Impact of Awareness Program on Pain, Fatigue, and Shoulders Function among Patients Post Humeral Fracture Surgery

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Abstract

Background: Proximal humeral fractures are the third most common fractures, following hip and distal radius fractures. Patients suffering fractures in overwhelmed hospitals have serious difficulties restoring their pre-fracture function. **Aim**: To investigate the impact of an awareness program on pain, fatigue, and shoulder function among patients post-humeral fracture surgery. **Research design**: A quasi-experimental research design was used to achieve the aim of this study. **Setting**: The study was conducted in the orthopedic outpatient clinic at Mansoura University Hospital. **Sample**: A convenient sample of 100 patients collected during six months aged (20-65) years old and from both sexes with proximal humeral fractures were included in the current study within six months. **Tools**: I: Structured interview questionnaire, II: Visual Analogue Scale, Tool III, Fatigue assessment scale, and IV: Shoulder function index. **Results**: There was a statistically significant difference in the total mean score of the knowledge, practices, pain, fatigue, and shoulder function after the awareness program application among patients post-humeral fracture surgery. **Conclusion**: The application of an awareness program has a positive effect on enhancing knowledge and practices, and reducing pain and fatigue. Also, improving shoulder function among patients post humeral fracture surgery**. Recommendations**: Awareness programs are recommended to be an integral part of the preoperative nursing teaching for patients undergoing humeral fracture surgery.

Keywords: Awareness program, Fatigue Knowledge, Practices, Pain, Patients post humeral fracture Surgery, Shoulder function.

Introduction

Humeral fractures are the third most common fractures, following hip and distal radius fractures. They account for approximately 5% of all fractures, and they are increasing in frequency. Adult patients have a higher incidence of proximal humeral fractures and typically sustain more complex fracture patterns than those sustained by a younger patient population. Given the likelihood of poor bone quality in this population, the surgeon should maintain a high level of suspicion for fragility fracture associated with relatively minimal trauma **(Varacallo et al., 2021)**.

Approximately 370,000 ER visits are anticipated annually in the United States due to upper limb fractures, which are on the rise in industrialized Western nations. The proximal humerus is the most prevalent site for fractures, accounting for 50% of all cases. Females have greater rates of humeral fractures than males do (36 visits per 100,000 people), with 78 visits per 100,000 people having a fracture, and a higher incidence in the 45–64 age group. Pain and restrictions in activities of daily living (ADL) are brought on by humeral fractures, which also lower the quality of life (**Iglesias-Rodríguez et al., 2021).**

Furthermore, a humeral fracture generates pertinent direct costs, such as medical expenses, as the cost of hospitalization accounts for the largest portion (55%), contributing to all healthcare costs associated with humeral fracture. The long-term loss of earnings, vocational rehabilitation costs, pensions and wage replacement costs, production delays, accident investigations, and, lastly, the hiring and training of workers to replace those injured are also anticipated, even though precise estimates of indirect costs are not yet available. A Humeral fracture frequently requires follow-up medical care, including surgery and rehabilitation **(Rossi et al.,**

2022).

It is customary to start treating adult working patients with joint-saving techniques first, such as open reduction, internal plate fixation, minimally invasive reduction, and intramedullary fixation. Afterward, nonoperative therapies are advised, typically centered around immobilization followed by rehabilitation. To cut expenses for both individuals and the business, a prompt return to work is also advised. General physiotherapy is a popular form of postoperative rehabilitation for humeral fractures. It consists primarily of segmental exercises for shoulder and upper limb mobility, humeral and upper limb muscle strengthening, shoulder girdle and upper limb muscle stretching, and upper limb postural control (**Jo et al., 2021).**

When working populations are treated, their therapeutic impact is dependent on the restoration of general motor features rather than specific daily living and work activities. Therefore, it would appear appropriate to look into more specifically focused workouts, like task-oriented exercises, whose goal is early independence in activity as well as the recovery of particular movements executed during job duties. Determining the intensity, frequency, length, and long-term effects of these programs, among other aspects of these exercises also need evidence (**Patel et al., 2021).**

A Humeral fracture is a break of the upper part of the bone of the arm (humerus). A humerus fracture represents 5–6% of all fractures. It is the third most common fracture in older adults. Typical signs and symptoms include pain, swelling, bruising, and limited range of motion at the shoulder. The deformity may be present in severe fractures; however, musculature may cause the absence of deformity on inspection. Numbness over the outside part of the upper arm and deltoid muscle weakness may indicate axillary nerve injury. Symptoms from poor blood circulation in the arm are uncommon due to collateral circulation in the arm **(Elliottet al., 2022)**.

