Safe Nursing Practices Applied for Patients Post Hip Joint Replacement

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Abstract: improving the safety of healthcare delivery saves lives. Nurses are in a key position to improve patient safety in hip replacement which considered one of the most successful orthopaedic procedures performed today. Aim: the current study was aimed to assess safe nursing practices applied for patients post hip joint replacement. Design: A descriptive research design was used. Study setting: This study was conducted at inpatient orthopaedic units of El-Hadara Orthopaedic and Traumatology University Hospital. Sample: all (52) available nurses who were involved in providing direct care for patients post hip joint replacement was included. They were classified according to level of education into 2 technical and 50 diploma nurses. One tool was used titled "Safe nursing practices applied for patients post hip joint replacement observational checklist" in addition to nurses' socio demographic data. Results: the study revealed that all the studied nurses had poor unsafe nursing practices in relation to postoperative care applied for patients post hip joint replacement. The mean and standard deviation of safe hospital environment maintained by nurses during day one postoperative were higher (42.84 ± 4.84) than the pre discharge day (40.49 ± 4.84). Conclusion: There was significant relation between the nurses' safety practices and their age, years of experience; as the practice level increased with increasing age and years of experience. Recommendations: Improving nurses' practices through encouraging them to participate in educational programs through workshops, lectures and recent researches related to safety postoperative hip replacement.

***Keywords*: "Joint Replacement", "Nursing Practices", "Post Hip Replacement', "Patients' Needs", "Safety"**

I. INTRODUCTION

Hip replacement (HR) has become one of the most successful and cost effective procedures in modern medicine [1]. For patients with hip pain caused by a variety of conditions; hip replacement surgeries alleviate the pain, restore function and improve quality of life. The World Health Organization (WHO) also considers HR being one of the most cost effective interventions in medicine [2]. Today; over 80,000 hip replacements are performed in England and Wales every year [3]. The demand for primary hip arthroplasties is projected to increase by 174% in 2030 [4]. According to the National Hip Fracture Database (NHFD) (2015) [5] there has been a steady increase in the number of hip replacements performed for hip fracture patients in the United Kingdom (UK) in 2011 (10.7%) of eligible hip fracture patients received HR. This increased to (19.1%) in 2013 and (26%) in 2015.The UK National Joint Registry of England, Wales National Joint Replacement (NJR) also corroborate this with 1,698 total hip replacement (THR) in 2011 for hip fracture compared to 3,246 THR in 2014 NJR (2011-14) [6]. The statistical records of El Hadara Orthopedic and Trumatology University Hospital, illustrated that the percent of patients underwent hip replacement surgery increased from 24% in 2014 to 24.3% in 2015 [7].

Hip replacement (HR) procedure replaces diseased hip articular surfaces with synthetic materials; these artificial parts are called prosthesis [8]. Both the socket (acetabulum) and the ball (femoral head) are replaced with metal and plastic parts. HR is usually considered as the only option in case of all non-operative approaches to pain control has been exhausted. In people with severe hip disease, HR can be life changing with major improvements in pain, function and quality of life [1, 7]. Evidence shows that HR surgery has excellent long term survivorship (defined as time from primary surgery to revision surgery) in both younger and older patients [9]. Typical survival rates for conventional cemented, metal on polyethylene bearing joint replacement are greater than 90%, 85% and 80% at 10, 15 and 20 years respectively [9-13].

As a result of hip replacement surgery, many people walk with little joint discomfort, altered in joint range of motion and less dependence on assistive devices [14]. The improvement is not only in motor function after the operation but also in sleep and rest, emotional behavior, social interaction and recreation which indicates the marked positive impact on all aspects of wellbeing [15]. In the past the nursing responsibility in patient safety was often viewed in narrow aspects of patient care for example avoiding medication errors and preventing patient falls. While these dimensions of safety remain important within the nursing preview, the breadth and depth of patient's safety and quality improvement are far greater. The most critical contribution of nursing to patient safety in any setting, is the ability to coordinate and integrate the multiple aspects of quality within the care directly provided by nursing and across the care delivered by others in the setting [16, 17].

Safety is the freedom from psychological and physical injury which is considered a basic human need. The nurse has the professional responsibility to be engaged in activities that support a patient centered safety culture. Successfully understanding and expanding the implementation of the safe practices rests on appreciating their value in the process of improving quality and safety in healthcare [18]. The nurse has the professional responsibility to be engaged in activities that support a patient centered safety culture. The Quality and Safety Education for Nurses (QSEN) [19] project was developed to meet the challenge of preparing future nurses who will have the Knowledge, Skills and Attitudes (KSAs) necessary to continuously improve the quality and safety of the healthcare systems within which they work.

The QSEN safety competency for a nurse is defined as minimizes risk of harm to patients and providers through both system effectiveness and individual performance. All nurses have a significant contribution in protecting and providing patient safety. They are ideally positioned to strengthen the safety net for patient care as they spend most of time with patients; overseeing, coordinating and providing care [20].

Hip replacement represents a significant event in a patient's life so that, it is incumbent upon healthcare providers to develop and provide a comprehensive perioperative nursing care plan for the patient and his/her family [21]. The successes or failure of any joint replacement is directly related to the close and orderly integration of three areas; the pre-operative, operative and postoperative periods. So that orthopedic nurses and surgeons should make a better effort to help patients to pass safely through this experience. Preoperative preparation of patients for hip replacement surgery is the most critical element of a successful outcome. *Preoperative nursing assessment and management* of the patient are considered the cornerstone of nursing practice, as it aimed at having the patient in optimal health at the time of surgery. Nurses need to be proficient in this clinical competency in order to identify physical and psychosocial issues that may influence patient care before and after surgery. Once the patient's needs have been established, preoperative education should commence. Patient should be educated about home safety, it is important to safely adjust the patient's home environment before surgery for easily moving around with a walker or crutches post-surgery and reducing the risk of falls and maintain hip joint precautions. *Safe home environment preparations*, instructing the patient about the necessary postoperative activity restrictions as hip precautions, The effectiveness of an individually tailored preoperative rehabilitation program in patients undergoing HR had been evaluated by Crowe and Henderson (2003) [22].

