Effect of Bio-psychosocial Health Model Based Educational Program on Patients' Needs Post Total Knee Arthroplasty

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Abstract:

Background: Total knee arthroplasty "TKA" is described among the most commonly performed surgical interventions in orthopedics worldwide. Post TKA, bio-psychosocial needs is considered a vital aspect of care as patients may experience intense disabling pain and psychosocial problems that may negatively influence recovery and outcomes **Aim:** To evaluate the effect of bio-psychosocial health model based educational program on patients' needs post total knee arthroplasty. **Design:** A quasi experimental (pre/posttest) research design was used to achieve the aim of this study. **Setting:** Orthopedics inpatient and outpatient departments at Benha University Hospital. **Sample:** A purposive sample of 66 adult patients. **Tools: Tool I:** Patients' interview questionnaire, it includes two parts; 1) socio-demographic characteristics of the studied patients, 2) patients' clinical data. **Tool II:** Postoperative bio-psychosocial needs assessment; it included three parts; (a)-WOMAC Index, (b)-Hospital Anxiety and Depression Scale, (c)-Social Dysfunction Rating Scale. **Results**: A statistically significant improvement was found between pre-educational program application and after as well follow up post educational program application regarding patient's total knowledge level. Also, there is a statistically significant difference between pre-educational program application and after as well follow up post educational program application among the studied patients regarding all domains of physical, psychological and social needs at P-value ≤ 0.05. **Conclusion:** Application of a bio-psychosocial health model based educational program had a significant statistical improvement effect on patients' knowledge and their bio-psychosocial needs. **Recommendations:** Similar studies are needed to assess the long-term effects of such health education models.

Keywords: Bio-psychosocial model**,** Educational program, Patients' needs, Total knee arthroplasty.

Introduction:

Total Knee Arthroplasty (TKA) or as called replacement (TKR) is a surgical replacement of the severely damaged knee joint with an artificial prosthesis **(Ullah, et al., 2023).** The most common indications of TKA are osteoarthritis (OA) that is thought to affect more than 300 million individuals worldwide. TKAs are among the most common inpatient surgical procedures and their number has increased along with the frequency of osteoarthritis **(Konnyu, et al., 2023).**

The goal of TKA is to reduce knee discomfort and enhance knee function. Nonetheless, TKA is one of the most effective surgical procedures, and while the majority of patients report less pain and better functioning, up to 20% report persistent pain, decreased functionality, and unhappiness after TKA **(Mahmoud, et al., 2024)**. Furthermore, surgical and implant factors are insufficient to fully explain these findings. Numerous studies have demonstrated that the post-operative state of patients is not just influenced by physical variables; surgical

treatment outcomes are also influenced by psychological and social aspects **(Olsen, 2024).**

It's critical to understand both physical and psychological demands to identify peoples who may have bad results. Understanding these demands would enable healthcare professionals to better prepare patients and help provide more assistance to help patients achieve successful health outcomes **(Zhang et al., 2024).**

The physical and psychological needs of individuals who have had total knee replacement should be carefully taken into account by medical personnel during all phases of post-operative rehabilitation. Bio-psychosocial health model based educational program highlights interdependence of these dimensions. By considering each person's distinct experiences, beliefs, and social environment, this holistic approach is crucial to fully comprehending and managing TKA patients **(Saleh, 2023).**

The International Council of Nurses (ICN) declares that the human needs guide the work of nursing. A nurses caring role embraces all facet of humanity of patients .This holistic approach to nursing care mean meeting the psychological and social needs of patients as well as their physical needs. The nurses have to ensure that bio-psychosocial needs are considered during assessment and when planning the care of their patients **(Abozead et al. 2022).**

In order to ensure a positive outcome and a speedy recovery for post-operative patients, nursing care is both essential and difficult. The quality of nursing care for post-operative patients is a fundamental responsibility of the nursing profession. The main responsibility of the nurses in caring for postoperative patients is to recognize the appropriate planning and implement adequate treatment **(Zulkafli, et al., 2022).**

The bio-psychosocial assessment for TKR enables the nurses to identify a variety of physical, psychological, and social problems that, with the right care, can significantly improve the patient's quality of life and surgical results **(Ibraheem, et al., 2023).**

Significance of the study:

Nowadays, most people agree that the best course of treatment for end-stage knee osteoarthritis is TKA **(Ullah, et al., 2023).** Over the last years, there is an increasing demand for primary total knee arthroplasty and the average number of total knee replacement procedures performed worldwide was between 175 and 149 procedures per 100,000 people **(Ghahramanian, et al., 2024).**

The orthopedic department at Benha University Hospital documented an admission number of patients for TKA of 70 & 80 in ٢٠٢٢ and ٢٠٢٣ **(Benha University Admission Office Census, ٢٠٢٣).** Despite the documented surgical success of TKR, A respected proportion of patients are dissatisfied from the surgical outcomes **(Zhang et al., 2024).**

Patients dissatisfaction may be referred to that TKA patient may experience intense pain, functional limitation, disability and psychosocial problems that may diminish their satisfaction. These poor outcomes indicate that patients' needs may be neglected or inadequately identified following knee arthroplasty **(Ribbons, et al., 2023).**

It is possible to use the bio-psychosocial framework to enhance patient care. In place of separate psychological or conventional rehabilitation, a bio-psychosocial approach combined with normal treatment may improve the overall result

following total knee replacement **(Bhatia, et al., 2020).**

Consequently, it is anticipated that the results of this investigation may promote nursing practice and research which help providing needed support and improve outcomes after surgery.