A humeral fracture classically falls under a bimodal distribution by age and energy level. This bimodal pattern is very common and clinicians should recognize the high-energy (e.g. Motor vehicle accident in adult patients) versus low-energy (e.g. elderly patient status post ground level fall) paradigm in various groups and fracture patterns. A humeral fracture most commonly occurs in patients over 65 years of age. In the setting of osteoporosis or osteopenia, a low-energy fall resulting in a humeral fracture is, by definition, a fragility fracture. Adult patients often present with these injuries following high-energy trauma such as Motor Vehicle accidents **(Varacallo et al., 2021).**

There are both non-surgical and surgical options for the treatment of proximalhumerus fractures. The recommended treatment is decided based on fracture stability as determined by imaging and clinical examination. Surgical options for unstable proximal humerus fractures include closed reduction with percutaneous pinning (CRPP), open reduction with internal fixation, intramedullary rod fixation, shoulder arthroplasty, and reverse shoulder arthroplasty **(Ebraheim, 2022).**

A humeral fracture can have a substantial impact on the patient´s physical function and independent living and is associated with higher morbidity and mortality. Functional recovery of the shoulder is often slow and many people have ongoing disability during activities of daily life. Also, A humeral fracture induces pain, reduces quality of life, and produces relevant direct costs including medical costs. After sustaining a humeral fracture, the main focus of treatment is to regain the best possible function of the shoulder **(Monticone et al, 2021)**.

Exercise plays a vital role in post-surgical management. Immediate physiotherapy following a proximal humerus fracture results in faster recovery with maximal functional benefit. Also, post-surgical exercises can help prevent joint stiffness which is a common complication with this type of upper arm**.** Stretching of the shoulder girdle and upper limb muscles, strengthening of the humeral and upper limb muscles, and postural control of upper limb fractures are the major types of exercises

(Richard et al., 2020).

Nurses have an active role in meeting the basic needs of patients, supporting their functional abilities, and aiding them in taking protective measures for daily routines. Rehabilitation nurses determine the care needs of patients and provide education and support. Instruct patients in a home exercise program to improve the strength and endurance of the shoulder **(Gutenbrunner etal., 2021).**

Significance of the study:

Proximal humeral fractures are relatively common, accounting for 4 to 6 percent of all fractures in Adult patients and 1 to 3 percent of all fractures in elderly patients. The annual incidence ranges from 13 to 20 per 100,000 persons and is higher with age **(Iglesias et al., 2021)**. PHF has a substantial impact on the patient´s physical function and independent living and is associated with higher morbidity and mortality **(Rundgren et al., 2020)**. Exercises help to improve shoulder function after proximal humeral fracture Surgery, So this study was conducted to investigate the impact of awareness programs on pain, fatigue, and shoulder function among patients post humeral fracture surgery.

Aim of the study

This study aimed to investigate the impact of awareness programs on pain, fatigue, and shoulder function among patients post humeral fracture surgery through:

- Assessing pain intensity among patients post humeral fracture surgery.
- Assessing fatigue among patients post humeral fracture surgery.
- Assessing shoulders function among post-humeral fracture surgery.
- Designing and implementing the awareness program according to patient's needs**.**
- Evaluating the impact of the awareness program on pain, fatigue, and shoulder function among patients post humeral fracture surgery**.**

Research hypothesis:

H1: Patients post humeral fracture surgery who receive the awareness program are expected to experience improved knowledge and practice post-application than pre-application.

H2: Patients with post-humeral fracture surgery who receive the awareness program are expected to experience less pain and fatigue post-application than pre-application.

Subjects and Methods:

Research design:

A quasi-experimental research design was used to achieve the aim of this study.

Setting:

The study was conducted in the orthopedic outpatient clinic at Mansoura University Hospital. This setting was selected due to the high flow rate of cases additionally it serves the biggest region of the population.

Subjects:

A convenient sample of 100 patients was collected during six months aged (20-65) years and both sexes with proximal humeral fracture were included.

Tools of data collection:

Four tools were used:

Tool (I): Structured interview questionnaire:

After examining relevant national and international literature **(Gutenbrunner etal., 2021, Iglesias et al., 2021, Monticone et al, 2021, Richard et al., 2020)**, the researchers developed it. This instrument was made up of the following three parts:

Part 1: It contained information on the age, gender, education level, and place of residence of the patients.

Part 2: Structured multiple-choice questionnaire (before and post two, and four months) to gauge the patients' knowledge regarding operation for humeral fracture. First, it covered the definition, etiology, indications, signs and symptoms, and complications (20 questions) of humeral fracture surgery.

- Diagnosis of humeral fracture surgery (5 questions).
- Management and treatment of humeral fracture surgery (10 questions).

- Complications prevention of humeral fracture surgery (5 questions).

Scorings system

Every right response was valued at one, whereas every wrong response was valued at (zero). Three categories were used to classify the patients' knowledge level: poor (less than 50%), fair (between 50 and 75%), and good (more than 75%).

Part (3): Patients' practice questionnaire (pre and post two, and four months) to assess the patients' practices about exercises post the humeral fracture surgery. It was developed by the researchers after reviewing current national and international literature. It included knowledge about exercises such as preparation for doing the exercises, types of exercises that can be done, frequency, and precautions that can be taken.

Scoring system:

The scoring scheme for the practice was as follows: (2) for correctly done, (1) for incompletely finished, and (0) for not completed. Two categories were created from the total practices: satisfactory and unsatisfactory. Practice was deemed satisfactory if the patient's score was greater than 60% and considered unsatisfactory if it was less than 60%.

