temporary or permanent disability that affects their function. Dealing with these disabilities often involves high costs, placing a heavy socioeconomic burden on the patients, their relatives, and society as a whole (Christie et al., 2020). So, this study was conducted to evaluate the impact of nursing instructions and exercises training on functional outcomes for patients with pelvic fixation surgery.

Aims of the study:

The aims of this study were:-

- Assessing patient's level of knowledge regarding pelvic fixation surgery.
- Providing nursing instructions and exercises training for patients with pelvic fixation surgery.
- Evaluate the impact of nursing instructions and exercises training on functional outcomes for patients with pelvic fixation surgery.

Hypothesis:

The aim of the study prompted the formulation of the following hypothesis.

• Patients in the study group will have higher post-mean knowledge score than patients in the control group.

• Compared to patients in the control group, study group patients who receive nursing instructions and exercise training report an improvement in functional outcomes.

Operational definitions:

Nursing instructions: The term "nursing instruction" describes the use of nursing staff teaching abilities for offering patients structured learning strategies, which increases patients' awareness of health issues and modifies their behavior about self-care.

Functional outcomes: Include the aspects of life that a fracture may negatively affect, such as relationships, work performance, and living skills. Contrasting with clinical results, functional outcome is more concerned with a person's recovery in areas like social and vocational functioning than with the relief of symptoms.

Pelvic fixation surgery: This is a surgical technique used to stabilize a broken hip or pelvic bone and can be achieved through open reduction and internal fixation or external fixation.

Patients and methods:

Research design:

For this study, a quasi-experimental research design was utilized.

Setting:

The study was carried out at the trauma unit of Assiut University Hospital.

 Sample:

This study included sixty patients (Male and female) aged between 18-65 years old who attend the trauma unit with pelvic fractures. Those patients underwent open reduction and internal fixation surgery, and thirty patients were randomly assigned to each the study and control groups.

Sample size:

Considering the results of a prior study, a power analysis was carried out to estimate the sample size by comparing two means with a confidence level of 95% and power analyses of 80%. Sample size estimated at 0.05 the difference between the two means 2.1 with a standard deviation in study group 2.5 and control group 3.2 minimum number required is 30 cases in each group.

Tools:

The next three tools were used to gather data:

Tool (I): Patient assessment sheet:

The researcher created this tool to evaluate the patient's condition based on the review of the literature. It will consist of three parts:

Part (1): Demographic data: such as (age, gender, marital status, level of education, occupation, and residence).

Part (2): Medical data: (Medical diagnosis, comorbidities, affected side, mechanism of injury, associated orthopedic injury, and length of hospital stay).

Part (3): Patient`s knowledge assessment: This part assesses the patient's knowledge regarding the definition of internal fixation, preoperative preparations, body position, pain management, nutrition, wound care, coughing and breathing exercises, leg exercise, use of assistive devices, time of weight bearing, prevention of pressure ulcer and deep venous thrombosis.

Scoring system:

There were thirty-one questions in all. It was utilized to measure patients' level of understanding regarding pelvic fixation surgery before the introduction of nursing instructions and exercise training. After nursing instructions and exercise training were educated, the same method was utilized to assess the knowledge gained. Certain items were divided into two categories: correct (1) or incorrect (0). Other items were divided into three categories: complete correct (2), incomplete correct (1), or incorrect (0). All items together had a score of (60). A score of less than 70% was considered unsatisfactory, while a score of more than 70% was considered a satisfactory.

Tool (II): Majeed Pelvic Score (MPS) adopted from (Majeed, 1989).

The Majeed Pelvic Score (MPS) was used to assess functional outcomes. It includes six items broken down into the following four subscales: pain (30 points), work (20 points), sitting (10 points), and standing (36 points). We excluded (4 points) for sexual intercourse. A total of 100 possible points. Majeed's suggested cutoffs for excellent (85-100), good (70-84), fair (55-69), and poor (<55).

Nursing instructions and exercise training for patients with pelvic fixation surgery (teaching booklet): This tool was created by the researchers using a review of both national and international literature. (Port Said Scientific Journal of Nursing, 2019), (Journal of the American Academy of Orthopaedic Surgeons, 2020) and (European Journal of Translational Myology, 2021) It was written in an Arabic language and included pictures to provide information about:

- Nursing instructions about the definition of internal fixation, preoperative preparation, body position, pain management, nutrition, wound care, use of assistive devices, time of weight bearing, prevention of pressure ulcer , deep venous thrombosis, bowel and bladder care.
- Exercises training about coughing and breathing exercises, range of motion, and muscle strengthening exercises.

