

Assessment for Nurses' Practices Regarding Pre and Postoperative Care for Patients with Total Knee Arthroplasty

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Abstract: Background: Total knee arthroplasty (TKA) is one of the most clinically successful and cost-effective medical procedures developed during the mid of last century, and usually used to treat chronic refractory knee pain and loss of movement because of various underlying knee problems, **Purpose:** to assess nurses' practices related to pre and postoperative care of patient with total knee arthroplasty, **Design:** A descriptive research design was used in the study. Setting: The present study was carried out at Orthopedic Departments affiliated to the Suez Canal University Hospitals, **Sample:** All available staff nurses (80 nurses) were included in the study, **Instruments:** Nurses' Practices Observational Checklist specifically designed for the care of patients undergoing total knee arthroplasty, **Results:** The findings of the study indicated that a significant proportion, specifically 73.8% of the nurses, demonstrated an incompetent level of total practices concerning the care of patients undergoing TKA., **Conclusion:** Based on the results of the current study, the majority of studied nurses had an incompetent level of practices regarding pre and postoperative care of patient with TKA, This outcome raises concerns about the adequacy of nursing practices in the pre and postoperative care of TKA patients within the studied setting, As an incompetent practices could potentially impact patient outcomes, recovery, and overall satisfaction with the healthcare provided. **Recommendations:** Educational programs and educational guidelines about standardized protocol of pre and postoperative nursing care for patients with total knee arthroplasty should be prepared and conducted. Further investigation and intervention may be necessary to address the identified gaps in nursing practices, potentially through targeted training programs, continuing education, or the implementation of evidence-based guidelines. Improving the competency of nursing practices in TKA care is crucial to ensuring the optimal well-being and recovery of patients undergoing this procedure, ultimately contributing to the continued success of TKA as a medical intervention.

Key words: *Knee Arthroplasty. Nurses' practices, Pre and postoperative care.*

*Assessment for Nurses' Practices Regarding Pre and Postoperative Care for
Patients with Total Knee Arthroplasty*

Introduction

Total knee arthroplasty is one of the most clinically successful and cost-effective medical procedures developed during the last middle century (Feng et al., 2018). Many patients with musculoskeletal dysfunction undergo surgery to correct the condition. Conditions that may be corrected by surgery include unsterilized fracture, deformity, joint disease, necrotic or infected tissue, and tumors. Moreover conditions undergo joint replacement include severe joint pain, disability, and conditions contributing to joint degeneration include osteoarthritis, rheumatoid arthritis, trauma, and congenital deformity. (Khan et al., 2021)

A total knee arthroplasty is a cartilage replacement with an artificial surface. The knee itself is not replaced, an artificial substitute for the cartilage is inserted onto the end of each of the bones, and this is done with a metal alloy on the end of the femur and tibia, with a medical-quality plastic inserted between them. The cartilage on the undersurface of the kneecap also can be replaced with plastic. (Schwartz et al., 2019).

Indications for total knee arthroplasty are based on the patient's age, underlying orthopedic condition, and general physical health and the impact of joint disability on daily activities. Timing of these procedures is important to ensure maximum function. In general, surgery should be performed before surrounding muscles become contracted; atrophied and serious structural abnormalities occur (Khan et al., 2021).

Preoperative assessment and nursing care are aimed to promote patient's optimal health at the time of surgery through continuous evaluation of cardiovascular, respiratory, renal, and hepatic functions. Also, it is important to assess the neurovascular status of the extremity undergoing joint replacement and evaluate preoperative leg edema, a history of any venous thromboembolism, and varicose veins that increase the risk for postoperative deep venous thrombosis (DVT) and pulmonary embolism. Finally postoperative assessment data are compared with preoperative assessment data to identify changes and deficits (Olotu et al., 2019).

Nurses play a vital role for the care of patients from the time they are scheduled for surgery, guiding the patient through the pre-admission process and educating the patient about what to expect during their hospital stay and recovery process, that will help the patient recover safely and quickly, managing pain, initiating mobilization, and following recommendations for preventing postoperative complications (Kang et al., 2018).

