

Effectiveness of Rehabilitation Program on Functional Ability among Patients Undergoing Total Hip Replacement Surgery

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Abstract

Background: Rehabilitation program after Total Hip Replacement (THR) is the most important aspect of post-operative care and has been linked to improved functional outcomes. **Study aim:** Was to evaluate the effectiveness of rehabilitation program on functional ability among patients undergoing total hip replacement surgery. **Design:** A quasi experimental design was used. **Setting:** Study was established in orthopedic department and outpatient orthopedic clinics at Zagazig university hospitals. **Sample:** A purposive sample of 80 patients undergoing total hip replacement surgery, classified into two identical groups; study group and control group (40 patients for each). **Tools:** Five tools were utilized; Interviewing Questionnaire for patients; Practice Observational Checklist, Lower Extremity Functional Scale (LEFS), Hip Joint Exercise Checklist, and Complications Assessment Questionnaire. **Results:** There was a statistical significant increase in mean score of patients' knowledge and practice regarding total hip replacement surgery in study group than those in control group post program. There was a statistical significant improvement in mean score of lower extremity functional ability and performing lying and standing exercises among patients in study group than those in control group post program with highly statistical significant differences ($P = 0.001$). **Conclusion:** The rehabilitation program had a positive effect on improving patients' knowledge and practice that reflected on improving their functional ability in performing activities of daily living. **Recommendations:** The initiation of a rehabilitation program should commence promptly upon the patient's admission to the hospital, Rehabilitation program should be implemented on patients with THR in various settings for improving functional ability.

Key words: Functional Ability, Rehabilitation Program, & Total Hip Replacement.

Introduction

Total hip replacement (THR) is a frequently conducted surgical intervention for individuals who have not shown improvement with extended conservative therapy in order to alleviate severe pain and restricted mobility in the joint. (El Sayed, et al., 2021). Total hip replacement (THR) has a profound influence on the

quality of life, patient satisfaction, and functional limitations, limited range of motion (ROM), instability, leg disparities, and changes in gait post-surgery (Ali & Abo El-Fadl, 2021).

Following THR surgery, patients starts their recovery immediately after surgery and lasts for several years (Zaghlol, et al, 2020). Most patients undergoing the recovery process after THR surgery have limited knowledge

regarding post-operative activities. Therefore, they are in need of discharge education to address their concerns related to pain management, mobility, daily living activities, and support needs. (Meng, et al., 2022). The process of discharge education commences upon a patient's admission to the hospital, aiming to equip them with the necessary knowledge and guidance for their post-discharge treatment, care, and physical activities (Nicolau, et al., 2022).

Rehabilitation is essential for optimal recovery after total hip replacement surgery, as it is closely tied to improved functional outcomes. The rehabilitation program for total hip replacement primarily concentrates on strengthening the muscles surrounding the impacted joint and enhancing joint stability (Pidani, et al., 2020).

Rehabilitation program developed by nurses aims to empower individuals to attain the highest level of self-care autonomy and independence. This program plays a crucial role in facilitating Postoperative functional rehabilitation, which is of utmost significance in regards to recovering operational capability and reintegrating individuals into their social and professional lives (Dong, & Chen, 2020). During the preoperative phase, the rehabilitation nurse's role should primarily revolve around educating patients as a preventive measure against potential complications. This involves imparting knowledge about THR surgery and guiding individuals through rehabilitation exercises. The ultimate objective is to facilitate the patients' functional adaptation to activities of daily living (ADLs) (Ninlerd, et al., 2020).

Significance of the study:

Hip replacement surgery (HR) is a highly common and successful surgery.

Every year, over a million surgeries for total hip replacement (THR) are carried out globally (Costa, et al., 2021). In 2018, more than 550,000 hip replacement surgeries were done in the USA and 150 000 were performed in France (De Marco, et al., 2022). In 2019, about 600 000 hip replacement surgeries were done in China, and the rate elevating 20% per year (Wainwright, et al., 2020); (Mew, et al., 2022).

Rehabilitation program post THR surgery is an essential part of treatment for improving functional ability and promoting patients' return to daily living activities (Colibazzi, et al, 2020); (Zhang, & Xiao, 2020). Rehabilitation based exercise generally starts in the hospital and lasts after discharge at home and in outpatient clinics (Hamed, & Gaballah, 2021); (Yanyan et al, 2020). Therefore, this study aimed to evaluate the effectiveness of rehabilitation program on functional ability among patients undergoing THR surgery.