Ethical considerations:

The ethical committee of the Faculty of Nursing granted permission to conduct the study. A formal permission was obtained from the head of Orthopedic surgery department and outpatients' clinic. After informing patients or their families about the nature and goals of the study, informed agreement was acquired from those who wished to participate. Privacy and confidentiality were guaranteed. Patients were free to decline participation in the trial or to leave at any moment, for any reason.

Procedure:

The research was conducted in three phases:

Preparatory phase:

At this stage, the researchers conducted a thorough national and international literature search of nursing and medical textbooks, periodicals, and online resources before preparing the data collection tools

Content validity and reliability:

Five academic experts—two from Assiut University's orthopedic surgery department and three from the medical surgical nursing department—revised and verified the validity of all the tools. They looked over the tools for clarity, relevance, comprehensiveness, understanding, and applicability. Only minor adjustments were needed, and the repair was made as a result. Regarding the instruments' dependability, the Cronbach's alpha coefficient (alpha=0.829) verified their consistency.

Pilot study:

A pilot study was carried out on 10% of patients (6 patients) to assess the feasibility, applicability, clarity, and relevancy of the study tools, to pinpoint potential application-related challenges, and to calculate the time required to complete them. These patients were excluded from the main trial when the necessary adjustments were made.

Implementation phase:

Data collection was started by the researchers received the approval to move forward with the intended study.

Data from the trauma unit at Assiut University Hospital was gathered between January and June of 2023.

The tools were completed via interviews. We conducted this research during the morning and afternoon shifts. In three sessions, the patients received the exercise instruction and nursing instructions.

First session,

- The first session began in the trauma unit at Assiut University Hospital 24 hours after the patient's admission.
- Before data collection, the studied patients were visited to establish a communication channel and to clarify the purpose and nature of the study to those who had given their assent.
- Every participant was interviewed individually and asked to complete tool (1) (pretest) to assess demographic data and medical data. Also assess his/her knowledge about pelvic fixation surgery (definition of internal fixation, preoperative preparations, body position, pain management, nutrition, wound care, coughing and breathing exercise, leg exercise, use of assistive devices, time of weight bearing, and prevention of pressure ulcer and deep venous thrombosis), then the researchers use the second tool (pretest) to assess functional outcomes. The study intervention was constructed using these findings as a baseline.
- The session lasted around 20 to 30 minutes.

Second session:
The researchers orient the patient to the nursing instructions and exercise training during this session. The nursing instruction included: Knowledge about the definition of internal fixation, preoperative preparation, body position, pain management, nutrition, wound care, coughing and breathing exercises, use of assistive devices, time of weight bearing, prevention of pressure ulcer and deep venous thrombosis and bowel and bladder care.

- To improve the understanding of patients and aid in their understanding of the material by using images.
- There were 10:20 minutes for explanations and feedback after the session ended. To make sure the patient understood, reinforcement was given based on their needs.
- The booklet was given to each patient in hard copy.
- The session lasted for 30-40 minutes.

Third session:

Exercise training includes training about coughing and breathing exercises, range of motion, and muscle strengthening exercises.

Evaluation phase:

- Tool I and Tool II were used to complete the evaluation phase for every subject.

- After three and six months, the patient's knowledge about pelvic fixation surgery was assessed using (Tool I part 3) posttest.

- Functional outcomes have been evaluated through (Tool II) after three and six months via the phone or at the trauma outpatient clinic during follow-up (posttest).

Statistical analysis:

The gathered data were coded and then converted into a format specifically created to be input into an IBM-compatible computer. Using the Statistical Package for Social Sciences (SPSS) version 20 for Windows, all entered data were checked for errors. Numbers, percentages, means, and standard

deviations are examples of descriptive statistics. The Chi-square test, t-test, and ANOVA test were used to gather, tabulate, and statistically evaluate the data.

RESULTS

Table (1): Comparison between the study and control groups regarding demographic data (n= 60).