Tool (II):- Visual Analogue Scale (VAS) for pain: (**Hawker et al., 2011**)

For measuring pain intensity, the Visual Analogue Scale, or VAS, is a widely used standardized measure. Test-retest reliability, on the other hand, was (r = 0.94) Participants in the VAS were asked to rate their level of discomfort on a single, 11-point numerical scale by selecting a number between 0 and 10. As a result, the VAS was used in this study to measure the participants' pain level twice a day by asking them to select a number that represented their level of discomfort before and after each session. The NRS uses a 0–10 scale to classify pain into four categories: moderate pain (1-3), medium pain (4), severe pain (zero) (5), and no pain (zero).

Tool (III): Fatigue assessment scale:

This tool was modified from a 10-item self-developed rating scale by **Kleijnet al. (2011**), which evaluated how tired people felt throughout different weekly activities in terms of their bodily, social, psychological, and spiritual well-being as well as how their level of exhaustion related-to the time of day. The conceivable score range, with a total of 0 to 100, is 0 (no fatigue) to 100 (worst possible). There are six levels of weariness: barely noticeable, light, moderate, severe, and worst. The scale's dependability is deemed good, with an overall score of Cronbach's alpha of 0.81.

Tool IV: Shoulder function index: (**Van et al., 2015**). It was used to evaluate the patient's shoulder function. It was applied three times (preoperatively, and two months postoperatively). It included 13 items. The 13 items cover a range of activities typically done in and around the house, for self-care and keeping the household.

Scoring system:

It uses a three-point Likert scale, and description intensity ranging from 0 = unable, 1
= partially able, 2 = Able used for each item.

Conversion from raw score to SFInX score:

Raw score	0	1	2	3	4	5	6	7	8	9	0	1
FInX score	2 0 7 2 6 0 3 6 9	2	5	8	1	4	7	0	3	7	1 9	00

Validity of the tools:

The content validity of the tools, their clarity, comprehensiveness, appropriateness, and relevance were reviewed by y 5 experts (three professors in the field of Medical-Surgical nursing, and two professors in the orthopedic surgery department. Sentence clarity and content appropriateness were

ensured by making modifications to the panel's decision.

Reliability of the tools:

Cronbach's alpha is regarded as being in a favorable range with a fatigue assessment scale total score of 0.81. The VAS's (Visual Analogue Scale) reliability coefficient was (r = 0.94). (0.92, 0.85) was the dependability coefficient for the study tools I and IV.

Methods:

The study was conducted with ethical consent granted by the Ethical Research Committee of the Faculty of Nursing at Mansoura University. -In a letter from the dean of Mansoura University's faculty of nursing, the directors of the previously selected setting granted permission for this study to be carried out. To obtain permission for collecting research data, the purpose of the project was outlined.

A pilot study

A pilot study was carried out on 10% (10 patients) of the entire sample to evaluate the feasibility and clarity of the research design. No changes were made to create the tools in their final version. The study comprised the patients from the pilot study.

Ethical considerations:

To obtain their involvement and explain the study's goal, the researchers had a meeting with the directors of the selected setting before the study. The patients consented in exchange for cooperation. The study's goals were communicated to the patients. Enrollment in the trial was entirely voluntary, and the patients were informed that they could withdraw their consent at any time, for any reason. Patients were told that it would be utilized for research purposes only.

The procedure of data collection:

The data collection period covered four months from the beginning of February 2022 to the beginning of June 2022. The researchers visited the settings they had previously selected three days a week, from 9 am to 1 pm. Each interview tool took about 50 to 60 minutes to complete. In the settings they had previously selected, the researchers visited with patients one-on-one and introduced themselves before outlining the goal of the study.

Implementation of the study included four phases (assessment phase, planning phase, implementation phase, and evaluation phase).

Assessment phase:

- The researcher initially established a friendly relationship with the patients by having brief talks with them. Every patient was interviewed before the program was conducted to gather the patients' data utilizing tool (I) part (1).
- Tool (I) part (2), Tool II, Tool III, and Tool IV were used to evaluate the patients' knowledge, practice, VAS, fatigue assessment scale, and shoulder function.

II. Planning phase:

In response to the patients' practical demands, knowledge gaps, discomfort, and exhaustion following humeral fracture surgery, the goals, priorities, and expected results were defined based on the results of the preceding phase. For the patients under study, the researchers designed five sessions—two theoretical and three practical.

The awareness program

They created and updated an awareness program. It featured presentations on humeral fracture surgery, both theoretical and clinical.

The general objective of awareness program sessions:

At the end of the **awareness program** sessions, the patients were expected to acquire knowledge and practices that improve their pain, fatigue, and shoulder functions post-humeral fracture surgery

Specific objectives of the awareness program:

- Define humeral fracture surgery.
- Identify the causes of humeral fracture surgery.
- Enumerate indications of the humeral fracture surgery.
- List the signs & symptoms of the humeral fracture surgery.
- Identify the complications of the

humeral fracture surgery.
- Know the diagnosis of the humeral fracture surgery.
- Identify management and treatment of humeral fracture surgery
- Know the prevention of complications of humeral fracture surgery
- Identify preparation for doing the exercises
- List types of exercises that can be done, frequency, precautions that can be taken

III. Implementation phase:

- This study aimed to investigate the impact of awareness programs on pain, fatigue, and shoulder function among patients post post-humeral fracture surgery

- The implementation of the awareness program was aimed at improving patients ' knowledge and practice, pain, fatigue, and shoulder function regarding humeral fracture surgery through five sessions; including two theoretical and three practical sessions for about 30-45 minutes each).