Aim of the study:

Study aimed to evaluate the effectiveness of rehabilitation program on functional ability among patients undergoing total hip replacement surgery.

Objectives:

1. Assess patients' knowledge and practice regarding total hip replacement surgery.
2. Assess functional ability among patients undergoing total hip replacement surgery.
3. Assess complications for patients undergoing total hip replacement surgery.
4. Design, and implement rehabilitation program for patients undergoing total hip replacement surgery.
5. Evaluate the effectiveness of rehabilitation program on functional

ability among patients undergoing total hip replacement surgery.

Research Hypotheses:

- H1: Mean Score of knowledge and practice in study group will be higher after rehabilitation program than that of control group.
- H2: Functional ability will improve in study group after rehabilitation program than those of control group.
- H3: Patients in study group are expected to have less complication after rehabilitation program than those of control group.

Operational definitions:

- The rehabilitation program is defined in this study as a rehabilitation program to improve functional ability after total hip replacement.
- Functional Ability is defined in this study as patients' ability to do everyday activities through patients' training to perform hip joint exercise after total hip replacement.

Subjects and Methods:

Research design

A quasi experimental design was used. In situations where ethical or practical constraints prevent the use of real experiments, this tool proves to be valuable as it employs a non-random approach to allocate subjects into groups. (Thomas, 2020).

Setting:

The study was established in orthopedic department of New Surgery Hospital, Zagazig University Hospitals which located in the fifth floor consisted of two sections; male and females; each

section included five rooms; five beds for each, and outpatients' orthopedic clinics at Zagazig University Hospitals.

Subjects:

A purposive sample of 80 patients undergoing total hip replacement surgery. Patients were recruited based on the inclusion criteria as: Both sexes, age range between 20-60 years, one or both hip replacement, capable to communicate, and willingness to share in the study. Exclusion criteria: Previous history of stroke affecting the legs and end stage chronic disease.

Studied patients were classified into two identical groups: study group (40) received the rehabilitation program, and control group (40) received the routine hospital care as taking prescribed medications, wound care, leg elevation and using ice packs.

The sample was randomly selected. The estimated sample size was calculated using a power and sample size estimation program, aiming to achieve a power of 80% at a confidence level of 95%. The calculation for determining the sample size is as follows:

$$n = \frac{N \cdot Z^2 \cdot p \cdot (1-p)}{(N-1) \cdot e^2 + Z^2 \cdot p \cdot (1-p)}$$

Data collection tools:

Tool I- Interviewing Questionnaire for Patients (Pre/ Posttest): Created by researchers based on review of relevant literature (Mahure, et al., 2022) & (Saunders, et al., 2022) & (Jones, et al., 2022) and contained the following main parts:

Part 1: Demographic characteristics of studied patients: composed of nine close end questions regarding age, sex, marital status, level of education, occupation, residence, living with, income, and treatment budget.

Part 2: Patient medical and surgical history: consisted of seven questions about comorbidity history, previous orthopedic surgical operations, the most common problem, walking outside home, walking aids, BMI, and smoking.

Part 3: Questions to assess patient's knowledge regarding THR surgery: included 15 multiple choice questions about definition of THR, causes, types of THR surgery, purposes of THR surgery, possible complications that may occur post THR surgery, signs and symptoms of wound infection and deep venous thrombosis, duration of artificial joint, factors affecting duration of artificial joint, materials used in THR surgery, when patient can move after surgery, purpose of walking aids, time of complete recovery from surgery, factors promote surgery success, and source of information about THR surgery.

Part 4: Questions to assess patients' knowledge regarding instructions given to patients after discharge: consisted of eight multiple choice questions about safety precautions after THR surgery, inform physician about warning signs occur at home, action taken to prevent constipation, foods help in wound healing, time expected to perform daily living activities without walking aids, action taken to prevent swelling in replaced joint, instructions about back to work, and exercises that should performed after total hip replacement surgery.

Score 1 was given for correct response, while a score of 0 was given for an incorrect answer. Patients attained a total score of 60% or above were deemed to possess satisfied knowledge, whereas patients with a total score below 60% were classified as having unsatisfactory knowledge, as per the statistical analysis.