Aim of the study:

This study aimed to evaluate the effect of bio-psychosocial health model based educational program on patients' needs post total knee arthroplasty.

Operational definitions

Bio-psychosocial health model based educational program refers to a structured program designed to educate patients post TKA about managing their recovery. It incorporates physical, psychological, and social aspects through interactive sessions, written materials, and practical demonstrations to address patients' physical needs (pain, stiffness & physical limitation), psychological needs (anxiety & depression) and social needs (self-care, interpersonal relations & social performance) which help to improve their outcomes post-surgery.

Research Hypotheses:

The following hypotheses were developed in order to fulfill the study's objective:

H1: Knowledge score of studied patients with TKA could be significantly improved post application of the bio-psychosocial health model based educational program compared to before.

H2: Physical, psychological, and social needs' score of studied patients' with TKA could be significantly improved post application of bio-psychosocial health model based educational program compared to before.

Research design:

To achieve the goal of the current study, a quasi-experimental design (one-group pretest-posttest) was used. Quasi-experimental design investigates the effect of an intervention in its target population without random assignment **(Porche, 2022).**

Settings:

This study was carried out in orthopedic department and followed the patients through the orthopedic outpatient clinic at Benha University Hospital. The orthopedic department was composed of eight rooms containing thirty beds.

Subjects:

Sixty-six patients were included as a purposive sample based on retrospective statistic from both gender, their age above 40 years old and agreed to take part in the study. The sample size was calculated based on the admission of the calendar year 2023 in which there were 80 patients admitted for TKA in the previous mentioned setting.

Sample size was calculated based on Krejcie & Morgan formula that was adopted from **(Sharma, 2022)** as the following:

$$n = \frac{X^2 * N * P(1-P)}{e^2 * (N-1) + X^2 * P(1-P)}$$

Where: - sample size **(n)**, population size **(N)** = 80, (X^2) = 3.841 at 1 degree of freedom and 95% confidence level, (**P)** = proportion of participation (assumed to be 0.5) and (e) = acceptable margin of error = 0.05.

$$\mathbf{n} = \frac{3.841 \text{ X } 80 \text{ X } 0.5(1-0.5)}{0.05^2\ (80-1) + 3.841\ \text{X}\ 0.5(1-0.5)} = \mathbf{66}$$

Exclusion criteria:

Patients with critical conditions and mentally ill patient.

Preparation of the study tools:

It involved going over the recent present as well as past relevant literatures of various aspects of the study using books, papers, internet, journals and periodicals to create the tools for data collection and health education model.

Tools for data collection:

Data was collected using the following two tools:

Tool I: Structured interview questionnaire for patients: it was designed simply into Arabic by the researchers after reviewing the relevant literatures **(Sveinsdóttir, et al., 2021; Abozead, et al., 2022; De klerk, et al.; 2023 &Abdelall, et al., 2024).** It was consisted of two parts:

First Part: patients' personal data; it contained five questions and used to assess patients' personal data including age, gender, marital status, educational level and occupational status.

Second Part: patients' clinical data; it contained 12 questions and used to assess patients' past health history (3 questions) and present (5questions) health history, family history (2 questions) and personal habits (2 questions).

Third Part: patients' knowledge assessment.

This tool was used to assess patients' knowledge about TKA pre application, one month post and 3 months post application of bio-psychosocial health model based educational program. It consisted of 42 closed ended multiple choose questions.

Scoring System: each correct answer was given one mark and each incorrect /don't know answer was given zero. Knowledge score was summed and converted into percent while the total level of knowledge was considered **(Abozead, et al., 2022)**:

- **Poor** knowledge < 50% (<21).
- **Average** knowledge 50-<75% (21-31)
- **Good** knowledge ≥75% (31-42).

Tool II: Postoperative bio-psychosocial needs assessment; it included 3 parts;

Part (1):- The Western Ontario and McMaster Universities Osteoarthritis (WOMAC)Index**:** this tool was adopted from **(Tuamia, et al., 2020)** to assess physical needs for patients post TKA pre application, one month post and 3 months post application of bio-psychosocial health model based educational program. It was composed of 22 statements on scale ranges from "none" to "extreme". It was divided into three subscales that included the following:

- **Pain** "6 statements".
- **Stiffness** "2 statements".
- **Physical limitation**"14"statements".

The higher scores representing the worse pain, stiffness and physical limitation.

Scoring system:

The patient's responses for every statement were as follows: 0=none, 1= mild, 2=moderate, 3=severe and 4=extreme. The total scores of each domain were considered as the following.

Subscale	None	Mild	Moderate	Severe
Pain	0	1-6	7-12	≥13
Stiffness	0	1-2	3-4	≥5
Physical limitation	0	1-14	15-28	≥29
Total	0	1-22	23-44	≥45

Part (2):- Hospital Anxiety & Depression Scale: it was adopted from **(Zigmond and Snaith, 1983)** to assess patients psychological needs pre application, one month and 3 months post application of bio-psychosocial health model based educational program. It was composed of 14 statements on scale ranges from" never" to "most time".