- The researchers began every session by gathering input regarding the preceding one, and they concluded each one with a recap.

- The researchers were accessible in the study settings from 9 a.m. to 1 p.m., three days a week, The previously indicated study techniques were used for one-on-one interviews with each patient.

- .Following a review of the relevant literature based on an assessment of the actual needs of the patients under study, a simplified booklet was used as supportive material and provided to patients in Arabic. It covered all items regarding the knowledge and practice of humeral fracture surgery.

- A variety of instructional techniques, including lectures, brainstorming sessions, small-group discussions, visuals, demonstrations, and re-demonstration in a medical education setting. A variety of instructional tools were employed, including flipcharts, PowerPoint, figures, handouts, and animated films explaining humeral fracture surgery.

The awareness program's theoretical and practical sessions were done as follows:

The first session (theoretical) began with the researchers introducing themselves, wishing the patients happy participation in the study, and outlining the goals of these instructional sessions. The following topics were reviewed in the first session: definition, causes, indications, signs and symptoms, and complications related to surgery for a humeral fracture.

The topics discussed in the second (theoretical) session included the diagnosis and the surgical treatment of humeral fractures. Third session (Practical): this course covered the administration, therapy, and avoidance of problems following humeral fracture surgery. In the fourth session, which was practical, patients were clinically demonstrated and re-demonstrated how to prepare for performing exercises after humeral fracture surgery. These exercises were created by the researcher in response to the patient's lack of knowledge and experience. Fifth Session (Practical): These sessions began with gathering input regarding the preceding sessions and addressing any queries regarding humeral fracture surgery, exercise kinds and frequencies, and safety measures to reduce pain, and fatigue, and gradually enhance shoulder function. After giving out the post-test to each participant's patients, the researcher expressed gratitude for their participation in the study. The phases were as follows:

Phase I: the first range of motion immediately following surgery began one to four weeks following surgery, use a sling for the first three weeks, and stop wearing it for one week after that (shoulder, elbow, wrist, and hand). Exercises for range of motion are followed by mild strengthening exercises (scapular retraction and ball squeezes).

Phase II: commenced 4-8 weeks post-surgery: Exercises for a range of motion (e.g., side-lying shoulder flexion, low punch, supine shoulder flexion) and strengthening (e.g., biceps curls, triceps extension, and prone rows).

Phase III: the first strengthening (stretching, strengthening, and shoulder range of motion) began 8-12 weeks after surgery.

Phase IV: Twelve to sixteen weeks following surgery, advanced strengthening exercises

such as plyometrics, push-up progression, and resisted shoulder were initiated.

Evaluation phase:

In this phase, the researchers reassess the impact of the awareness program on knowledge, practice, pain, fatigue, and shoulder function among patients post-humeral fracture surgery post two and four months using the same tools used in the pretest (tools II, III, and IV as post-test).

Statistical analysis:

Data were translated, coded, and tabulated into a form that was specifically created to be input into a computer. SPSS version 22 was utilized for data entry and analysis. The Excel program was used to help make the visuals. The same group's pretest and posttest results were compared using t-tests, which were used to analyze quantitative data presented as mean and SD. Quantitative data was expressed as numbers and percentages. Pearson correlation was used to explain the link between quantitative variables that were normally distributed. Using a P-value of 0.05, the significance was ascertained as follows: Statistical significance was defined as a P-value of less than 0.05. Highly statistically significant was defined as having a P-value of less than or equal to 0.001.

Results:

Table (1) illustrates that (46%) of the studied patients were aged from 35 ≤ 45 years with a mean of 51.24±10.9 years, and 70% of them were females. Regarding residence, 60% of the studied patients were living in rural areas. Concerning the educational level of the studied patients (35%) of them were illiterate. Regarding occupational status, 65% of the studied patients were housewives.

Table (2): Shows that the majority of the studied patients do not have a surgical history (80 %). According to medical history: it was observed that (40%) of them have diabetes. Concerning mechanism of injury: The highest percentage of the studied patients was related to falls (65 %) followed by motor car accidents (20%). Regarding hospital stay, it was found that half of the studied patients stayed in hospital for 4- 10 days.

Table (3) presents an improvement in patients' knowledge following the implementation of the two and four post awareness program, with a highly statistically significant difference (P<0.001) between pre- and post-program knowledge.

According to **Table 4**, 66% of patients had a poor knowledge level about the procedures before the introduction of the awareness program. However, following the implementation of an awareness program for two months, their level of knowledge increased to a good level (90.0%), and four months later, it reached 92.0%. Patients' knowledge levels before, two months after, and four months after the awareness program's implementation were shown to change significantly (P<0.001).

Pre-, post-, and four-month awareness program implementation differences were highly statistically significant, as **Table (5)** shows. This table made it evident which patients had unsatisfactory practice before the program, with 48% of the patients under study having an unsatisfactory level of preparation, and 100% and 94%, respectively, having a satisfactory level of practice following two and four months of doing the awareness program. It was also discovered that 66% of the patients in the study had unsatisfactory exercise frequency before the awareness program, while 96% had satisfactory exercise frequency after two and 88% post four months of the program's implementation.