Significance of the study:

Total Knee Arthroplasty involves many more ambulatory procedures than ever before that are new to nursing and other health care staff, therefore there is a need to assess the level of nurses' practices regarding pre and postoperative care of patient with TKA and to determine the level of defect that definitely affect patient

*Assessment for Nurses' Practices Regarding Pre and Postoperative Care for
Patients with Total Knee Arthroplasty*

prognosis and outcomes, in order to direct nursing authorities in future nurse training and education plans. The study also emphasizes the post-operative complications and health problems, which are reflected in decreasing mortality and morbidity rates.

Purpose:

Assess nurses' practices regarding pre and postoperative care of patient with total knee arthroplasty.

Research Question:

What is the level of nurses' practices regarding pre and post operative care of patients with total knee arthroplasty?

Method:

Design:

A descriptive research design was used in the study.

Setting:

The present study was carried out at orthopedic departments affiliated to the Suez Canal University Hospitals.

Sampling:

All available staff nurses (80 nurses) who working at the previously mentioned setting. A convenient sample was used in this study according to the following equation: $N = (Z \alpha/2)^2 * P (1-P) / d^2$. Where (N= sample size. $Z \alpha/2$ = is the statistic corresponding to level of confidence (1.96). d = is precision (corresponding to effect size) (0.1). P is expected prevalence (25%) (Aldakheel et al., 2021).

Instruments:

Nurses Observational checklist: it is adopted by the researchers from Healy et al., (2016), Lynn & LeBon, (2018), Perry & Potter, (2019), Dougherty & Lister, (2015), Foran, (2017), and Hess & Pederson, (2017), it includes three parts: nurses profile , preoperative observational checklists , and postoperative observational checklists used as a monitoring and an evaluative instrument for nurse's performance related to protocol of care for patient with TKA..

- **Part (1): Nurses profile.** It contains demographic and work-related data of studied nurses such as age, level of education, years of experience in orthopedic departments, and previous training program related to knee replacement patient care.
- **Part (2): Preoperative practices observational checklist:** It is used to assess the studied nurses' practices regarding preoperative physical examination, preoperative patient preparation,
- **Part (3): Postoperative practices observational checklist:** it is used to assess studied nurses' practices related to immediate and ongoing postoperative care, fall prevention measures, application of cold therapy, transferring patient from the bed to a chair, range of motion exercises, application of continuous passive motion machine, and wound care.

Scoring system:

The total score of the nursing practices ranged from 0 to 143 degrees. The possible choice for each item was done

*Assessment for Nurses' Practices Regarding Pre and Postoperative Care for
Patients with Total Knee Arthroplasty*

and not done or incorrect; each nurse was given one score for step done and zero for that was not done or incorrect. A total score of less than 70% was considered an incompetent level of practice, and the total score of 70% or more was considered a competent level of practice (Bakr Abo El-Ata et al., 2019).

Validity:

Content validity (or logical validity) was performed to measure the extent to which the tools represent all facets of the social psychometrics construction. The method of measuring content validity was performed by gauging agreement among raters/judges regarding how essential of a particular item of the tools is. Each of the subject matter expert raters (SMEs) on the judging panel respond to the following question for each item: "Is the practice measured by this item 'essential,' 'useful, but not essential,' or 'not necessary' to the performance of the construct?" If more than half the panelists indicate that an item is essential, that item has content validity. Greater levels of content validity exist as larger numbers of panelists agree that a particular item is essential

Reliability:

Reliability was tested by using Cronbach alpha coefficient to assess the internal consistency of the instrument value ($\alpha=0.86$).

Pilot study

Instruments of data collection were tested on ten percent of subjects (8 nurses) and they were excluded from the entire sample of research study.

The purpose of the pilot study is to test the applicability of study instruments and to estimate the time needed to fill it. The results of the data obtained from the pilot study helped the researcher to modify the instruments: items were corrected or added as needed. Accordingly, modifications were done and the final form was developed

Procedure:

A letter was submitted from the Dean of the Faculty of Nursing, Suez Canal University to the director of Suez Canal University hospital explaining the purpose and methods of data collection.