Scoring system: The scores for the responses of positive statements were as follows: Most of time = 0, Sometimes = 1, Not more = 2, Never = 3. This score was reversed for negative statements, the higher scores indicating more psychological distress. The

total scores of were considered as the following;

- 0-14 No psychological distress.
- 15-21 Mild psychological distress
- 22-28 Moderate psychological distress
- 29-42 Severe psychological distress

3)-Social Dysfunction Rating Scale.

This scale was adopted from **(McDowell, 2006)** to assess patients' social needs pre application, one month post and 3 months post application of bio-psychosocial health education model. It was composed of 21 statements on scale ranges from "not present" to "very severe". The higher scores higher scores reflect greater social dysfunction.

Scoring system: The patient's responses for every statement were as follows: 0=none, 1= mild, 2=moderate, 3=severe and 4=extreme. The total score was considered as the following.

- 0-21 Normal or no social dysfunction
- 22-42 Low dysfunction
- 43-63 Moderate dysfunction
- 64-84 Severe dysfunction

Development of educational program regarding TKA:

This structured bio-psychosocial health model based educational program was designed by researchers and then reviewed by the panel of five experts in the department of medical surgical and mental health nursing. It was offered in simple Arabic language to meet the bio-psychosocial needs of patient post TKA. It was focused on raising their awareness about postoperative instructions and preventive measures of complications. This was done by addressing their physical, psychological and educational needs through an integrated health educational approach. Additionally, promoting improved functional outcomes, emotional resilience as well social reintegration. It was designed based on patient's assessment and after reviewing the most recent relevant literatures **(Li, et al., 2021; Sveinsdóttir, et al., 2021; Abozead, et al., 2022; Ribbons, et al., 2023, & Song, et al., 2024)** and approved by panel of experts. The construct of bio-psychosocial educational program was used as a guide in all educational sessions provided to patients.

Content validity:

The tools and the educational program were validated by a group of five experts in medical surgical nursing and mental health nursing, Benha Nursing Faculty. They expressed opinions about the tools' accuracy, consistency, layout, format, substance, and relevance. They believed that just slight changes were made.

Reliability:

The Cronbach's alpha test was used statistically to assess the proposed tool's reliability. Tool-I patient's knowledge assessment was acceptable reliable at 0.79, which is a model of internal consistency with normal range of 0 to 1 (value more than 0.5 acceptable reliability). WOMAC Osteoarthritis Index was reliable at 0.85, hospital anxiety and depression scale was reliable at 0.86 and social dysfunction rating scale was reliable at 0.88.

Ethical consideration:

The research approval was approved by Committee for Scientific Research and Ethics code REC-MSN-P60, Nursing Faculty, Benha University. An official permission obtained from Benha University Hospital's medical director and head nurse of orthopedic department at Benha University Hospital prior to the study's commencement.

Patients were informed of the study's purpose and given the assurance that any information will be maintained confidentiality, and it will be utilized

exclusively for research purposes. Written consent of participation in the study obtained from studied patients. Patients were made aware of their freedom to decide whether or not to take part in the study and their ability to leave at any moment without providing a reason.

Pilot study:

It was conducted on 10% of the participants (seven patients) after establishment of tools and before starting data collection to test feasibility, clarity, applicability and estimate the needed time for data collection. As there were no necessary modifications, all participants were involved in the total sample.

Field work:

The fieldwork took place across period of seven months began at the beginning of January, 2024 till the end of July, 2024. The study was carried out in four stages: assessment, planning, implementation and evaluation.

Assessment phase:

Once the patients' consent was obtained and written following an explanation of the study's objectives, the researcher conducted interviews with each patient individually to assess baseline data on personal data, medical data and knowledge assessment using tool I for studied patients pre-educational program implementation. Also, they were assessed for postoperative bio-psychosocial patients' needs post TKA using tool II as baseline data assessment.

Planning phase:

To create a plan for conducting the study, the researcher gathered information about the study setting. The researcher created the educational program based on data from the pilot study, patient evaluation, and current relevant literature.

This educational program was created with defiance's of patients' needs. The overall goal was to improve knowledge and physical, psychological, and social need post TKA. The form of educational program which was color printed and was supplemented by photos for more illustration to help patients to understand the content.

It was consisted of information about TKA, post-operative instructions, physical, psychological, and social need, for TKA patients and instructions on getting back to work and returning to usual activities. Moreover teaching material was prepared e.g. power point presentation, videos and printed handout was helped in covering the theoretical and all information.

Implementation phase:

1- Bio-psychosocial health model based educational program was applied in 5 sessions. Every session lasted roughly 45 minutes, with discussion periods based on the patients' input and progress.

2-The researchers went to the orthopedic department & outpatient's clinics three times a week in the morning and afternoon shifts to gather data for the study. Patients were evaluated both before and after application of bio-psychosocial health model based educational program (Tool I & Tool II).

3- During the sessions, a variety of teaching and learning techniques were employed using printed handout to improve understanding of bio-psychosocial health model based educational program for TKA patients.

4- Each patient who was enrolled in the study received an educational colored booklet to aid in review and to supplement instruction and to aid patients in understanding the contents.

5- Patients received orientation at the start of the first session about an educational program's objectives, contents, and effects on it on physical, psychological and social needs. At the end of the session, patients were told the time of the following session.

6- Every session began with summary of the previous session's topics and the goals of the current one. It concluded with a description of its contents and patient comments to make sure the patient received the most possible benefit.

In the first session, In addition to introducing herself, the researcher also provided an overview of the health educational model and its goals. Patients were informed about total knee arthroplasty as the anatomy of the knee, definition TKA and its indications and pre-operative preparation.