Tool II- Practice Observational Checklist (Pre/ Posttest): It was adopted from (Yang, et al., 2020) & (Jansson, et

al., 2022) to assess patients' practice regarding wound care after THR surgery; composed of 20 items; 12 steps before wound care, 5 steps during wound care, and 3 steps after wound care. Scoring system; score 1 for done items and score 0 for not done. Patients attained a total score of 60% or above were classified as having satisfactory practice, whereas those who scored below 60% were categorized as having unsatisfactory practice.

Tool III- Functional Ability Assessment (Pre/ Posttest): It was adopted from (Wu, et al., 2019), (Turcotte, et al., 2022) & (Wang, et al., 2022) to assess patient's ability to perform everyday tasks; included the following two parts:

Part 1: The Lower Extremity Functional Scale (LEFS) adopted from (Poulsen, et al., 2020): included 20 items regarding patients' ability to do everyday activities. The LEFS can be used to assess patients' initial function and outcome. The LEFS can be used to assess functional disability of a patient with lower extremities disorders and evaluate the effectiveness of the rehabilitation exercises program. As the following (Usual work, house work, hobbies or sporting, getting in and out of bath, walking between rooms, putting your shoes or socks, squatting, picking objects, performing light activities, performing heavy activities, getting in and out of car, walking 2 blocks, walking a mile, going up or down 10 stairs, standing for an hour, sitting for an hour, running on even ground, running on un even ground, making turns, hopping, and rolling over in bed). Items Scored as 0-4; 0 for extreme difficulty or unable to performing activities, 1 Quite a Bit of difficulty, 2 for Moderate difficulty, 3 for Little Bit of difficulty, and 4 for No difficulty.

Part 2: Hip Joint Exercise Checklist (Dong &Chen, 2020): to evaluate the ability of patients to do exercise after total

hip replacement surgery, consisted of two types; lying exercises and standing exercises. Lying exercises consisted of seven exercises as the following (Ankle Pumps 4 items, Quad Sets 5 items, Gluteal Sets 3 items, Abduction and Adduction 4 items, Heel Slides 4 items, Short Arc Quads 4 items, Knee Extension - Long Arc Quads 6 items). Standing Exercises are two as the following: (Standing Heel Raises 6 items, Standing Knee Flexion 5 items). Score 1 given for done item and score 0 for not done. Patients considered to have satisfactory practice if they have a total score of 60% or above, while patients with scores less than 60% were considered to have unsatisfactory practice based on statistical analysis.

Tool IV- Complications Assessment Questionnaire (Pre/ Posttest):

It was used to assess expected complications after THR surgery including two parts:

Part 1: General Complications Assessment after THR surgery; adopted from (Wall, 2020), and included seven questions about postoperative systemic complications (Cardiovascular system, neurological system, respiratory system, gastrointestinal tract, urinary system, bed sores, and deep venous thrombosis).

Part 2: Access Site Complications Assessment: It was adopted from (Zhong, et al., 2021): and used to assess signs and symptoms of infection at access site, included eight yes or no questions; scored as 0 for absence of infection, and 1 for presence of infection.

Content validity and reliability:

Content validity was utilized for tools modifications to identify whether they achieved the study aim or not. It was evaluated by a jury of seven experts; five academic nursing staff and two orthopedic medical staff members. The Cronbach's alpha reliability coefficient was "0.78, 0.82, 0.77, 0.81, and 0.75 respectively for

"Interviewing Questionnaire for patients, Practice Observational Checklist, Lower Extremity Functional Scale (LEFS), and Hip Joint Exercise Checklist, and Complications Assessment Questionnaire".

Field Work:

Approval from relevant authorities was acquired before commencing the study. Subsequently, structured interviews were carried out with eligible patients to clarify the study's objectives, ensure confidentiality, and secure informed consent. The study was conducted through six months from November 2023 to April 2024 where the researchers were available every day through these phases:

Assessment phase:

Prior to implementing the rehabilitation program, groups of patients who had undergone THR surgery were interviewed in orthopedic department to gather baseline data using various study tools. The duration of each interview ranged from 35 to 40 minutes.

Implementation phase:

The rehabilitation program was introduced to the studied patients through lectures and group discussion which were strengthened by demonstrating the role play by using suitable teaching aids prepared specially for the program such as handout, brochure, colored pictures and videos, and involved two parts;

The initial theoretical part comprised of four sessions, with two sessions being conducted during the assessment phase, providing an overview of anatomy of hip joint, total hip replacement; definition, causes, types of surgery, and complications after surgery, and the other two sessions involved discharge instructions regarding signs & symptoms of wound infection, and deep venous

thrombosis. Furthermore, ADL and return to work will be addressed along with detailed safety measures, necessary equipment, and guidelines for safe usage. Additionally, the discussion will encompass a comprehensive understanding of hip exercises, including various types and recommendations for optimal performance.