The purpose of the study was explained briefly by the researcher to nurses who were willing to participate. The actual data collection was carried out over a period of six months, starting from the 1st of December 2021 to end of May 2022. The researcher observed the studied nurses directly during nursing care of patients with total knee arthroplasty. Data collection was conducted through the following:

Assessment phase: -

Assessment of nurses' practices regarding pre and postoperative care of patient with total knee arthroplasty. Based on the previous completed work, the researchers designed the instrument based on the actual need assessment of studied nurses through reviewing the literature reviews and based on recent evidence-based protocol for caring of patient with total knee arthroplasty, which cover the theoretical and practical skills related total knee

*Assessment for Nurses' Practices Regarding Pre and Postoperative Care for
Patients with Total Knee Arthroplasty*

arthroplasty nursing care in orthopedic units.

Once objectives were developed, the researchers interview each member of the nursing team, and provide an introduction to the nature of the study, which focused on clarifying the purpose of the study and emphasizing on ensuring privacy and safety, and ensuring the confidentiality of information. After that, the nurse asked to fill out a questionnaire and then the researchers observed and recorded nursing care practices and skills related to pre and postoperative care of patient with total knee arthroplasty. Data collected by the researchers at three days per week for six months during the morning, afternoon, and night shift.

Ethical considerations:

This study was approved by Research Ethics Committee, faculty of Nursing, Suez Canal University with a code number (119.8/ 2021). Before the initial interview, a written consent was obtained from each nurse prior to participation in the study after simple explanation of the purpose and the expected outcomes. The researcher assured nurses regarding the voluntary participation or withdrawal, anonymity and confidentiality of the information.

Statistical design:

Upon the completion of data collection, the gathered data were organized and coded prior to computer entry. Statistical package for social sciences (SPSS version 23) software was used mean and chi-squares were

used for analysis. Significance of results: When $P < 0.05$, there is a statistically significant difference. When $P < 0.01$, there is a highly statistically significant difference.

Results

Table 1:- shows that 43.8% of studied nurses' ages were between 25 to less than 30 years with mean age 26.71 ± 4.26 , while 61.3% of studied nurses were females, and 57.5% of studied nurses had technical degree. Also 51.3 of the studied nurses had less than 3 years of experience in orthopedic unit. Moreover, Figure 1 shows that 97.5% of studied nurses did not attend courses related to total knee arthroplasty patient care.

Figure (1): Revealed that, 97.5% of studied nurses did not attend courses regarding total knee arthroplasty patient care while, only 2.5% of studied nurses who attended courses regarding total knee arthroplasty patient care.

Table 2:- illustrates the mean score of the total nurses' practice (91.38 ± 12.04). Also,

figure 2:- reveals that 73.8% of nurses had an incompetent level of practice, while only 26.3% of nurses had a competent level of practice related to pre and postoperative care of patients with total knee arthroplasty.

Table 3:- demonstrates that there was no statistically significant relation between total scores of the studied nurses' practice level and demographic characteristics.

Assessment for Nurses' Practices Regarding Pre and Postoperative Care for Patients with Total Knee Arthroplasty

Table (1): Percentage Distribution of the Studied Nurses According to their Demographic Characteristics.

Demographic Characteristics	Total Sample (N=80)	
	N	%
Age (Years)		
25:<30	35	43.8
20:<25	29	36.2
30:<35	10	12.5
≥35	6	7.5
Mean ±SD	26.71±4.26	
Gender		
Female	49	61.3
Male	31	38.7
Education		
Technical	46	57.5
School 5y	20	25.0
School 3y	14	17.5
General experience (Orthopedic unit)		
<3y	41	51.3
3:<6	26	32.5
6:<9	8	10.0
>9y	5	6.2
Mean ±SD	3.38±3.32	
Courses attendance of Total Knee Arthroplasty patient care		
No	78	97.5
Yes	2	2.5

Table (1): Showed that, 43.8% of studied nurses' age was between 25 to less than 30 years with mean age 26.71±4.26. Also, while 61.3% of studied nurses are female. Also 57.5% of studied nurses had technical degree.

Figure (1): Distribution of studied nurses regarding courses attendance regarding total knee arthroplasty patient care (n=80).