Variable	Study group		Control group		P .value
	(n=30)	%	(n=30)	%	
Age					
18<30 years	9	30.0%	15	%50.0	4.892 NS
30<40 years	8	26.7%	6	%20.0	.299 NS
40<50 years	8	26.7%	3	%10.0	
50<60years	3	10.0%	5	%17.2	
60<65 years	2	%6.7	1	%3.3	
Mean ±SD	36.06 ± 14.05.				
Sex					
Male	22	73.3	21	%70.0	.082 NS
Female	8	26.7	9	%30.0	.500 NS
Marital status					
Single	7	23.3	10	%33.3	.749 NS
Married	22	73.3	19	%63.3	.688 NS
Widowed	1	3.3	1	%3.3	
Educational level					
Illiterate	5	%17.2	2	6.7	1.952 NS
Read and write	5	%17.2	7	%23.3	.582 NS
Secondary	19	%63.3	19	%63.3	
University	1	3.3	2	6.7	
Occupation					
Working	14	%46.7	11	%36.7	.617 NS
Not working	16	%53.3	19	%63.3	.300 NS
Residence					
Urban	14	%46.7	12	%40.0	.271 NS
Rural	16	%53.3	18	%60.0	.397 NS

-SD- stander deviation- Chi-Square testNS: no statistically significant difference P value >0.05

Table (2): Comparison between the study and control groups regarding medical data (n = 60).

Medical data		Studied group		P Value
		Study (n=30)	Control (n=30)	
1. Type of fracture				
pelvis B fracture	N	11	8	
	%	36.7%	26.7%	
pelvis C fracture	N	5	11	
	%	16.7%	36.7%	
acetabulum fracture	N	9	4	P=.102 NS
	%	30.0%	13.33%	
pelvis A +acetabulum	N	0	3	
	%	0.0%	10.0%	
pelvis B +acetabulum	N	1	1	
	%	3.3%	3.3%	
pelvis C +acetabulum	N	4	2	
	%	13.33%	6.7%	
2. Commodities				
Hypertension	N	2	3	
	%	6.7%	10.0%	
Diabetes mellitus	N	0	1	P=.320 NS
	%	0.0%	3.3%	
Hypertension and diabetes	N	0	2	
	%	0.0%	6.7%	
Non	N	28	24	
	%	93.33%	80.0%	
3. Affected side				
Right	N	11	14	
	%	36.7%	46.7%	
Left	N	15	15	P=.340 NS
	%	50.0%	50.0%	
Both	N	4	1	
	%	13.3%	3.3%	
4. Mechanism of injury				
MCA	N	16	10	
	%	53.33%	33.33%	
Motor cycle accident	N	2	2	
	%	6.7%	6.7%	
FFH	N	10	15	P=.460 NS
	%	33.33%	50.0%	
FOG	N	2	3	
	%	6.7%	10.0%	
5. Associated injury				
Upper limb	N	1	1	
	%	3.33%	3.33%	
lower limb	N	5	5	

	%	16.7%	16.7%	P=1.000[NS]
Non	N	24	24	
	%	80.0%	80.0%	

Pearson Chi-Square NS: no statistically significant difference P value >0.05

Table (3): Distribution of hospital stay among the studied patients (n=60).

	Studied group	N	Mean	Std. Deviation	Minimum	Maximum	Sig.
Length of hospital stay	Study	30	16.86667	6.067058	8	32	.496
	Control	30	16.20000	7.077892	7	37	.697

Table (4): Comparison between study and control group related to patient`s knowledge assessment during three program phases (Preoperative, 3 months postoperative, and 6 months postoperative (n=60)

Patients' knowledge assessment	Study		Control		X2/T	P.value
	No	%	No	%		
Preoperative						
Unsatisfactory	30	100.0	29	96.7	1.01	1.00[NS]
Satisfactory	0	0.0	1	3.3		
Mean ± SD	1.17±2.51		2.23±8.12		T=0.687	0.495 [NS]
3 months postoperative						
Unsatisfactory	2	6.7	29	96.7	48.56	<0.001**
Satisfactory	28	93.3	1	3.3		
Mean ± SD	55.87±5.85		2.3±8.12		T=29.32	<0.001**
6 months postoperative						
Unsatisfactory	4	13.3	29	96.7	42.08	<0.001**
Satisfactory	26	86.7	1	3.3		
Mean ± SD	54.5±7.7		2.3±8.12		T=25.54	<0.001**

- *SD-stander deviation*   - *Chi square test*
Significant level at P value < 0.05,   **Significant level at P value <*
0.01
- NS: no statistically significant difference P value >0.05

Table (5): Comparison between the study and control group related to Majeed Pelvic Score (MPS) during three program phases (Preoperative, 3 months postoperative, and 6 months postoperative (n=60)