The practical part was carried out through 10 sessions in orthopedic department. Two sessions are conducted for wound care. Four sessions for hip Lying exercises consisted of seven exercises as the following (Ankle Pumps, Quad Sets, Gluteal Sets, Abduction and Adduction, Heel Slides, Short Arc Quads, Knee Extension- Long Arc Quads) and four sessions for Standing Exercises as the following: (Standing Heel Raises, Standing Knee Flexion). The exercises were applied individually, with each session lasting approximately 40 to 45 minutes. During the session, each exercise was done for 5-10 sets in the morning under the supervision of researchers until satisfactory performance was achieved.

Then the patients were directed to perform the exercises again independently in the afternoon and evening in hospital. Afterward, Patients were instructed to persist with their home exercise regimen for the next 8 weeks after discharge, using the program booklet as a guidance to ensure correct execution and to gradually increase the intensity of the exercises if possible. If well-tolerated, the number of repetitions for each exercise was increased to 5 at this point. These sessions were conducted over a period of three months.

Each patient participating in the study received a booklet that contained the program's content. This booklet served multiple purposes, including aiding in reviewing, supporting teaching, and facilitating training at home. The researchers developed the booklet by thoroughly reviewing literatures. This

booklet was written in a straightforward Arabic language and complemented with images and diagrams to enhance patients' comprehension of its contents. The studied patients were followed up through telephone communication to continue performing exercises at home until the time of evaluation.

Evaluation phase

The evaluation of patients in outpatient orthopedic clinics was conducted using the same study tools after a period of two months following the implementation of the rehabilitation program.

Pilot study:

It was applied on eight patients to examine the instruments for precision and pertinence, comprehension, understanding, applicability and ease of implementation. Data results helped in tools modification. Patients who took part in the pilot study were not included in study sample.

Administrative design:

Prior to conducting the study, formal approval was granted by the Research Ethics Committee of the Faculty of Nursing at Zagazig University and the director of Zagazig University Hospital. The researcher conducted an interview with the nursing administrative personnel to gain orientation about the study's aims and objectives. This was done to ensure better cooperation during the implementation of the study. Additionally, the patients' consents were obtained before collecting any data.

Ethical consideration:

Every participant received detailed information regarding the objective and advantages of the study, then taking patients' oral consents, along with the assurance that their involvement was entirely voluntary and they could withdraw from the study at any point without providing any explanation. Furthermore, the confidentiality and anonymity of the individuals were safeguarded through the coding of all data. No harm was expected from study implementation.

Statistical analysis:

The data was gathered, organized, and subjected to statistical analysis using SPSS 20.0 for Windows (SPSS Inc., Chicago, IL, USA 2011). Quantitative data was represented using the mean \pm SD, whereas qualitative data was represented using absolute frequencies (number) and relative frequencies (percentage). The Chi-square test or Fisher exact test was employed to compare the percentage of categorical variables, and the student "t" test was utilized to compare the means of two independent groups of quantitative data. The Pearson correlation coefficient was calculated in order to assess the association between the variables being examined. A positive sign signifies a direct correlation, whereas a negative sign indicates an inverse correlation.

Furthermore, values approaching 1 indicate a strong correlation, while values close to 0 suggest a weak correlation. The Cronbach alpha coefficient was calculated to assess the internal consistency and reliability of the scales used. A p-value below 0.05 was deemed to be statistically significant, while a p-value below 0.001 was regarded as highly statistically significant. Conversely, a p-value equal to

or greater than 0.05 was considered to be statistically non-significant.

Results:

Table 1: Shows that 80.0% of patients in control group and 75% of patients in study group their age more than 40 years old with mean \pm SD 48.75 \pm 10.09 and 49.15 \pm 11.13, respectively. Also, 55% of patients in control group and 60% of them in study group were males. It was observed that 70% of patients in control group and 40% of them in study group were educated. In addition to, 75% of patients in control group and 85% of them in study group were married. Concerning occupation, it is obvious that 40% of patients in control group and 30% of them in study group were working. In relation to residence, 65% of patients in control group and 60% of them in study group were from rural area. There were 70% of patients in study and control groups lived with their family. In relation to income, 65%, 85% respectively of patients in control and study groups had insufficient income. There were a highly statistical significant differences between two groups regarding financial resources.