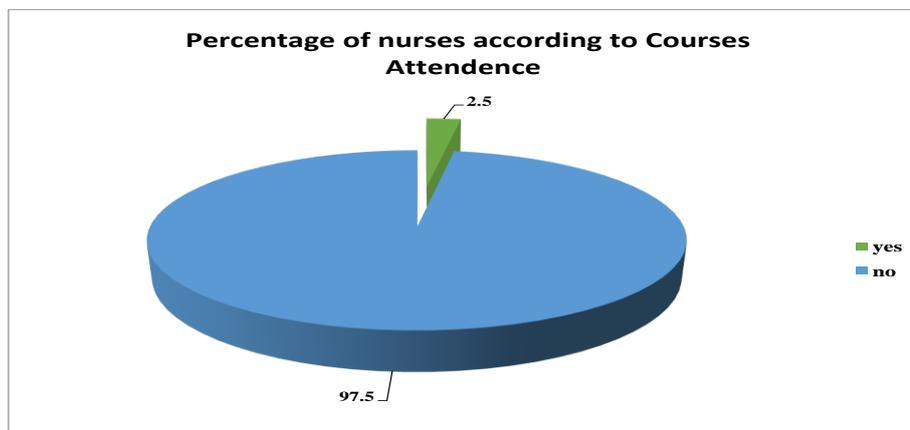


Figure (1): Revealed that, 97.5% of studied nurses did not attend courses regarding total knee arthroplasty patient care while, only 2.5% of studied nurses who attended courses regarding total knee arthroplasty patient care.

Assessment for Nurses' Practices Regarding Pre and Postoperative Care for Patients with Total Knee Arthroplasty

Table (2): Practice Mean Scores of the Studied Nurses Regarding Pre and Postoperative Care of Patient with Total Knee Arthroplasty (N=80).

Practices	Mean±SD
1) Preoperative physical examination (9 items)	5.41±1.78
2) Preoperative patient preparation (13 items)	8.50±2.23
3) Immediate and ongoing postoperative care (21 items)	14.25±2.79
4) Fall prevention measures (15 items)	6.91±2.11
5) Cold therapy (14 items)	8.38±2.25
6) Transferring patient (18 items)	12.31±2.12
7) Range of motion exercises (9 items)	5.43±2.03
8) Continuous passive motion machine (17 items)	10.59±2.04
9) Wound care (28 items)	19.60±3.57
Mean±SD (144 items)	91.38±12.04

Table (2): Illustrated that mean score of the total nurses' practice was (91.38±12.04) out of 144. Also, the mean score of practice regarding wound care was (19.60±3.57) out of 28 as the higher mean score.

Figure (2): levels of nurses' practices regarding pre and postoperative care of patient with total knee arthroplasty (n=80)

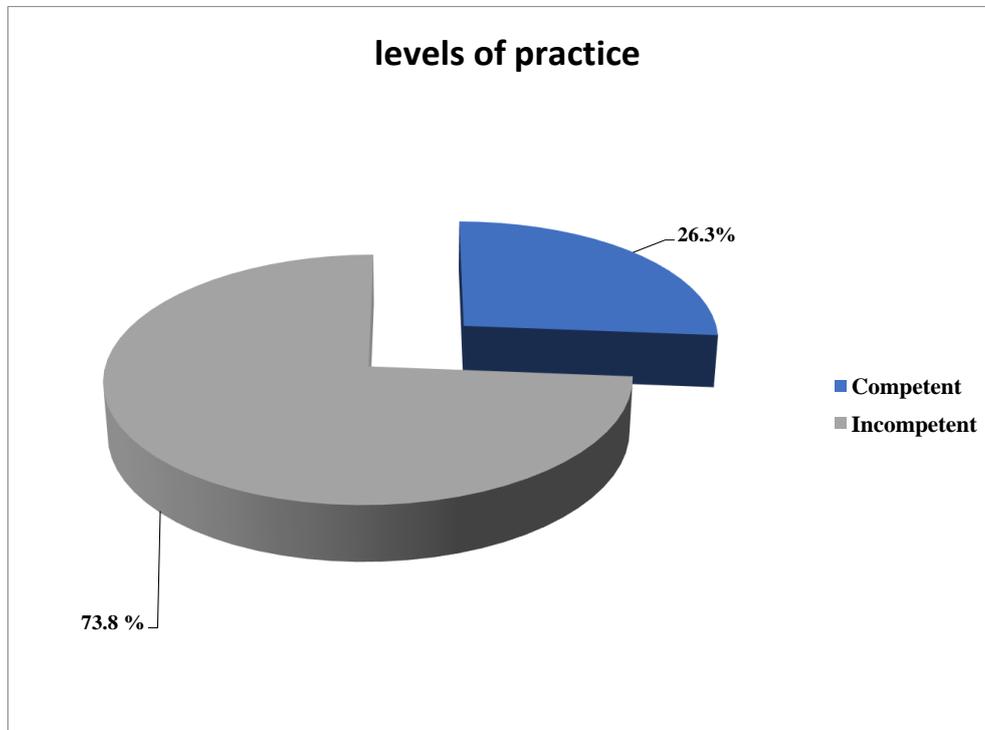


Figure (2): Shows that 73.8% of nurses had an incompetent level of practices, while only 26.3% of nurses had a competent level of practices regarding pre and postoperative care of patient with total knee arthroplasty.