Majeed Pelvic Score (MPS)	Study		Control		X2/T	P.value
	No	%	No	%		
Preoperative						
Poor (<55).	30	100.0	30	100.0	-	-
Mean ± SD	0.33±1.83		0.2±1.1		T=0.343	0.733ᴺˢ
3 months postop active						
excellent (85-100)	1	3.3	0	0.0		
good (70-84)	3	10.0	0	0.0	5.79	0.122
fair (55-69)	9	30.0	6	20.0		
Poor (<55).	17	56.7	24	80.0		
Mean ± SD	48.67±15.88		36.77±13.66		T=3.11	0.003**
6 months postoperative						
excellent (85-100)	16	53.3	7	23.3		
good (70-84)	9	30.0	9	30.0	7.89	0.048
fair (55-69)	4	13.3	10	33.3		
Poor (<55).	1	3.3	4	10.0		
Mean ± SD	79.07±12.67		67.13±14.21		T=2.90	0.005**

SD-stander deviation   *- Chi square test*
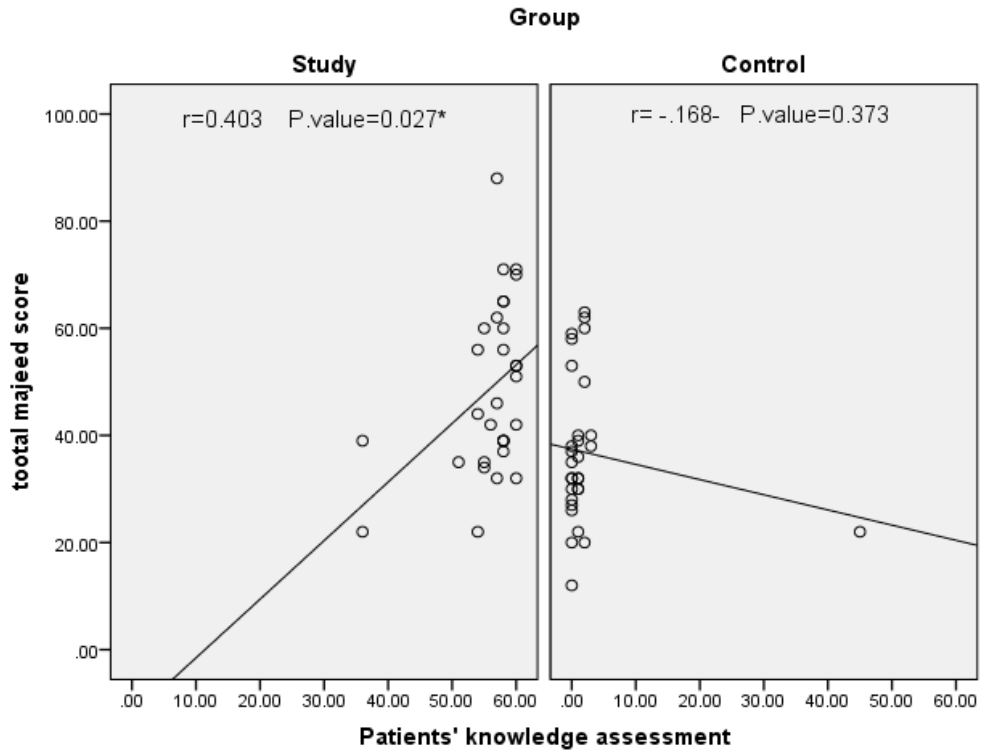*Significant level at P value < 0.05*   **Significant level at P value < 0.01*
- NS: no statistical significant difference P value >0.05
Fig: (1): Comparison between Majeed Pelvic Score (MPS) for the study and control group with their knowledge assessment 3 months postoperative (n=60)
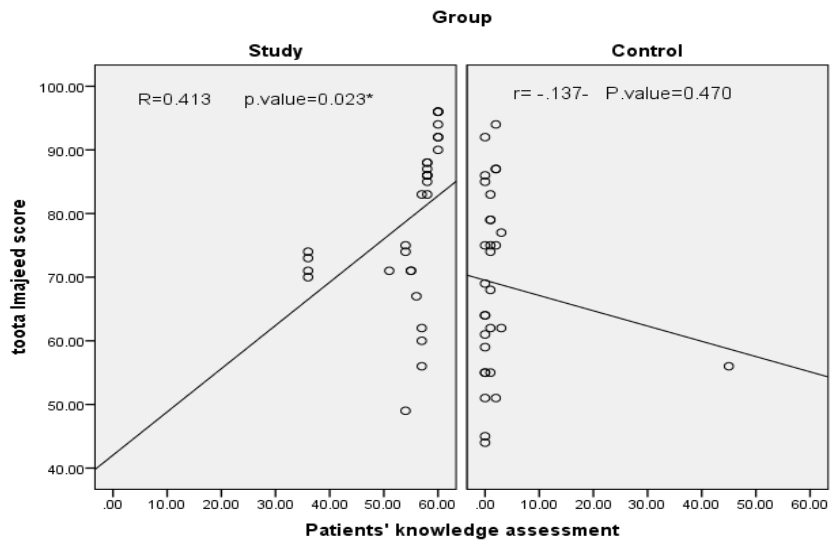
-r. Pearson correlation