The patients' practice distribution for exercises following humeral fracture surgery is shown in **Figure 1** before and after the two- and four-month awareness program implementation. The results show that 88% of the studied patients had a satisfactory practice level after the four-month awareness program implementation, while only 10% of the studied patients had an unsatisfactory practice level before the awareness program post two months and 12% post four months of awareness program implementation.

Table 6 demonstrates that there was a statistically significant difference in the pain

scores among the studied patients post-two and four months of the awareness program at the <0.05 level.

Figure (2) indicates that (20%) of the studied patients had severe pain levels post-two months of awareness program implementation compared to no one who had severe pain levels post-four months of awareness program implementation.

Table (7): shows that the fatigue level scores among the studied patients post-two and four months of awareness program were significantly lower, indicating a significant difference in fatigue levels.

From **Table 8,** after awareness program implementation, there was a statistically significant in the fatigue mean scores among the studied patients post-two and four months of the awareness program at (P<0.001) and a reduction in their fatigue mean score.

Table (9): Shows that there was a statistically significant difference between the studied patients regarding the total mean score of the shoulder functions pre-, post-2 months, and 4 months of awareness program implementation (p-value 0.0187*).

Table (1): Demographicdata of the studied patients (No = 100):

Demographic data	N.	%
Age group (years):		
• 20 ≤ 25	6	6.0
• 25 ≤ 35	8	8.0
• 35≤ 45	46	46.0
• 45≤ 55	16	16.0
• 55≤ 65	24	24.0
Mean ± SD	**51.24±10.9**	
Gender:		
Male	30	30.0
Female	70	70.0
Residence		
Urban	40	40.0
Rural	60	60.0
Educational level		
Illiterate	35	35.0
Read and write	25	25.0
Secondary	29	29.0
High	11	11.0
Occupational status		
Working	35	35.0
Housewives	65	65.0

Table (2): Medical data of the studied patients (No = 100):

Medical data	Study sample N=100	
	N.	%
Surgical history	20	20.0
Yes	80	80.0
No		
Chronic illness		
Diabetes	40	40.0
Hypertension	20	20.0
Asthma	15	15.0
Coronary Heart Disease	20	20.0
Cancer	5	5.0
Mechanism of injury		
Fall down	65	65.0
Motor car accident	20	20.0
Assault	10	10.0
Gunshot wound	5	5.0
Length of hospital stay:		
1-3 days	45	45.0
< 4-10	50	50.0
>10 days	5	5.0

Table (3): The studied patients' knowledge distribution regarding humeral fracture surgery pre-, Post-two, and four months of awareness program implementation (n=100)

Patients' knowledge	Pre-awareness program implementation		Post- two months awareness program implementation		Post- four months awareness program implementation		F	P-value
	No	%	No	%	No	%		
Definition								
-Correct	60	60.0	100	100	100	100	123.5	<0.001**
-Incorrect	40	40.0	0	0.0	0	0.0		
Indications								<0.001**
-Correct	48	48.0	98	98.0	92	92.0	143.6	
-Incorrect	52	52.0	2	2.0	8	8.0		
Causes								<0.001**
-Correct	52	52.0	94	94.0	90	90.0	145.8	
-Incorrect	48	48.0	6	6.0	10	10.0		
Signs and symptoms								<0.001**
-Correct	44	44.0	96	96.0	94.0	94	112.4	
-Incorrect	56	56.0	4	4.0	6.0	6.0		
iagnosis and complications								<0.001**
- Correct	38	38.0	96	96	92	92.0	99.9	
- Incorrect	62	62.0	4	4.0	8	8.0		
Management and treatment								<0.001**
• Correct	38	38.0	96	96	92	92.0	87.9	
• Incorrect	62	62.0	4	4.0	8	8.0		
Prevention of complications								<0.001**
-Correct	56	56.0	98	98.0	94	94.0		
-Incorrect	44	44.0	2	2.0	6	6.0	96.6	

(**) highly statistical significance at p < 0.001

Table (4): The studied patients' level of knowledge distribution regarding humeral fracture surgery pre-, Post-two, and four months of awareness program implementation (n=100)

Patients' knowledge level	Poor		Average		Good		F	P-value
	No.	%	No	%	No	%		
Pre-awareness program implementation	66	66.0	30	30.0	4	4.0	**133.8**	**0.000****
Post two months of awareness program implementation	0	0.0	10	10.0	90	90.0		
Four months Post- awareness program implementation	0	0.0	8	8.0	92	92.0		

(**) Highly significant at P<0.001

Table (5): The studied patients' practice distribution regarding exercises post humeral fracture surgery pre-, Post-two, and four months of awareness program implementation (n=100)

Patients' practice	Pre-awareness program implementation				Post- two months awareness program implementation				Post- four months awareness program implementation				F	P
	Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory			
	No	%	No	%	No	%	No	%	No	%	No	%		
preparation for doing the exercises	48	48.0	52	52.0	0	0	100	100	3	6.0	94	94.0	117.2	0.000**
Types of exercises	54	54.0	46	46.0	10	10.0	90	90.00	8	8.0	92	92.0	183.2	0.000**
Frequency	66	66.0	34	34.0	4	4.0	96	96.0	12	12.0	88	88.0	123.36	0.000**
precautions that can be taken	68	68.0	32	32.0	6	6.0	94	94.0	14	14.0	86	86.0	83.31	0.000**