Table 2: Clarifies that 40% of patients in control group had a history of diabetes and hypertension, while in study group 35% and 25% of patients had diabetes and hypertension. Also, 35% of patients in both groups had past history of surgical operation. In addition to, 30% of patients in control group and 55% of them in study group were smokers. Regarding body mass index 62.5% of patients in control group and 60% of them in study group were overweight. Additionally, 80% of patients in control group had walking problems while 45% of patients in study group suffered from pain, stiffness, and walking problems. Moreover, 65% of patients in control group and 50% of them

in study group walked out door. Also, 70% of patients in control group used canes as walking aid, while 60% of them in study group used walker in walking. There were statistically significant differences in co-morbidity, smoking, BMI, and the main complain.

Table 3: Reveals that, there was a statistical significant increase in mean scores of patients' knowledge regarding hip replacement surgery and discharge instruction in study group than those in control group post program with highly statistical significant differences ($P = 0.001$).

Table 4: Illustrates that there was a statistical significant increase in mean scores of patients' practice regarding wound care in study group than those in control group post program with highly statistical significant differences ($P = 0.001$).

Table 5: Demonstrates that there was a statistical significant improvement in mean scores of lower extremity functional ability among patients in study group than those in control group post program with

highly statistical significant differences ($P = 0.001$).

Table 6: Clarifies that there was a statistical significant improvement of patients' ability in performing lying and standing exercises in study group than those in control group post program with highly statistical significant differences ($P = 0.001$).

Table 7: Displays that, there was a statistical significant decrease in mean scores of general and local complications among patients in study group than those in control group post program with highly statistical significant differences ($P = 0.001$).

Table 8: Shows that, there was a strong positive correlation between patients' knowledge, practice, LEFS, and exercise post program, while there was a negative correlation between patients' knowledge, practice and complication post program with a highly statistical significant differences ($P = 0.001$).

Table 1: Frequency and Percentage Distribution of Demographic Characteristics for Studied Patients (n= 80)

Items	Control group (n=40)		Study group (n=40)		FET(p-value)
	No.	%	No.	%	
Age (years)					
≤ 40 years	8	20.0	10	25.0	0.790
> 40 years	32	80.0	30	75.0	
Mean± SD	48.75±10.09		49.15±11.13		
Sex					
Male	22	55.0	24	60.0	0.821
Female	18	45.0	16	40.0	
Marital status					
Married	30	75.0	34	85.0	0.402
Not married	10	25.0	6	15.0	
Education					
Educated	28	70.0	16	40.0	0.013
Not educated	12	30.0	24	60.0	
Occupation					
Working	16	40.0	12	30.0	0.482
Not working	24	60.0	28	70.0	
Residence					
Rural	26	65.0	24	60.0	0.818
Urban	14	35.0	16	40.0	
With whom live					
Alone	12	30.0	12	30.0	0.99
With family	28	70.0	28	70.0	
Income					
Sufficient	14	35.0	6	15.0	0.069
Insufficient	26	65.0	34	85.0	
Financial resources					
Health insurance	16	40.0	14	35.0	$\chi^2 = 10.667$ p=0.001**
State expense	20	50.0	10	25.0	
Own expense	4	10.0	16	40.0	

Fisher exact test (FET)

Chi square test (χ^2)

*p < 0.05 (significant)

Table 2: Frequency and Percentage Distribution of Medical and Surgical History of Studied Patients (n= 80)

Items	Control group (n=40)		Study group (n=40)		FET(p-value)
	No.	%	No.	%	
Comorbidity					$\chi^2=19.118$ (0.001**)
No comorbidity	8	20.0	2	5.0	
Diabetes Mellitus	16	40.0	14	35.0	
Hypertension	16	40.0	10	25.0	
Renal disease	0	0.0	8	20.0	
Others	0	0.0	6	15.0	
Past surgery					0.99
No	26	65.0	26	65.0	
Yes	14	35.0	14	35.0	
Smoking					0.041*
No	28	70.0	18	45.0	
Yes	12	30.0	22	55.0	
BMI					$\chi^2 = 7.667$ (0.022*)
Healthy weight	15	37.5	16	40.0	
Overweight	25	62.5	24	60.0	
Main complain					$\chi^2=35.789$ (0.001**)
Pain	2	5.0	6	15.0	
Joint stiffness	0	0.0	10	25.0	
Walking problems	32	80.0	6	15.0	
All symptoms (pain, stiffness, walking problems)	6	15.0	18	45.0	
Outdoor walking					0.258
No	14	35.0	20	50.0	
Yes	26	65.0	20	50.0	
Walking aids					0.013
Cane	28	70.0	16	40.0	
Walker	12	30.0	24	60.0	