-Person correlation test   *Significant level at P value < 0.05

Fig: (2): Comparison between Majeed Pelvic Score (MPS) for the study and control group with their knowledge assessment 6 months postoperative (n=60).

-          Person correlation test   *Significant level at P value < 0.05

Table (6): Relation between Majeed Pelvic Score (MPS) for study and control group with their data during three program phases 3 months postoperative and 6 months postoperative (n=60).

	Majeed Pelvic Score (MPS)					
	Study			Control		
	N	3 months	6 months	N	3 months	6 months
		Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD
Age						
18:<30	9	48.78±18.12	81±12.74	15	37.6±14.44	71.07±14.57
30:<40	8	57.88±10.66	86.13±8.31	6	45.33±15.1	76.17±13.08
40:<50	8	42.75±16.05	70.63±15.34	3	23±9.64	56.67±10.21
50:<60	3	53.33±8.33	81.67±7.09	5	33.2±3.9	64.2±13.07
60:65	2	28±8.49	72±1.41	1	32±0	55±0
P.value		0.103[NS]	0.127 [NS]		0.204 [NS]	0.230 [NS]
Sex						
Male	22	46.77±15.08	77.23±12.72	21	35.29±12.18	65.67±13.68
Female	8	53.88±17.9	84.13±11.8	9	40.22±16.92	76.67±13.01
P.value		0.286 [NS]	0.192 [NS]		0.374 [NS]	0.050*
marital status						
Single	7	47.29±15.09	84.86±9.56	10	34.3±12.23	69.5±13.53
Married	22	49.77±16.46	77.59±13.38	19	38.11±14.85	68.74±15.29
Widowed	1	34±0	71±0	1	36±0	68±0

P.value		0.619 NS	0.351 NS		0.786 NS	0.989 NS
educational level						
Illiterate	5	44.8±14.87	80.68±13.31	2	30±2.83	65±14.14
Readandwrite	5	38.6±12.92	72±14.56	7	32.57±13.71	62.57±14.82
Secondary school	19	52.11±16.56	81.6±7.44	19	38.58±13.08	71.74±13.4
University	1	53±0	71±0	2	41±29.7	69±25.46
P.value		0.366 NS	0.501 NS		0.664 NS	0.535 NS
Occupation						
Working	14	51.36±16.27	79±14.89	11	36.73±15.72	69.36±14.43
Notworking	16	46.31±15.67	79.13±10.86	19	36.79±12.77	68.74±14.48
P.value		0.395 NS	0.979 NS		0.991 NS	0.910 NS
Residence						
Urban	14	48.64±14.84	77±13.94	12	30.58±12.34	64±12.66
Rular	16	48.69±17.23	80.88±11.59	18	40.89±13.22	72.28±14.56
P.value		0.994 NS	0.413 NS		0.041*	0.120 NS

- SD-stander deviation   *- One-way Anova test*
*Significant level at P value < 0.05   ***Significant level at P value < 0.01*
- NS: no statistically significant difference P value >0.05

Table (7): Relation between Majeed Pelvic Score (MPS) for study and control group with their medical data during three program phases 3 months postoperative and 6 months postoperative (n=60).