In the second session, Patients were given information about contraindications, complications and preventive measures of complications of TKA.

During the third session, physical needs related content was educated. Patients was trained on muscle strength exercises, proper positions during sitting, standing, walking, using stairs, dressing and showering. Also, patients were educated about pharmacological and non-pharmacological measures of pain management.

During fourth session, psychological needs related content was included. Patients were trained on coping strategies (positive confrontation, problem solving, acceptance and hope, cognitive, emotional scientific support and restore to religion, behavioral disengagement and venting) and relaxation techniques (massage, listening to music and yoga exercises and breathing exercise) and resilience skills.

During fifth session, social needs related content was included. Patients were trained on effective communication with family and caregiver and educated about enhancing social support network. Patients were educated about discharge instructions and engagement in activities, wound care, diet and returning to work, driving cars and follow up visits.

Evaluation phase:

Following bio-psychosocial health model based educational program, the researcher had an interview with total knee arthroplasty patients separately and assessed them with the same pre-test instruments (tool I, part 3) postoperative bio-psychosocial needs assessment, tool (II) then compare the follow-up after one and three months with baseline assessment. At the completion of the study, a comparison of all patients' pre-test and post-test results was conducted after 1st and 3rd months to ascertain the impact of a bio-psychosocial health educational model on patients' physical, psychological and social needs post TKA.

Statistical analysis:

Results were collected, statistically analyzed and tabulated using statistical package of social science (SPSS) version 27 and Microsoft Excel version 2010. Quantitative data were presented as mean and standard deviation (SD) while qualitative data were expressed as frequency and percentage.

Chi-Square independency test was used to test the significance between qualitative variables. Moreover, Friedman test was used to compare the difference between three or more matched measurements. Student T-test was used for testing the significance of relation between two independent groups while ANOVA test was used to test the significance of relation between more than two independent groups.

Spearmen correlation coefficient (r) was used to evaluate the Strength and

direction of correlation between two continuous variables.

The observed statistical differences were considered:

Non-significant (NS) if P-value > 0.05.

Significant (NS) if ≤0.05.

Results:

Table (1) demonstrates that, 91.6 % of patients under study were in age group > 50-60 years with mean age 59.09±3.66 and 70.9% of them were females. Also, 79.1% of them were married and 45.9% of them had secondary education and 33.4% of them were housewife.

Table (2) represents that, knee pain was the main compliant among 95.8% of the studied patients and onset of complaint was >5-10 year among 47.9% of them. Knee osteoarthritis was the surgical indication among 85.4% of them and 68.7% of them had comorbidities where HTN and DM were the most common among 58.3% and 47.9% of them respectively. 58.4% of the studied patients had history of previous knee surgeries while 52.1% of them had no family history of arthritis and 79.1% of them had no family history of TKA surgery. 77.1% of them were nonsmokers.

Figure (3) shows that, there were significant statistical differences between pre-educational program application and after as well follow up post educational program application among the studied patients regarding all items of the overall knowledge about TKA at P-value ≤ 0.05. Also, there was an enhancement in total level of knowledge about TKA after and follow up post educational program application among patients under study.

Table (3) indicates that, there were significant statistical differences between pre-educational program application and after as well follow up post educational program application among the studied patients regarding all domains of physical needs at P-value ≤ 0.05.

According to Table (4), there were statistically significant differences between pre- educational program application and after as well follow up post program application among studied patients regarding their total level of psychological and social needs at P-value ≤ 0.05.

Table (5) illustrates that, pre-educational program application, A statistically significant relation was found between total level of pain among the participants under study and their age, educational level and occupation at P-value=0.005, 0.036 and 0.022 respectively. While, there was no significant statistical relation between total level of pain among the studied patients and their gender, marital status and residence at P-value=0.382, 0.092 and 0.212 respectively. While post-program, No statistically significant relation was found between total level of pain among participants under study and their demographic characteristics at P-value > 0.05 except occupation which was significantly related

Table (6) shows that pre and post-educational program, there was no statistically significant relation between total level of pain among studied patients and their duration of knee osteoarthritis, chronic disease, and practicing physical activities at P-value > 0.05.

According to Table (7), there was a significant statistical positive correlation between total level of pain and total level of stiffness pre and post educational program application at P-value=0.004 and 0.027 respectively. Additionally, there was a significant statistical positive correlation between total level of pain and total level of physical limitation pre and post educational

program application at P-value=0.041 and 0.035 respectively. Moreover, there was a significant statistical positive correlation between total level of stiffness and total level of physical limitation pre and post educational program application at P-value=0.000.

Table (8) indicates that, there was a significant statistical positive correlation between total level of physical needs and total level of psychological needs pre and post educational program application at P-value=0.049 and 0.016 respectively. Additionally, a statistically significant positive correlation was found between total level of physical needs and total level of social needs pre and post educational program application at P-value=0.036 and 0.011 respectively.