Fisher exact test (FET)

Chi square test (χ^2)* $p < 0.05$ (significant)**Table 3: Mean Scores of Patients' Knowledge in Both Groups Pre and Post Program (n= 80)**

Items		Control group (n=40)	Study group (n=40)	t-test	p-value
		Mean± SD	Mean± SD		
Hip replacement Surgery	Pre	7.10±1.81	7.60±2.62	0.991	0.325
	Post	7.11±1.99	11.80±2.61	9.037	0.001**
Discharge instruction	Pre	2.80±0.99	2.70±1.47	0.356	0.722
	Post	3.30±1.20	5.75±1.39	8.426	0.001**
Total	Pre	9.90±2.02	10.30±2.70	0.750	0.456
	Post	10.40±2.27	17.55±2.81	12.487	0.001**

t: student t-test,

* $p < 0.05$ (significant)

Table 4: Mean Scores of Patients' Practice in Both Groups Pre and Post Program (n= 80)

Items		Control group (n=40)	Study group (n=40)	t- test	p-value
		Mean± SD	Mean± SD		
Assessment	Pre	4.75±2.14	4.80±3.27	0.081	0.936
	Post	4.90±2.53	8.65±2.08	7.221	0.001**
Before wound care	Pre	1.75±1.46	1.90±1.78	0.412	0.682
	Post	2.00±1.60	4.00±1.15	6.407	0.001**
During wound care	Pre	3.45±1.51	3.10±2.43	0.771	0.443
	Post	3.35±1.52	7.15±1.33	11.590	0.001**
After wound care	Pre	1.60±1.29	1.35±1.16	0.906	0.368
	Post	1.61±1.30	3.10±0.77	6.273	0.001**
Total	Pre	11.55±1.98	11.15±3.19	0.673	0.503
	Post	11.95±3.02	22.90±2.14	18.655	0.001**

t: student t-test, non-significant (p>0.05),

** : statistically significant (p<0.001).

Table 5: Mean Scores of Lower Extremity Functional Ability for Patients in Both Groups Pre and Post Program (n= 80)

Items		Control group (n=40)	Study group (n=40)	t- test	p-value
		Mean± SD	Mean± SD		
LEFS	Pre	16.20±5.30	15.25±3.63	0.9353	0.3525
	Post	28.60±5.82	61.15±4.93	26.979	0.001**

t: student t-test

*p < 0.05 (significant)

Table 6: Mean Scores of Exercise Among Patients in Both Groups Pre and Post Program (n= 80)

Items		Control group (n=40)	Study group (n=40)	t- test	p-value
		Mean± SD	Mean± SD		
Lying Exercises	Pre	1.35±1.21	1.10±1.31	0.884	0.379
	Post	1.45±1.25	3.15±0.92	6.889	0.001**
- Ankle Pumps	Pre	1.85±1.54	1.80±1.88	0.130	0.897
	Post	1.85±1.54	3.80±1.22	6.25	0.001**
- Quad Sets	Pre	1.85±1.02	1.60±1.29	0.769	0.4441
	Post	1.95±1.03	2.45±0.87	7.500	0.001**
- Gluteal Sets	Pre	1.70±1.06	1.55±1.85	0.444	.658
	Post	1.70±1.01	3.20±0.88	7.041	0.001**
- Abduction and Adduction	Pre	1.60±1.37	1.55±1.58	0.151	0.881
	Post	1.61±1.38	2.87±1.11	4.560	0.001**
- Heel Slides	Pre	1.90±1.15	1.80±1.46	0.342	0.7335
	Post	1.91±1.2	3.00±1.24	4.113	0.001**
- Short Arc Quads	Pre	1.65±1.21	2.32±2.59	1.491	0.140
	Post	1.66±1.21	4.90±1.31	11.49	0.001**
- Knee Extension - Long Arc Quads	Pre	2.60±1.54	1.75±2.53	1.807	0.075
	Post	2.55±1.51	4.70±1.13	7.169	0.001**
Standing Exercises	Pre	1.70±1.39	2.15±2.27	1.067	0.289
	Post	1.70±1.39	4.02±1.21	7.951	0.001**
- Standing Heel Raises	Pre	15.20±2.74	14.92±4.78	0.315	0.754
	Post	15.25±2.67	32.10±3.02	26.37	0.001**
- Standing Knee Flexion	Pre	15.20±2.74	14.92±4.78	0.315	0.754
	Post	15.25±2.67	32.10±3.02	26.37	0.001**
Total	Pre	15.20±2.74	14.92±4.78	0.315	0.754
	Post	15.25±2.67	32.10±3.02	26.37	0.001**