	Majeed Pelvic Score (MPS)					
	Study			Control		
	N	3 months	6 months	N	3 months	6 months
		Mean±SD	Mean±SD		Mean±SD	Mean±SD
medical diagnosis						
#pelvisB	11	51.36±19.37	82.73±10.73	9	38.44±17.85	66±18.41
#pelvisC	5	42.2±15.97	62.8±9.86	11	39.91±13.22	70.82±12.87
#acetabulum	9	51.78±14.52	87.67±7.37	4	34.75±13.05	74.75±13.96
#pelvisA±acetabulum	-	-	-	3	33±4.36	70.67±3.79
#pelvisB±acetabulum	1	56±0	83±0	1	30±0	79±0
#pelvisC±acetabulum	4	40.5±7.19	69±6.38	2	25±7.07	53±2.83
P.value		0.627 NS	0.000**		0.769 NS	0.537 NS
Length of hospital stay						
Less than 15 days	16	52.94±18.38	80.63±14.05	17	38.06±13.48	68.94±15.32
From 15-20 days	7	42.14±10.3	79±14.46	7	42.57±14.9	77.29±10.45
More than 20 days	7	45.43±12.55	75.57±7.25	6	26.33±7.09	59.33±9
P.value		0.277 NS	0.694 NS		0.081 NS	0.071 NS
Comorbidities	N					

Hypertension	2	28±8.49	72±1.41	3	41.33±16.17	74.67±19.5
Diabetes Mellitus	-	-	-	1	30±0	55±0
DM&TTN	-	-	-	2	27.5±0.71	69.5±7.78
Non	28	50.14±15.31	79.57±12.97	24	37.25±14.14	68.79±14.36
P.value		0.055 NS	0.424 NS		0.697 NS	0.714 NS
Affected side	N					
Right	11	52.36±18.69	80.18±12.77	14	34±14.44	68.64±15.79
Left	15	47.6±14.08	80±11.69	15	39.13±13.35	68.73±13.49
Both	4	42.5±15.55	72.5±17.41	1	40±0	77±0
P.value		0.547 NS	0.554 NS		0.599 NS	0.857 NS
Mechanism of injury						
MCA	16	50.31±15.88	82.5±10.48	10	42.5±12.22	76.6±10.83
Motorcycle accident	2	45.5±14.85	83±0	2	30.5±12.02	59±4.24
FFH	10	43.7±12.28	72.8±14.2	15	32.33±13.52	65.4±15.22
FOG	2	63.5±34.65	79±24.04	3	44±15.87	68±16.82
P.value		0.413 NS	0.291 NS		0.205 NS	0.185 NS
Associated orthopedic injury						
Upper limb	1	53±0	88±0	1	39±0	62±0
Lower limb	5	37.2±11.05	65±12.75	5	26.6±6.62	65.6±13.41
Non	24	50.88±16.19	81.63±10.99	24	38.79±14.16	69.96±14.76

P.value		0.212NS	0.016*		0.193 NS	0.741 NS

- *SD-stander deviation*   *- One-way Anova test*
*Significant level at P value < 0.05   ***Significant level at P value < 0.01*
- NS: no statistically significant difference P value >0.05
Part I: Demographic data of the studied patients:

Table (1): Comparison between the study and control groups regarding -demographic data (n= 60).

This table showed that: The average age of the study patients was 36.06 ± 14.05 years. Concerning gender, the majority of patients (73.3% and 70% respectively) were males. Regarding the marital status, most of the patients in both groups (73.3% and 63.3% respectively) were married. Regarding the patient's education, the majority of patients have secondary education (63.3%). Concerning the patients' occupations, more than half patients (53.3% and 63.3% respectively), were not working. Finally, the highest percentages of patients (53.3% and 60% respectively) were from rural areas.

Part II: Medical data of the studied patients:

Table (2): Comparison between the study and control groups regarding medical data (n = 60).

This table revealed that; a significant portion of the research group's patients (36.7%) experienced a pelvis b fracture, whereas a similar proportion of the participants in the control group suffered from a pelvic c fracture, Left side injuries affected 50.0% of the patients in both groups. over half (53.3%) of the study sample was involved in motor car accidents, while 50.0% of the control group fell from a height. Finally, a lower limb injury was present in 16.7% of studied patients.

Table (3): Distribution of hospital stay among the studied patients (n=60)

This table illustrated that; the duration of hospital stay for the study and control groups was (16.86±6.06 and 16.20±7.07dayes respectively) with a range of (8-32 and 7-37days respectively).