(**) Highly significant at P<0.001

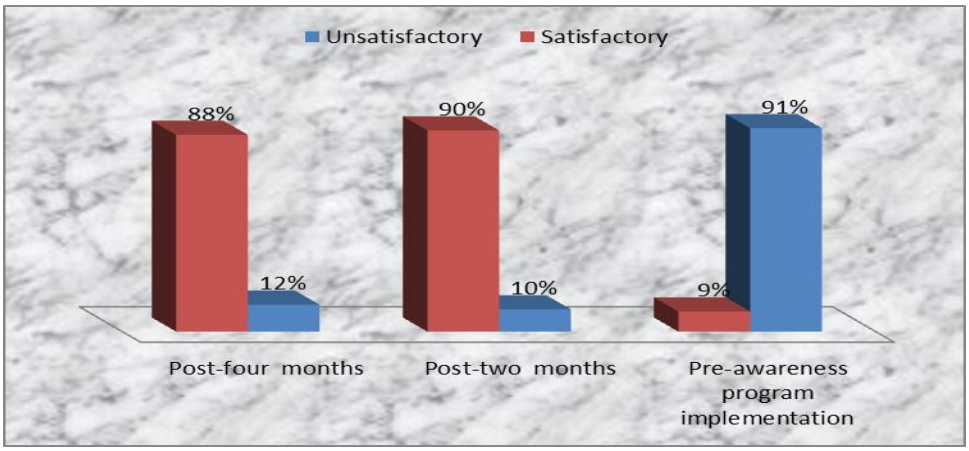

Figure (1): The studied patients' level of practice distribution regarding exercises post humeral fracture surgery pre-, post-two, and four months of awareness program implementation (n=100)

Table 6: Comparison of pain scores among the studied patients post-two and four months of the awareness program

Items	Pain level				X^2	p-value
	Post-two months of awareness program		Post- four months of awareness program			
	Mean Score	SD	Mean Score	SD		
Pain levels	5.22	0.33	4.22	0.56	53.33	<0.001**

NS=Non-significant, *= significant at p<0.05 level

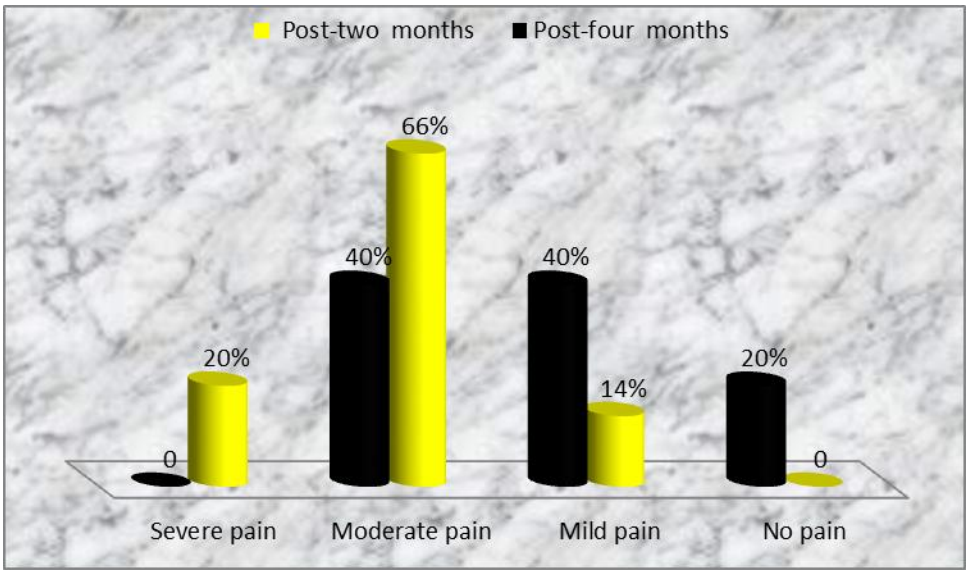

Figure (2): The studied patient's distribution regarding pain levels post-two and four months of awareness program implementation (n=100)

Table (7): Frequency and percentage distribution of fatigue levels among the studied patients post-two and four months of awareness program (n=100)

Fatigue level	Post- two months awareness program implementation		Post- four months awareness program implementation		T	P-value
	No	%	No	%		
No fatigue (0)	0	0.0	30	30.0	28.55	<0.001**
Very little (1-9)	0	0.0	20	20.0		
Mild (10-30)	30	30	30	30.0		
Moderate (3- 60)	25	25	20	20.0		
Severe (61-80)	25	25.0	0	0.0		
Worst (81-100)	20	20.0	0	0.0		

Table (8): Comparison of fatigue mean scores among the studied patients post-two and four months of awareness program (n=100)

Items	Post- two months awareness program implementation	Post- four months awareness program implementation	P- value
Fatigue score	19.06+ 1.22	17.49+ 3.67	56.44 (0.0001*)