t: student t-test

*p < 0.05 (significant)

Table 7: Mean Scores of Complications in Both Groups Pre and Post Program (n= 80)

Items		Control group (n=40)	Study group (n=40)	t-test	p-value
		Mean± SD	Mean± SD		
General Complications	Pre	4.95±1.17	4.35±1.48	1.7419	0.0868
	Post	4.75±1.23	1.30±1.01	13.633	0.001**
Local complications	Pre	5.00±1.11	4.70±1.47	1.030	0.306
	Post	4.80±1.13	1.65±1.122	12.473	0.001**
Total	Pre	9.95±1.41	9.65±1.40	0.8270	0.4116
	Post	9.55±1.51	2.95±1.37	20.368	0.001**

t: student t-test,

p* < 0.05 (significant)Table 8: Correlation Coefficient between Knowledge, Practice, Lower Extremity Functional Ability, Exercise, and Complications Pre and Post Program**

Item		Knowledge		Practice	
		R	P	R	P
Pre	Practice	0.29	0.001**		
	Complications	-0.027	0.813	-0.110	0.331
	LEFS	0.074	0.514	0.018	0.876
	Exercise	0.043	0.704	0.152	0.179
Post	Practice	0.705	0.001**		
	Complications	-0.730	0.001**	-0.843	0.001**
	LEFS	0.826	0.001**	0.823	0.001**
	Exercise	0.784	0.001**	0.871	0.001**

p* < 0.05 (significant)* **p* < 0.01 (high significant)Discussion :**

Regarding the demographic characteristics, the current study results illustrated that, more than three quarters of patients in control and study groups their ages more than 40 years old. This result may be caused by increase in the prevalence of osteoarthritis over the decades. This finding was in agreement with **Huang et al. (2017)**; **Gabor et al. (2020)** who mentioned that less than half of patients in both groups were less than sixty years. Conversely with **El Sayed et al. (2021)** who found that, less than half of patients in both groups their ages were above 60 years.

The current study result revealed that more than half of studied groups were

males. This might be due to the fact that males are more susceptible to hip osteoarthritis which is the most common indication for THR. This result was in the same line with **Liu et al. (2021)** who reported that two thirds of subjects were males. This result disagreed with **Arkin et al. (2019)** who found that two thirds of participants were females.

In relation to marital status, nearly the majority of patients in both groups were married. This study finding was similar to those of **Wu et al. (2018)** & **El Sayed et al., (2021)** who reported that the majority of the subjects was married. This might be due to that the majority of the studied patients their ages were more than 40 years old and typically, by this age, they are

married according to Egyptian social culture. Concerning patients' occupation, this study result illustrated that about two thirds of patients in both groups were not workers. This might be due to increase ages of the study sample, additionally due to severe pain and impaired mobility before surgery which qualified them for not working. This result agreed with **Brembo et al. (2017)** who found that two thirds of participants were not workers.

Concerning past medical history, this study finding illustrated that, above one third of patients in control group had diabetes mellitus (DM) and hypertension, while about one third of patients in study group were diabetic. This may be due to their ages more than 40 years old are a common high-risk group for DM and hypertension. This result was in agreement with **Arkin et al (2019)** who reported that equal one quarter of study patients had DM. In the same line with **Frane et al. (2021)** who found that two thirds of patients were hypertensive. Concerning past surgical history, this study finding showed that about one third of patients in both groups had previous surgical operations. Similarly, with **Bakr (2018); Saunders et al. (2021)** who found that one third of the patients had previous orthopedic surgery.

Concerning patient complain, this study finding demonstrated that more than three fourths of patients in control group had walking problems, while less than half of patients in study group suffered from pain, stiffness, and walking problems. This was supported by **Park et al. (2023)** who found that patients complained of swelling, pain and stiffness in hip joint and their movement was reduced.