Part III: Patient`s knowledge assessment:

Table (4): Comparison between study and control group related to patient`s knowledge assessment during three program phases (Preoperative, 3 months postoperative, and 6 months postoperative (n=60)

This table reported that; before the application of nursing instructions and exercise training, almost all patients (100.0% in the study group and 96.7% in the control group) have not sufficient knowledge. However, following the execution of nursing instructions, there were high differences that are statistically significant regarding total knowledge score between the two groups 3 and 6 months post-operatively with p. value =0.001**. This result supports study hypothesis I.

Part IV: Assessment of patient`s functional outcomes using Majeed Pelvic Score (MPS):

Table (5): Comparison between the study and control group related to Majeed Pelvic Score (MPS) during three program phases (Preoperative, 3 months postoperative, and 6 months postoperative (n=60)

This table showed that; the mean Majeed score was poor for the study and control group 3 months postoperatively with a highly statistically significant difference p. value =0.003**. mean Majeed score was good for the study group and fair for the control group 6 months postoperatively with a highly statistically significant difference p. value =0.005**. This result supports study hypothesis II.

Part V: Relations:

Fig: (1): Relation between Majeed Pelvic Score (MPS) for study and control group with their knowledge assessment 3 months postoperative (n=60)

This figure displayed a significant relationship between the Majeed Pelvic Score (MPS) and the patients' knowledge assessment and. for the study group 6 months postoperatively (p value=0.027*) however in the control group, there isn't a statistically significant association.

Fig: (2): Relation between Majeed Pelvic Score (MPS) for study and control group with their knowledge assessment 6 months postoperative (n=60)

This figure shows a significant relationship between the Majeed Pelvic Score (MPS) and the patients' knowledge assessment and for the study group 6 months postoperatively (p value=0.023*) however in the control group, there isn't a statistically significant association.

Table (6): Relation between Majeed Pelvic Score (MPS) for study and control group with their data during 3 months postoperative and 6 months postoperative (n=60)

This table showed that; Good functional outcomes were seen in patients aged 30 :< 40, single, had secondary school education, and working patients with no statistically significant correlation. Patients who lived in a rural area had a better outcome than patients who lived in an urban area 3 months post-operatively with statistical significance difference (p. value =0.041*) . Female patients had better functional outcomes than male patients 6 months post-operatively with statistical significance difference (p. value =0.050*).

Table (7): Relation between Majeed Pelvic Score (MPS) for study and control group with their medical data during three program phases 3 months postoperative and 6 months postoperative (n=60)

This table demonstrated a significant association between the Majeed Pelvic Score (MPS) and type of fracture and associated orthopedic injury (p-value =0.000 and 0.016 respectively) for the study group 6 months postoperatively.

DISCUSSION

Pelvic fractures are most frequently the result of severe trauma and are frequently linked to other fractures or injuries to other parts of the body. Because major arteries, nerves, and organs can be damaged in pelvic fractures, there is a high risk of patient morbidity and mortality as these injuries require meticulous examination (Ferede, et al., 2021). Patients who suffer from Pelvic fractures are more likely to experience long-term disability. Following a pelvic fracture, the majority of patients do not resume their pre-injury activities, which results in a decrease in functional outcome (Vermmla et al., 2020).

In this context, the current study's main objective was to evaluate the impact of nursing instructions and exercises training on functional outcomes for patients with pelvic fixation surgery.

The following key findings will be covered in the discussion:

Demographic and medical data:

According to the demographic data, the current study showed that the average age of the patients under study was 36.06 ± 14.05 years. This result was consistent with the average age of 35.84+12.22 years reported by (Petryla et al. 2021). Additionally, (Pan et al., 2021) reported a mean age of 36.2 ± 16.9 years, which corroborated the data above. The results of (Ko et al. 2021) contrasted with this finding, pointing out that the age was 45.2 years.

As regards gender, most of the patients were males. This finding was consistent with (Nana et al., 2022) who found that the highest proportion of study participants were males. On the other hand (Petryla et al., 2021 discovered that most patients were female.

As regards type of fracture, according to the results of the present study, type B fractures accounted for the largest proportion of the sample. This finding was in agreement with the study of (Jäck le et al., 2021) which found that the b injury is more common than c. This result contrasted with that of (Brouwers et al., 2020) who reported that A fractures affected most of the research participants.

Regarding the mechanism of injury, the current study indicates that half of the study participants experienced a motor vehicle accident, while half of the control group experienced a fall from a height. This result corresponds with that of (Abdelrahman et al., 2020), who observed that the most frequent mode of injury was motor vehicle accidents followed by falls.