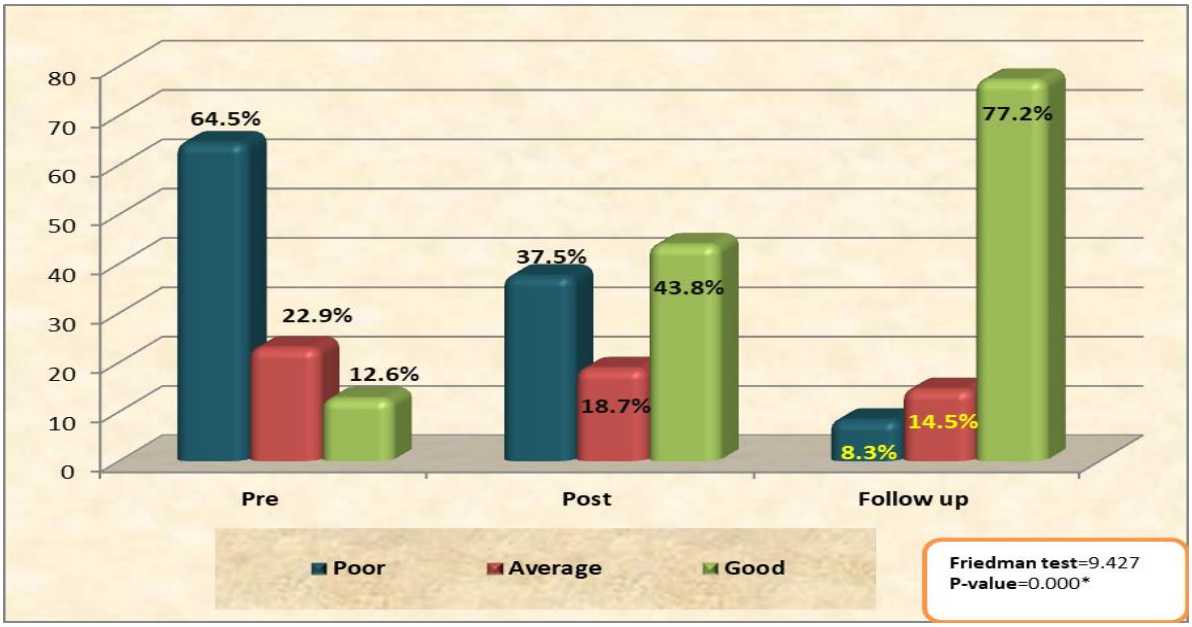
Additionally, there was a significant statistical positive correlation between total level of psychological needs and total level of social needs pre and post educational program application at P-value=0.007 and 0.029 respectively.

Table (1): Frequency and percentage distribution of personal data of patients under study (n=66).

Socio-demographic	N	%
Age		
<50 years	6	8.4
> 50-60 years	60	**91.6**
Mean ±SD	59.09±3.66	
Gender		
Male	19	29.1
Female	**47**	**70.9**
Marital status		
Married	**52**	**79.1**
Unmarried	14	20.9
Educational level		
Not read/write	8	12.5
Read and write	15	22.9
Secondary	**30**	**45.9**
University	12	18.7
Occupational status		
Office work	10	14.5
Technical work	15	22.9
House wife	**22**	**33.4**
Retirement	19	29.2

Table 2: Frequency and percentage distribution of patients clinical data (n=66).

Clinical data	(N)	(%)
The main complaint (during hospital admission)		
Knee pain	63	95.8
Knee stiffness	44	66.6
Others	15	22.9
Onset of complaint		
<1 year	6	8.4
1-5 year	15	22.9
>5-10 year	32	**47.9**
>10 year	14	20.8
The surgical indication (according to patient s diagnosis)		
Knee osteoarthritis	56	**85.4**
Knee rheumatoid arthritis	3	4.2
Others (trauma, tumor, fractured knee)	7	10.4
Comorbidities		
Yes	45	**68.7**
None	21	31.3
If yes (n=45)		
Hypertension	38	**58.3**
Diabetes mellitus	32	**47.9**
Kidney diseases	1	2.1
Liver diseases	3	4.2
Heart diseases	5	8.3
History of previous knee surgeries		
Yes	39	**58.4**
No	27	41.6
Family history of arthritis		
Yes	32	47.9
No	34	**52.1**
Family history of TKA surgery		
Yes	14	20.8
No	52	**79.1**
Smoking		
Yes	15	22.9
No	51	**77.1**



Friedman test: comparing between the three studied periods *P-value ≤ 0.05= Significant (S)

Figure (1): Comparison of studied patients according to their total level of knowledge about TKA pre and post educational program application (n=66)

Table (3): Comparison of the studied patients according to their total level of physical needs domains pre and post educational program application (n=66).

Physical needs	Level	Pre educational program		Post educational program		Follow up		Friedman test	P-value
		N	%	N	%	N	%		
Pain	None	0	0.0	5	3.3	43	28.7	6.174	**0.000***
	Mild	3	2.3	83	54.6	94	62.2		
	Moderate	55	36.4	33	22.1	14	9.1		
	Severe	93	61.3	30	20.0	0	0.0		
Stiffness	None	0	0.0	14	9.1	30	19.7	5.164	**0.000***
	Mild	15	10	55	36.4	57	37.9		
	Moderate	59	38.8	32	21.2	48	31.8		
	Severe	77	51.1	50	33.3	16	10.6		
Difficulty during activities	None	0	0.0	10	6.3	45	29.4	7.907	**0.000***
	Mild	7	4.3	27	17.8	69	45.3		
	Moderate	42	27.5	67	44.1	34	22.6		
	Severe	103	68.2	48	31.8	4	2.7		
Total physical needs	None	0	0.0	25	16.5	49	32.3	8.600	**0.000***
	Mild	31	20.5	53	35.2	60	39.4		
	Moderate	37	24.2	38	25.2	19	12.7		
	High	84	55.3	35	23.1	24	15.6		

Friedman test: comparing between the three studied periods *P-value ≤ 0.05= Significant (S)

Table (4): Comparison of the studied patients according to their total level of psychosocial needs domains pre and post educational program application (n=66).