Regarding patients' knowledge, there were a statistical significant increase in patients' knowledge in study group than

those in control group post program with statistical significant difference. This explained the effectiveness of rehabilitation program on promoting interaction of patients with health care members and improving patients' knowledge. This result was in the same line with **Bakr (2018); El Sayed et al. (2021)** who found a highly statistical significant difference between the patients' knowledge in both groups post care bundle and implementation of the educational program.

While conflicting with the findings of **Kearney et al. (2011)** who used different methods of preoperative education, including online and written education; their lack of standardization may explain why they did not reach significance.

As regards patients' practice, there was a statistical significant improvement in mean score of patients' practice pertaining wound care in study group than those in control group post program. This could be because patients needed enough instructions toward practices to improve their functional ability. This was supported by **Luo et al. (2019)** who revealed that application of exercise demonstrated potentially positive effects on patients' self-efficacy, self-care, quality of life, and levels of anxiety.

This study result reported that there was a statistical significant improvement in mean score of lower extremity functional ability among patients in study group than those in control group post program. This explained the impact of exercise program on improving functional ability of studied patients when performing activities of daily living. This matching with the finding of **Ali & Abo El-Fadl. (2021) and Mohammed et al. (2023)** who found that there was a positive effect of pre and postoperative nursing

intervention for patients undergoing hip replacement on improving functioning and daily living activities & as well as quality of life.

Similarly, with **Abd El-Naby et al., (2021)** who stated that there was a statistical significant difference between study and control groups regarding their functional status after nursing instructions. In the same line **El metwaly et. al. (2017)** revealed that the program had a positive effect on functional outcome.

This study findings contradicting with those of **McDonald et al. (2014)**, who found that preoperative education had a minimal benefit. In addition, an increase in ambulation distance and degrees of hip flexion. This may be due to using a systematic review; which was outdated and much has changed in hip since that time.

Concerning hip joint exercise, this study finding revealed that there was a statistical significant improvement of patients' ability in performing lying and standing exercises in study group than those in control group post program with highly statistical significant differences. This might indicate that doing exercise could improve pain which encourages the patients to perform activity of daily living. Also, it indicates that patients require continuous motivation to follow the recommendations of the performing exercises. This was supported by **Lee, et al. (2017)** who discovered that engaging in exercises following hip fracture surgery enhances movement, ADL, balance, strength, and performance. In the same line with **Ali & Abo El-Fadl. (2021)** who reported that there was a highly statistical significant improvement in hip ROM after program.

The present study finding revealed that there was a statistical significant decrease of complication for patients in study group than those in control group

post program. This could be due to that this rehabilitation program had a highly positive effect and it was an inexpensive way of providing patients with methods to manage their problems well. This result was in accordance with **Mohammed et al. (2023)** who found that pre and post postoperative nursing care had a positive impact on reducing patient's pain intensity and complications after hip replacement among study group than control group.

This study result illustrated that, there was there was a strong positive correlation between knowledge, practice, exercise, and LEFS post program, while there was a negative correlation between knowledge, practice and complication post program. This approved that rehabilitation program had a positive effect on improving knowledge, practice and functional ability, moreover reducing complications after total hip replacement surgery. This study finding was similar to those of **El Sayed et al. (2021)** who stated that a statistically significant positive correlation between total knowledge, total performance and total Hip disability and Osteoarthritis Outcome Score in the study group post program. Similarly, with **Ali and Abo El-Fadl (2021)** reported that there was a positive relation between ROM and patients' outcomes.

Conclusion:

The rehabilitation program had a positive effect on improving patients' knowledge and practice that reflected on improving their functional ability in performing activities of daily living.

Recommendations

- The initiation of a rehabilitation program should commence promptly

upon the patient's admission to the hospital.

- Rehabilitation program should be implemented on patients with THR in various settings for improving functional ability.
- A larger sample should be used to replicate the present study in order to generalize the findings and promote wider utilization of the rehabilitation program.

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No Conflict of interest.

Author contribution:

The first author shared in gathering of data, providing pre and posttest, applying the rehabilitation program to patients, taking part in the assortment of references and data analysis. The second author participated in designing data collection tools, preparation of tools and booklet, statistical analysis, comments on the result, references organizing, and administering the rehabilitation program.

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