Assessment for Nurses' Practices Regarding Pre and Postoperative Care for Patients with Total Knee Arthroplasty

Table (3): Relation between Demographic Characteristics and Practice Level.

Demographic Characteristics	Practice level				X ² (P value)
	Satisfactory		Unsatisfactory		
	N	%	N	%	
Age (Years)					
20:<25	9	31.0	20	69.0	6.20 (.084)
25:<30	5	14.3	30	85.7	
30:<35	5	50.0	5	50.0	
≥35	2	33.3	4	66.7	

Cont, Table (3): Relation between Demographic Characteristics and Practice Level.

Demographic Characteristics	Practice level				X ² (P value)
	Satisfactory		Unsatisfactory		
	N	%	N	%	
Gender					
Male	6	19.4	25	80.6	1.24 (.265)
Female	15	30.6	34	69.4	
Education					
School 3y	7	50.0	7	50.0	5.51 (.063)
School 5y	3	15.0	17	85	
Technical	11	23.9	35	76.1	
General experience (out orthopedic unit)					
<3y	11	26.8	30	73.2	3.77 (.266)
3:<6	8	30.8	18	69.2	
6:<9	0	0.0	8	100	
>9y	2	40	3	60	
Experience (orthopedic unit)					
<3y	12	24	38	76	3.67 (.269)
3:<6	4	21.1	15	78.9	
6:<9	1	25.0	3	75	
>9y	4	57.1	3	42.9	
Courses					
Yes	21	26.9	57	73	.730 (.393)
No	0	0.0	2	100	

Table (3) depicts that, there was no statistically significant relation between total scores of the studied nurses' practices and demographic characteristics.

*Assessment for Nurses' Practices Regarding Pre and Postoperative Care for
Patients with Total Knee Arthroplasty*

Discussion

Total knee arthroplasty (TKA) is considered the most common treatment for end-stage knee osteoarthritis (OA), which also makes great sense for some other underlying indications, including inflammatory arthritis, fracture (posttraumatic OA or deformity), dysplasia, and malignancy (Ghosh & Chatterji, 2019).

Nurses play a vital role for caring patient with TKA from the time they are scheduled for surgery, guiding the patient through the pre-admission process and educating the patient about what to expect during their hospital stay and recovery process, that will help the patient recover safely and quickly, managing pain, initiating mobilization, and following recommendations for preventing postoperative complications (Kang et al., 2018).

Regarding demographic data (age) most of the studied nurses were with a mean age 26.71 ± 4.26 years, this result was in identical line with Aldakheel, (2021), a study performed to assess nurses' knowledge concerning knee arthroplasty and illuminated that more than half of the studied nurses aged between 20-29 years old.

On the same line, this result agreed with the study conducted by El-Sayed et al. (2016) about "Effect of nursing care standards for preventing deep vein thrombosis among patients undergoing hip surgery on nurses' performance and patients' outcome" and founded that about half of the studied nurses were in the age category >30 years old with mean age of 31.3667.

As regards educational level, more than half of the studied nurses had technical degree, but this result disagrees with El Shemey & Elsaay (2015), who reported that most studied nurses had a Baccalaureate degree in nursing education, also not agreed with Taha & Ibrahim, (2021), which revealed that two third of studied nurses had secondary school nursing education.

Concerning years of experience in orthopedic unit, more than two thirds of studied nurses ranged from 1-6 years of experience in orthopedic unit, these results was in line with Aldakheel, (2021), that revealed that most of studied nurses had between 1 to 8 years of experience,

Also, those results concur with a study done by Causey-Upton, et al (2020), a study performed to assess orthopedic nurses' perceptions of preoperative education for total knee replacement, revealed that most of nurses working in the orthopedic units ranged from 1-10 years of experience. The nurses of the present study had a decreased years of experience in orthopedic units and this may reflect increasing level of nurses' transmission between units and increasing turnover rate, as well as the old nursing staff directed to the critical areas in the hospital.