Psychosocial needs	Level	Pre educational program		Post educational program		Follow up		Friedman test	P-value
		N	%	N	%	N	%		
Total psychological distress	None	3	4.5	21	31.8	42	63.6	8.327	**0.000**
	Mild	10	15.2	25	37.9	17	25.8		
	Moderate	21	31.8	9	13.6	6	9.1		
	Severe	32	48.5	11	16.7	1	1.5		
Total level of social dysfunction	None	9	13.6	25	37.9	51	77.3	5.005	**0.000**
	Low	15	22.7	29	43.9	11	16.7		
	Moderate	32	48.5	10	15.2	4	6.1		
	Severe	10	15.2	2	3.0	0	0.0		

Friedman test: Comparing between the three studied periods ***P-value ≤ 0.05= Significant (S)**

Table (5): Relationship between personal data of the studied patients and their total level of pain pre and post educational program application (n=66).

Socio- demographic characteristics		Total level of pain							
		Pre-educational program		F Test	P-value	Post-educational program		F Test	P-value
		Mean	SD			Mean	SD		
Age (in years)	41-50 years	12.46	3.25	4.723	**0.005***	10.33	3.21	1.041	0.381 (NS)
	> 50-60 years	13.98	2.37			11.31	4.19		
	> 60 years	17.00	2.60			11.67	2.96		
Gender	Male	14.55	2.33	0.880	0.382 (NS)	10.36	3.80	0.066	0.948 (NS)
	Female	13.73	2.89			10.29	3.57		
Marital status	Married	13.20	2.70	3.347	0.092 (NS)	9.90	3.69	0.927	0.433 (NS)
	Unmarried	15.91	2.25			10.18	2.40		
Educational level	Not read/write	13.00	2.53	3.034	**0.036***	8.83	3.60	0.823	0.486 (NS)
	Read and write	14.53	2.26			9.67	3.53		
	Secondary education	14.69	2.36			10.58	2.36		
	University education	12.47	3.37			10.89	4.17		
Occupation	Office work	14.30	2.37	2.334	**0.022***	9.76	3.26	0.612	**0.053***
	Technical work	12.59	3.18			10.71	4.05		
	House wife	13.85	3.02			11.08	2.81		
	Retirement	16.33	2.08			10.67	2.57		

student T-test was used **F= ANOVA Test** **P-value > 0.05=** Non-significant (NS)
***P-value ≤ 0.05= Significant (S)**

Table (6): Relationship between health history of the studied patients and their total level of pain pre and post educational program application (n=66).

Health history		Total level of pain							
		Pre-educational program		F Test	P-value	Post- educational program		F Test	P-value
		Mean	SD			Mean	SD		
Duration of knee osteoarthritis	1-<5	13.40	2.84	2.213	0.095 (NS)	10.00	3.41	0.717	0.754 (NS)
	5-<10	15.70	2.11			10.90	3.69		
	10-<15	14.00	2.00			10.83	1.94		
	≥15	15.50	4.95			13.00	2.82		
Surgical indication	Knee osteoarthritis	14.80	3.63	8.344	0.597 (NS)	10.40	2.30	0.063	0.939 (NS)
	Knee rheumatoid arthritis	14.60	3.43			10.80	3.11		
	Others (trauma, tumor, fractured knee)	13.71	251			10.25	3.46		
Chronic disease	Yes	13.91	3.04	0.184	0.854 (NS)	10.70	3.33	1.394	0.168 (NS)
	No	13.77	2.32			9.50	3.24		
Practicing physical activities	Yes	12.20	1.92	1.386	0.171 (NS)	9.00	2.91	0.908	0.367 (NS)
	No	14.00	2.84			10.41	3.36		
Smoking	Yes	13.90	2.81	0.833	0.719 (NS)	10.36	3.47	0.385	0.702 (NS)
	No	13.50	2.97			9.88	2.16		

Student T-test was used F= ANOVA Test P-value > 0.05= Non-significant (NS) *P-value ≤ 0.05= Significant (S)

Table (7): Correlation between domains of patient's physical needs pre and post educational program application (n=66)

Items		Pain		Stiffness	
		r	p-value	r	p-value
Stiffness	Pre	0.546	**0.004***		
	Post	0.480	**0.027***		
Physical functions Limitation	Pre	0.830	**0.041***	0.667	**0.000***
	Post	0.567	**0.035***	0.653	**0.000***

r= Spearman correlation coefficient **P-value > 0.05= Non-significant (NS) *P-value ≤ 0.05= Significant (S)**

Table (8): Correlation between patient's physical, psychological and social needs pre and post educational program application (n=66)

Items		Psychological needs		Social needs	
		r	p-value	r	p-value
Physical needs	Pre	0.685	**0.049***	0.685	**0.036***
	Post	0.616	**0.016***	0.616	**0.011***
Psychological needs	Pre			0.521	**0.007***
	Post			0.498	**0.029***

r= Spearman correlation coefficient ***P-value ≤ 0.05= Significant**

Discussion:

Although the goal of total knee arthroplasty (TKA) is to reduce pain and enhance knee function, some patients continue to have discomfort and decreased function after TKA, which cannot be attributed to implant or surgical variables. Therefore, other psychological and social factors could affect TKA results **(Yau, et al., 2022).** The goal of this prospective research was to evaluate the effect of bio-psychosocial health model based educational program on patients' needs post total knee arthroplasty.