As regards associated orthopedic injury, this result illustrated the largest proportion of participants under study had associated with lower limb injury. This result lined up with (Duramaz, et al., 2020) who reported that the majority of the patients in the study had lower limb injuries. In contrast, (kokubo et al., 2017) documented that the largest proportion of the subjects under study had fractures of the lower extremity.

Regarding the hospital stays, regarding the length of hospitalization, the information acquired for this study showed that the patients' average stay was 16.87±6.06 days. This finding was in parallel to (Lai et al., 2022) who determined that the average length of hospital stay was 18.5 days.

patient`s knowledge assessment

Regarding the assessment of patients' knowledge, the current research concluded that before the application of nursing instructions and exercises training, nearly all of the studied patients had an inadequate level of knowledge. The researcher believed that the lack of training programs and opportunities for ongoing education, along with the fact that there was a lack of regular patient counseling concerning surgery from doctors and nurses, contributed to the low level of knowledge.

However, after implementing nursing instructions, it was noticed that there was a high difference that is statistically significant regarding knowledge assessment between the two groups 3- and 6-months post-operative with p. value =0.001**. This result supports study hypothesis I. This could be the result of nursing instructions provided to research subjects using various instructional techniques, such as colored booklets. This study's findings matched with those of (Yahia and Ali 2023), who found that, one and three weeks after patient education there was a high difference that is statistically significant between the two groups.

Likewise (Mohamed et al., 2022) validated the earlier results by demonstrating that the study group's knowledge scores changed in a statistically meaningful way after the educational program was implemented as opposed to before. Additionally, these findings are similar to the study (Sayed et al., 2019) which stated that most patients had satisfactory levels of understanding.

Assessment of functional outcomes

Regarding Majeed's pelvic score, the Majeed score level was poor for the study and control group 3 months postoperatively with a difference that is extremely statistically significant (p-value = 0.003**). The Mean Majeed score was good for the study group and fair for the control group 6 months postoperatively with a highly statistically significant difference (p. value =0.005**). This result supports study hypothesis II. From the opinion of the researcher, this might be due to nursing instructions and exercise training given to the study group. According to (Nuber et al., 2022), there was a statistically significant difference (p-value = 0.023) between the groups receiving conservative and surgical treatment. It was also confirmed by (Nefihancoroet al., 2021) that patients receiving surgical care had considerably less severe injuries than the non-operative group, as determined by the Majeed scale. This finding contradicts (Osterhoff et al., 2019) who documented that, at the end of follow-up a modified Majeed score showed no difference in the functional outcomes between the two groups (P = 0.910).

Regarding the relationship between Majeed pelvic score and knowledge assessment, the current study's findings exhibited a positive relationship between Majeed Pelvic Score (MPS) and patients' knowledge assessment for study groups 3 and 6 months postoperatively (p value=0.027* and 0.023* respectively) but there is no statistically significant correlation in the control group. This result was similar to (Yahia and Ali 2023) who mentioned that, the knowledge and overall functional physical score of the study group improved one and three weeks after the application of patient education.

Regarding the relationship between Majeed's pelvic score and personal data, Good functional outcomes were seen in patients aged 30 :< 40, single, secondary school educated, and working patients with no statistically significant correlation. Patients living in rural areas had better outcomes than patients living in urban areas 3 months post-operatively with statistical significance (p. value =0.041*).

Additionally (Nana et al., 2022) found that surgical patients and those under 30 years of age showed good average outcome scores. Female patients had better functional outcomes than male patients 6 months post-operatively with statistical significance (p. value =0.050*). According to the researchers, this could be explained by the female study participants' exposure to low-energy injury, since seven of the nine female patients and eight of the sixteen patients who reside in the ruler area suffered pelvic fractures as a result of falling from a height. The same outcome was consistent with what (Ghosh et al., 2019) found, which said that female patients had better outcomes (p-value = 0.047).

Regarding the relationship between Majeed's pelvic score and medical data, A positive correlation was observed between Majeed's Pelvic Score (MPS) and type of fracture and associated orthopedic injury (p-value =0.000 and 0.016 respectively) for the study group 6 months postoperatively. In addition, (Bott et al., 2019) found no statistical correlation between the outcome score and the fracture classification. Additionally (Nana et al., 2022) documented that the presence of associated injuries had no significant impact on the functional outcome.

CONCLUSION

The study findings revealed that providing nursing instructions and exercise training significantly improved patients' knowledge regarding pelvic fixation surgery and its functional outcomes.

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