The present study showed that most nurses had not attended previous training courses about TKA, this finding is supported by Aldakheel, (2021), that revealed that less than quarter of studied nurses participated in training courses related to knee replacement nursing care.

*Assessment for Nurses' Practices Regarding Pre and Postoperative Care for
Patients with Total Knee Arthroplasty*

Concerning total score of nurses' practices regarding pre and postoperative care of patient with total knee arthroplasty, more than two thirds of the studied nurses had incompetent level of practices regarding pre and postoperative care of patient with total knee arthroplasty. This result is identical with a study done by Taha & Ibrahim, (2021), entitled effect of educational program on nurses' knowledge, practices and patients' outcomes post total knee arthroplasty which showed that less than one third of studied nurses had a competent level of practice scores.

Moreover, the current results were in consistent with Healy. Et al (2016) and El Shemey & Elsaay, (2015), in a study entitled "Efficacy of Implementing Nursing Care Protocol on Total Hip Replacement Patient's Outcome" which showed that the majority of the studied nurses had unsatisfactory level of practices regarding preoperative care for patient with hip arthroplasty.

In the same context, the present results were in accordance with a study done by Tse & So (2008), Causey-Upton, et al (2020) and Bazezew, et al (2023), "Nurses' perceptions of preoperative teaching for ambulatory surgical patients" which revealed that nurses, perceptions and practices for providing preoperative care were incompetent in relation to preoperative preparation, and postoperative expectation.

Finally, these results of this study can be interpreted in the light of the fact that nurse's practices regarding care of patient with total knee arthroplasty have a great impact related to the

quality of nursing care provided to patient and the desired outcome. The study suggests that educational programs should be provided for all new nurses regarding the care of patients undergoing total knee arthroplasty surgery to reduce the frequency of patients 'complications and improve outcomes, in addition to continuous educational programs regarding total knee arthroplasty surgery and encourage creativity to create programs that encourage nurses to seek and update their skills.

Conclusion:

In the light of the current study findings, it can be concluded that, the majority of the studied nurses had incompetent level of practices regarding pre and postoperative care of patient with total knee arthroplasty. This outcome raises concerns about the adequacy of nursing practices in the pre and postoperative care of TKA patients within the studied setting. Incompetent practices could potentially impact patient outcomes, recovery, and overall satisfaction with the healthcare provided.

Recommendations:

In the light of the findings of this study, the following recommendations are proposed:

- 1) Educational programs should be conducted regarding standardized protocol of pre and postoperative nursing care of patients with total knee arthroplasty.
- 2) This study can be replicated in other surgical settings to assure the generalizability of results.

*Assessment for Nurses' Practices Regarding Pre and Postoperative Care for
Patients with Total Knee Arthroplasty*

- 3) Further researches should be conducted in other settings to improve nurses' practices.
- 4) Further investigation and intervention may be necessary to address the identified gaps in nursing practices, potentially through targeted training programs, continuing education, or the implementation of evidence-based guidelines.
- 5) Improving the competency of nursing practices in TKA care is crucial to ensuring the optimal well-being and recovery of patients undergoing this procedure, ultimately contributing to the continued success of TKA as a medical intervention.

References:

- Aldakheel, A. H. A., Abed, R. I., & Callis, A. (2021). Assessment of Nurses' Knowledge Concerning Knee Arthroplasty at Al Muthanna Hospitals. *Annals of the Romanian Society for Cell Biology*, 25(6), 9194-9199.
- Bakr Abo El-Ata, A., Hassan Ibrahim, M., Saad Mohamed, A., & Elsayed Ahmed Allawy, M. (2019). Nurses' Performance Regarding Administration of Inotropic Medications for Critically Ill Patients. *Port Said Scientific Journal of Nursing*, 6(1), 139-160.
- Bazew, A. M., Nuru, N., Demssie, T. G., & Ayele, D. G. (2023). Knowledge, practice, and associated factors of preoperative patient teaching among surgical unit nurses, at Northwest Amhara Comprehensive Specialized Referral Hospitals, Northwest Ethiopia, 2022. *BMC nursing*, 22(1), 1-13.
- Causey-Upton, R., Howell, D. M., Kitzman, P. H., Custer, M. G., & Dressler, E. V. (2020). Orthopaedic nurses' perceptions of preoperative education for total knee replacement. *Orthopaedic Nursing*, 39(4), 227-237.
- Dougherty, L., & Lister, S. (2015). *The Royal Marsden Manual of Clinical Nursing Procedures*, Ninth Edition .ISBN 978-1-118-74592-2. John Wiley & Sons.
- El Shemey, M. B., & Elsaay, E. A. E. (2015). Efficacy of implementing nursing care protocol on total hip replacement patient's outcome in orthopedic department at Tanta university hospital. *IOSR Journal of Nursing and Health Science (IOSR-JNHS)*, 4(5), 118-132.
- El-sayedead, D., Fouad Abdallah, K., Hegazi, M., & Mohammed, S. (2016). Effect of Nursing Care Standards for Preventing Deep Vein Thrombosis among Patients Undergoing Hip Surgery on Nurses Performance and Patients Outcome. *Journal of Nursing and Health Science*, 5(4), 1-12.
- Feng, J. E., Novikov, D., Anoushiravani, A. A., & Schwarzkopf, R. (2018). Total knee arthroplasty: improving outcomes with a multidisciplinary approach. *Journal of Multidisciplinary Healthcare*, 63-73.

*Assessment for Nurses' Practices Regarding Pre and Postoperative Care for
Patients with Total Knee Arthroplasty*

- Foran, J. R., & Fischer, S. J. (2017). Total knee replacement exercise guide. *AAOS OrthoInfo*, 1(1), 1-9.
- Ghosh, A., & Chatterji, U. (2019). An evidence-based review of enhanced recovery after surgery in total knee replacement surgery. *Journal of perioperative practice*, 29(9), 281-290. *Nursing*, 23(21-22), 3025-3035.
- Healy, W. L., Iorio, R., Clair, A. J., Pellegrini, V. D., Della Valle, C. J., & Berend, K. R. (2016). Complications of total hip arthroplasty: standardized list, definitions, and stratification developed by the hip society. *Clinical Orthopaedics and Related Research*, 474(2), 357-364.
- Hess, R.W., & Pederson, T. (2017). General Post-Operative Instructions Total Knee Replacement, Total Knee Post Op. published in Feb 2019. Retrieved from <https://tcomn.com/wp-content/uploads/2019/02/Hess-Knee-Scope-PostOp>.
- Kang, E., Gillespie, B. M., Tobiano, G., & Chaboyer, W. (2018). Discharge education delivered to general surgical patients in their management of recovery post discharge: a systematic mixed studies review. *International journal of nursing studies*, 87, 1-13.
- Khan, T. I., Hassan, M. M., Kurihara, M., & Ide, S. (2021). Research on diagnosis of knee osteoarthritis using acoustic emission technique. *Acoustical Science and Technology*, 42(5), 241-251.
- Lynn, P. (2018). *Skill Checklists for Taylor's Clinical Nursing Skills*. Lippincott Williams & Wilkins..
- Olotu, C., Weimann, A., Bahrs, C., Schwenk, W., Scherer, M., & Kiefmann, R. (2019). The Perioperative Care of Older Patients: Time for a New, Interdisciplinary Approach. *Deutsches Ärzteblatt International*, 116(5), 63.
- Perry, A. G. G., Potter, P. A., & Ostendorf, W. (2019). *Nursing interventions & clinical skills E-book*. Elsevier Health Sciences..
- Schwartz, A. J., Bozic, K. J., & Etzioni, D. A. (2019). Value-based total hip and knee arthroplasty: a framework for understanding the literature. *JAAOS-Journal of the American Academy of Orthopaedic Surgeons*, 27(1), 1-11.
- Taha, A. S., & Ibrahim, R. A. (2021). Effect of Educational Program on Nurses' Knowledge, Practices and Patients' Outcomes Post Total Knee Arthroplasty. *Evidence-Based Nursing Research*, 3(4), 16-16.
- Tse, K. Y., & So, W. K. W. (2008). Nurses' perceptions of preoperative teaching for ambulatory surgical patients. *Journal of Advanced Nursing*, 63(6), 619-625.