*Highly Significant at 0.0001 levels

Table (9): Correlation between the studied patients regarding total mean score of the shoulder functions pre-, post-months, and 4 months of awareness program implementation (No = 100)

Items	Pre	After 2 months	After 4 months	P.
Shoulder function index	32.0± 6.09	96.05±9.88	98.3±1.77	**0.0187***
	0.337	0.001*	0.0001**	
	0.986	69.66	14.76	

Significant at P. values ≤ 0.05

Discussion:

Fracture movement, fatigue, and pain were central symptoms that led to the loss of basic capabilities to perform activities, work, and recreation in the following weeks and months. Their lack of capability disrupted the patients' independence and self-image. The massive need for support from family or caregivers forced some patients to move and others developed social anxiety due to the fear of pain and re-injury. Patients' preferences were considered in the treatment decision-making process and could change through the treatment course according to the prevailing symptoms of gross fracture movement with pain and inability to perform basic activities (**Sargeant, 2020).**

Regarding the patients under study, the present results showed that, with a mean age of 51.24±10.9 years, a significant proportion of the patients fell within the 35 < 45-year age range. The majority of the patients in the study were the same age group, according to **Klug et al., (2019**) "Trends in surgical management of proximal humeral fractures in adults: a nationwide study of records in Germany from 2007 to 2016" which contradicted this report.

According to the results of this study, women made up the majority of the patients under investigation. This study's findings were at odds with those of **Sintini et al., (2018**), who claimed that most of the study group was male in their work "Investigating gender and ethnicity differences in proximal humeral morphology using a statistical shape model."

As stated by **Monticone et al., (2021**), one-third of the patients in the current study were illiterate, non-working, and three-fifths from rural areas. These findings are consistent with the findings of the current investigation. It could be connected to a knowledge gap, according to the researchers.

The majority of the patients in this study had no surgical history, according to the results of the assessment of the patient's medical records. This finding is consistent with the findings of **Handoll et al. (2015**), who stated as much in their randomized controlled trial titled "Evaluating the clinical effectiveness and cost-effectiveness of surgical compared with non-surgical treatment for proximal fracture of the humerus in adults."

The majority of the patients in this study have chronic kidney disease, which is explained by the findings of a cohort study conducted with **Chen et al., (2021)**, titled "Effect of chronic kidney disease on outcomes following proximal humerus fragility fracture surgery in diabetic patients: A nationwide population-based cohort study." The results of this study revealed that two-fifths of the patients studied had diabetes followed by coronary heart disease.

The results of the current study were consistent with those of **Ganta et al.'s (2022**) study, "Does mechanism of injury impact the outcome of operative fixation of geriatric proximal humerus fractures?" which found that fall accounted for more than three-fifths of the initial causes of fracture, followed by motor car accidents, gunshots, and assault.

The study conducted by **Silva et al. (2022**) in Portugal revealed that the majority of the patients under investigation stayed in the hospital for 4–10 days, which is not consistent with the findings of their study titled "Proximal humerus fractures: epidemiology and trends in surgical management of hospital-admitted patients in Portugal " which mentioned that

mean length of stay was 10.0 ± 14.1 days.

The current results showed that there was an improvement in patients' knowledge following the implementation of an awareness program with a highly statistically significant difference, measured by the total patients' knowledge level about humeral fracture surgery pre/post, two, and four months after the program's implementation. This, in the opinion of the researchers, shows how successfully the awareness initiative was implemented. This demonstrated how crucial it is to comprehend why the awareness initiative is being implemented to increase knowledge.

Patients in research examining practices and knowledge following humeral fractures reported having little understanding of their ailment and how it is managed medically, having naive views about how quickly they would heal, and being unsure about how safe it is to move and use their extremities (**Stern et al., 2021a**).

According to the same research group, patients who were not given enough information about the fracture suffered unfavorable effects; conversely, patients who were informed about the symptoms and what to expect were empowered and experienced less emotional distress (**Stern et al., 2021b**). Patients who suffer from humeral fractures depend on medical professionals to provide them with comprehensive information about their condition. This information should cover basic but essential details such as the extent of the injury, the anticipated course of treatment, the likely symptoms and results, and the available guidelines and options for rehabilitation and treatment (**Fraser et al., 2020).**

The majority of patients in the current study reported having a decent level of knowledge, but after participating in the awareness program, their levels of knowledge were shown to have changed dramatically. From the perspective of the researchers, this demonstrated the beneficial impact of implementing awareness programs in raising patient understanding.

Regarding the practices of patients Results from the pre-, post-, and four-month awareness program implementation showed that patients had reached a suitable degree of practice after the two and four months of the course. According to the researchers, this demonstrated how the awareness program's adoption had a good impact on the patients' practices and raised their practice level scores.

The results of this study showed that, following proximal humeral fracture surgery, there was a statistically significant difference in the overall mean score of pain level. The results of the current study additionally supported the goals and assumptions of the investigation by proving that an awareness program can effectively lower patients' pain levels. The researchers believe that this result demonstrates that the awareness program was effective in lowering patients' discomfort following surgery for humerus fractures. According to **Chen et al. (2022**), the program was more effective in reducing pain in working patients who had undergone surgery to treat humerus fractures. This is in contrast to a prior study that revealed no difference in pain relief between two and three weeks of immobilization (**Wirbel et al., 2019**).