In reference to the personal data, the current study findings showed that most of studied patients were in age group > 50-60 years with mean age 59.09±3.66 years and more than two thirds of them were females. Also, more than three quarters of them were married and more than two fifths of them had secondary education. One third of them were housewife.

This result agreed with **Ghahramanian, et al., (2024)** who conducted research "The Effect of Empowerment Program on the pain control and self-efficacy in patients under total knee arthroplasty in Iran" and reported that patients were mostly women, married, and housewives, with a mean age 58.09±3.66 years. Also, **Mohammed et al. (2022)** studied "Effect of Application Cold Compresses on Range of Motion, Activity Daily Living and Pain Control among Patients with Total Knee Replacement" and found that majority of participants was secondary school.

Additionally, **Mahmoud, et al., (2024)** who studied "Efficacy of Preoperative Nursing Education with Kinesio Taping Application on Functional Outcomes of Patients Undergoing Total Knee Arthroplasty" reported that mean ages of patients 59.55±6.61 and all patients were residing with others. However, **Ali et al. (2020)** in a study termed "The effect of implementing intervention protocol on self-efficacy of patients' post knee joint replacement" found that over three-quarters of patients were occupied and graduated from university.

Regarding the clinical data, the results of the present study demonstrated that knee pain was the primary compliant among most of the studied patients and onset of complaint was >5-10 year among near to half of them. Knee osteoarthritis was the surgical indication among majority of them and two thirds of them had comorbidities where HTN and DM were the most common among more than half and near to half of them respectively. Also, more over half of the participants in the study had history of previous knee surgeries and more than three quarters of them were nonsmokers.

This findings was in line with **Ali et al. (2020),** who found that about half of participants had Chronic osteoarthritis more

than three quarters of patients had history of chronic disease while had no family history of TKA surgery. **Also, Taha and Ibrahimet (2021)** studied " Effect of educational program on nurses' knowledge, practices and patients' outcomes post total knee arthroplasty " and found that complaint that began more than ten years ago most of patients and knee osteoarthritis was one of the reasons they needed surgery among majority of them as well as majority of them were nonsmokers. Moreover, **Al Thaher et al. (2024)** in a study termed "Health-related quality of life and outcome after total knee replacement" reported that more than half of candidates had history of previous TKR surgeries.

While, this study was contradicted with **Mohammed et al., (2022)** who discovered that the highest percentages of candidates had rheumatoid arthritis as their diagnosis and had no other long-term medical conditions.

Regarding the total level of knowledge, the results of the current study demonstrated that there were significant statistical differences between pre-educational program application and after as well follow up post educational program application among the studied patients regarding all items of knowledge about TKA.

This is in line with a research carried out by **Ali et al. (2020),** who discovered that the patients' significantly different overall mean knowledge scores following application of the intervention compared to before. This is supported with **Abozead et al. (2022),** in a study entitled "Effect of nursing instructions on total knee replacement patient's knowledge" who found that following nursing instruction for total knee replacement surgery, majority of participants had good knowledge scores.

This finding agreed with **Mahmoud, et al., (2024)** who established a significant statistical improvement in the studied patient's total mean scores for knowledge immediately after the educational intervention and two months later compared to pre-educational intervention.

Regarding effect of bio-psychosocial health model based educational program on patients' physical, psychological and social needs post total knee arthroplasty, The results of the current investigation demonstrated that there were significant statistical differences between pre-educational program application and after as well follow up post educational program application among the studied patients regarding all domains of physical and psychosocial needs at P-value ≤ 0.05.

This result was consistent with **Bhatia, et al., (2020)** that studied "The effect of bio psychosocial model of rehabilitation on pain and quality of life after total knee replacement" and reported that bio psychosocial model of rehabilitation was successful in enhancing function, pain, and quality of life after TKR. Also, **Ali et al. (2020)** found a significant difference between before and after interventions regarding social functioning post knee joint replacement.

This finding supported with **Kim, et al., (2023)** who found that the educational interventions were effective in improving pain and functional limitation. Also, this results was agreed with **Özbaş, et al., (2023)** who found that educational intervention have a positive impact on patients' quality of life, postoperative issues, and functionality during TKR.

In addition, **Jones et al. (2022)** in a study termed "The effect of preoperative education prior to hip or knee arthroplasty on immediate postoperative outcomes" found a statistically

significant difference in the outcomes following TKA among patients who participated in an instructional session as opposed to those who did not and concluded that patient education is effective in improving functional outcomes.

Furthermore, **Ho et al. (2022)** in a study entitled "The Effects of a patient-specific integrated education program on pain, perioperative anxiety, and functional recovery following total knee replacement" reported that the intervention group, which was exposed to the integrated education program, had an average WOMAC score that was considerably higher than that of the control group, which was not exposed, when using the WOMAC scale to evaluate the functional outcomes following TKA.

Regarding relations and correlation among the studied variable, the results of the present study demonstrated a significant statistical relation between total level of WOMAC among the patients under study and their age and occupation.

This finding was agreed with **Pilc, et al. (202٤)** who found significant association between age, employment of patients and their physical limitations after TJA. On the other hand, **Mohammed et al. (2022)** found sociodemographic characteristics and level of pain do not significantly correlate and non-significant correlation between certain daily living activities and medical characteristics.

The current study findings demonstrated a significant statistical relation between total level of WOMAC among the studied patients duration of knee osteoarthritis and stage of knee osteoarthritis and practicing physical activities. This finding was contradicted with **Mohammed et al. (2022)** who found non-significant association between medical characteristics and activity of daily living

The current findings showed a significant statistical positive correlation between total levels of physical needs and psychological needs pre and post educational program application. This finding could be explained by the interconnected nature of physical and psychological needs, where improving patients' understanding of their condition and reducing their misconceptions, anxiety and fears could help them better manage physical needs, creating an improvement.

This finding supported with **Belford, et al., (2020)** who studied "Psychosocial predictors of outcomes up to one year following total knee arthroplasty" and found that psychosocial factors are significantly associated with worse pain, stiffness and physical functioning at one year following TKA.

This finding was consistent with **Giusti, et al., (2021)** who stated psychological factors had a significant association with chronic postsurgical pain. This finding agreed with **Greory, et al., (2021)** who studied "The impact of psychological factors and their treatment on the results of total knee arthroplasty" and found that less satisfied psychological needs likely present risk factors for poor outcomes in TKA patients.

This result was in the same line with **Nishimoto, et al., (2023)** who examined "Effects of Combined Exercise and Psychological Interventions on Psychological Factors after Total Knee Arthroplasty" and found that psychological factors have an effect on chronic pain and physical function post TKA.

The current results showed a significant statistical positive correlation between total levels of physical needs and total level of social needs before and after educational program application. This finding could be attributed to that addressing physical needs

effectively help reducing sense of social isolation and facilitate better interaction with their social environment, and strength their correlation and Finally, emphasizing the effectiveness of the holistic bio-psychosocial Model.

This finding was in the same line with **Marcos, et al., (2024)** who studied "Psychosocial Interventions to Reduce Post-operative Pain in Total Knee Arthroplasty" and found that psychosocial interventions as patient education and relaxation techniques had a significant effect on reducing post-TKA pain. This finding was congruent with **Ribbons, et al., (2023)** who stated patients' social support has a significant impact on physical and psychological well-being.

Conclusion:

There were significant statistical differences between pre-educational program application and after as well follow up post educational program application among the studied patients regarding all items of the overall knowledge about TKA. Also, there were significant statistical differences between pre- educational program application and after as well follow up post educational program application among the studied patients regarding all domains of physical needs and psychosocial needs.

Recommendations:

- Replication of the current study using a larger probability sample from different geographical regions for generalization of results.
- Similar studies are needed to assess the long-term effects of such health education models.
- Training courses should be provided to nurses to increase their knowledge and skills for assessing of bio psychosocial patients' needs about TKA surgery.
- Distribute the educational booklet for all patients with TKA to improve the knowledge and satisfying their bio psychosocial needs.

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تأثير برنامج تعليمي قائم على نموذج الصحة الجسمانية النفسية الإجتماعية على إحتياجات المرضى بعد جراحة الإستبدال الكلى لمفصل الركبة

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تُعد عملية الاستبدال الكلى لمفصل الركبة واحدة من العمليات الجراحية الأكثر شيوعًا في جراحة العظام على مستوى العالم. تُعتبر الاحتياجات الجسمانية النفسية الاجتماعية جانبًا حيويًا من الرعاية، حيث قد يعاني المرضى من آلام شديدة ومشاكل نفسية اجتماعية قد تؤثر سلبًا على التعافي والنتائج. لذا فإن هذه الدراسة هدفت إلى تقييم تأثير برنامج تعليمي قائم على نموذج الصحة الجسمانية النفسية الاجتماعية على احتياجات المرضى بعد جراحة الاستبدال الكلى لمفصل الركبة. وقد تم استخدام تصميم البحث شبه تجريبي لتحقيق هدف الدراسة. وقد أجريت هذه الدراسة فى قسم جراحة العظام والعيادات الخارجية في مستشفى بنها الجامعى. وتم إختيار عينة غرضية تتكون من ٦٦ مريضًا بالغًا. الأدوات: الأداة الأولى: استبيان مقابلة المرضى، ويتضمن جزأين؛ ١) الخصائص الاجتماعية والديموغرافية للمرضى المشاركين في الدراسة، ٢) البيانات السريرية للمرضى. الأداة الثانية: تقييم الاحتياجات الجسمانية النفسية الاجتماعية بعد الجراحة، وتضم ثلاثة أجزاء؛ (أ) مؤشر WOMAC، (ب) مقياس القلق والاكتئاب بالمستشفيات، (ج) مقياس تقييم الاضطراب الاجتماعي. وقد استنتجت الدراسة أنة وُجد تحسن ذو دلالة إحصائية بعد تطبيق البرنامج التعليمي فيما يتعلق بالمستوى الكلي لمعرفة المرضى والاحتياجات الجسمانية والنفسية والاجتماعية. فقد كان لتطبيق برنامج تعليمي قائم على نموذج الصحة الجسمانية النفسية الاجتماعية تأثير إيجابي على معرفة المرضى واحتياجاتهم الجسمانية النفسية الإجتماعية. وقد أوصت الدراسة أن هناك حاجة لإجراء دراسات مماثلة لتقييم الآثار طويلة المدى لهذه النماذج التعليمية الصحية.