These findings conflicted with those of **Rummel et al., (2021**) who examined "Shoulder function after helical long humeral fracture Surgery plate" and discovered that there was no discernible difference in discomfort between the two groups throughout follow-up periods. **Budharaju et al. (2022**) examined the efficacy of immobilization versus early range-of-motion exercises in patients suffering from proximal humeral fractures. After six months or a year following surgery, the authors discovered no appreciable variations in pain, function, or quality of life between the two groups. A controversial randomized controlled trial conducted by **Lopiz et al.(2019**) assessed the efficacy of physical therapy interventions for patients suffering from proximal humeral fractures, but the results did not show any appreciable reductions in shoulder discomfort or function.

Hanchard et al. (2016), who investigated "Surgery for Proximal Humeral Fractures in Adults," corroborated these findings by showing that patients who finished the exercise program experienced a significant reduction in shoulder discomfort and function. Additionally, patients who got exercise therapy

showed lower pain scores and larger improvements in shoulder function compared to those who did not get exercise therapy, according to **Chen et al. (2021**).

In conclusion, research indicates that following surgery for proximal humeral fractures, exercise therapy may be useful in enhancing shoulder function and lowering discomfort. The bulk of research indicates that exercise treatment is beneficial in enhancing both outcomes, even though certain studies present contradictory data or limits in their conclusions. Healthcare professionals should think about including exercise therapy in their treatment plans for patients with proximal humeral fractures since it can generally be a beneficial part of rehabilitation following surgery **(Davey et al., 2022).**

The results of the current study indicated that less than one-third of the studied patients had severe pain levels post-two months of awareness program implementation compared to no one who had severe pain levels post-four months of awareness program implementation. This result is in the same line with **Dunlop et al., (2019**), who reported that pain perception had reduced by the end of treatment and follow-up periods. This reflects the positive combined effect of the awareness program.

In a study investigating 15 adult patients' experiences related to complex humeral fractures, the symptoms of pain and loss of function were also detrimental markers of recovery (**Sabharwal, 2021).** Injury-related pain was reported in general terms, and not as a direct association to the feeling of a loose upper arm, which seems to be very unique for the humeral shaft fracture population. However, the perception of upper arm function was similarly synonymous with the degree of recovery for humeral fractures. Furthermore, they reported that the loss of independence and lack of support from caregivers and family members could also negatively affect patients' mental states, and a trustworthy relationship with the healthcare professional alleviated distress around treatment and influenced the patients' outlook on treatment. These results confirm the significant role of this program.

A prospective cohort study conducted by **Yoon et al., (2017)** and published in the American Journal of Physical Medicine and Rehabilitation, evaluated the effectiveness of a supervised exercise program in patients with proximal humeral fractures who had undergone surgery. The authors found that the exercise program resulted in significant improvements inshoulder function and pain at 12 weeks and 6 months after surgery. They concluded that a structured exercise program can improve outcomes in patients with proximal humeral fractures.

The results of the present study illustrated that the fatigue level scores among the studied patients post-two and four months of the awareness program were significantly lower, indicating a significant difference in fatigue levels. There was a statistically significant in the fatigue mean scores among the studied patients post-two and four months of the awareness program. From the researchers' point of view, this is reflected in the success of the intervention and its positive effects which supported the aim and hypothesis of the study.

The study's findings demonstrated a statistically significant variation in the overall mean score of shoulder functions among the patients under investigation before, two months, and four months after the implementation of an awareness program following proximal humeral fracture surgery. This implies that individuals who received surgery for a proximal humeral fracture benefited from the exercise intervention in terms of shoulder function. In an observational study titled "Rehabilitation outcomes after proximal humeral fracture," **Taylor et al. (2021**) concurred with this result, reporting a statistically significant difference in the total mean score of the shoulder function index during follow-up periods following the application of shoulder exercise.

These exercises facilitate a quicker return to regular activities and enhance functional outcomes, patients' attitudes towards active training and physical performance recovery are positively influenced. Additionally, likely, these exercises work best when performed in environments similar to those that are encountered in the workplace. According to **Orman et al. (2020**), the experimental group exhibited higher estimates of activities,

indicating that they may be used to resume their regular employment activities once their recovery period ends. The patients' activity levels were satisfactory throughout the monitoring period. **Martinez-Catalan (2023)** deduced from these results that patients with proximal humerus fractures who get surgical treatment can have improved shoulder function through the shoulder training program.

Conclusion:

Based on the findings of the current study, it can be concluded that the implementation of an awareness program has a positive effect on enhancing knowledge and practices and reducing pain and fatigue. Also, improving shoulder function among patients post humeral fracture surgery**.**

Recommendations:

The following suggestions are put forth in light of the current study's findings:

- It is suggested that awareness programs be included in the preoperative nursing education of patients having surgery for a humeral fracture.
- All patients scheduled for proximal humeral fracture surgery should have easy access to printed copies of the exercises in the orthopedic clinic and department.
- To generalize the findings, the current study needs to be conducted again on bigger sample populations.

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