Postoperative nursing care: positioning, postoperative nursing assessment, wound management, the nurse should safely assess the operation site quickly and observe the dressing. *Fluid balance*: nurses need to assess the patient for fluid balance, especially if they are on an intravenous infusion. *Pain assessment and management*; after orthopedic surgery; pain can be intense due to presence of edema, hematomas, muscle spasms which contribute to the experienced pain. The nurse closely assesses the patient's pain level, response to therapeutic measures and makes every effort to relieve the pain and discomfort. Pain assessment is a critical nursing activity in postoperative pain management and involves communication between the patient and the nurse. Pain control is especially important for hip arthroplasty patient's recovery as it enhance range of motion and muscle strength for ambulation [23].

Patient's ambulation: the patient post hip replacement surgery usually gets out of bed. Ensure that the patient does not adduct or hyperflex the surgical hip during transfer to the chair. The chair should have a straight back and be high enough. The physical therapist works with the patient for ambulation with a walker or crutches. After hip joint replacement surgery, patients often start physical therapy on the first day after surgery; it is common to begin some minor physical therapy while sitting in a chair, the duration of patient's walk is about 10 to 15 minutes, three to four times daily. *Safe hospital environment:* maintaining a safe hospital environment for the postoperative hip replacement patient is very important to prevent dislocation of the hip prosthesis. This is done by ensuring that the patients does not flex the hip more than angle of 90 degree , not crossing legs, ensuring that they uses a high toilet seat whilst in hospital and has one for discharge, ensuring that the floor is dry, free from clutters and providing clean, quiet and well ventilated environment [24]. *Maintaining*

patient's dignity: nurses maintain dignity during patients' care through the following measures; respect, protecting privacy, emotional support, treating all patients alike and maintaining body image [25].

Prevention of complications: the nurse should be aware of the possible complications that could arise postoperative and should follow guidelines on how to deal with these when occurred including Dislocation, deep vein thrombosis (DVT) and pulmonary emboli. *Prevention of infection:* infection is a risk that can occur after any surgery, but it is of particular concern for the postoperative orthopedic patients because of the high risk of osteomyelitis so that prompt assessment and treatment of infection are great essential. Osteomyelitis often requires prolonged courses of intravenous antibiotics. At times, the infected bone and prosthesis must be surgically removed. Therefore, prophylactic systemic antibiotics are usually prescribed during the perioperative period. The nurse should assess the patient's response to these antibiotics in addition to follow of aseptic technique during changing dressings and emptying wound drainage devices. The nurse should also, monitor the patient's vital signs, operative site, drainage and for any signs of infection [26].

Postoperative education: education about changing their lifestyle is important to prevent any other problems that may occur later on. Nurses can give patients smoking cessation advice and can help with exercise, by referring the patient to physiotherapy [27]. The nurse teaches the patient protective positioning, which includes maintaining abduction and avoiding internal and external rotation, hyperextension and acute flexion. The nurse should educate the patient about care of operative site, getting in/out of the toilet, taking a bath/shower, performing household activities, time of resuming sexual relation, hip precautions, signs and symptoms of postoperative complications, medication schedule, safe usage of assistive devices, safe getting up/down stairs, safe getting in/out the car [28], starting to drive and resuming of work [29].

Safe patient discharge: patient care should continue at the household, which would help to avoid re hospitalizations, which significantly elevate healthcare expenses. This calls for systemized hospital discharge planning which would guarantee enhanced explanations for patients and/or families [30]. In general, by 3 months, the patient can resume routine activities of daily livings (ADLs). Stair climbing is permitted as prescribed and is kept to a minimum for 3 to 6 months. Frequent walks, swimming and use of a high rocking chair are excellent for hip exercises. Sexual activities should be started 4-6 weeks after surgery, with the patient in the dependent position (flat on the back) for 3 to 6 months to avoid excessive adduction and flexion of the artificial hip discharge of patients with hip replacement will enable health professionals to address patient safety before discharge and help them to develop appropriate strategies to meet patient and family concerns [31, 32]. Following discharge from the hospital, the patient may go to a skilled nursing facility, rehabilitation center or directly home. Ongoing physical therapy is the most important part of recovery for the first four to five months following surgery [33]. In recent years, shorter hospital stays have been promoted widely in hospitals to reduce healthcare costs and promote patient care. The reduction in the length of stay requires patients to achieve independence and be discharged home in increasingly shorter periods of time [16].

A reduced length of stay impacts on orthopedic patients, especially patients with hip joint replacements where safe discharge criteria are based on independence in tasks such as transfers, ambulation and stair climbing [34]. Patient safety has received increased attention in recent years but mostly with a focus on the epidemiology of errors and adverse events rather than on practices that reduce such events [35], so this study was undertaken to assess safe

nursing practices applied for patients post hip joint replacement that will have a great impact on the patient clinical outcomes.

Aims of the study

The aim of the current study was to assess safe nursing practices applied for patients post hip joint replacement.

Research question:

To what extent the safe nursing practices are applied for patients post hip joint replacement?

II. MATERIALS AND METHOD

Research design:

A descriptive research design was used to collect data in this study.

Setting:

This study was conducted at inpatient orthopedic units of El-Hadara Orthopedic and Trumatology University Hospital, Alexandria University

Subjects:

The study comprised **all** available nurses who were involved in providing direct care for patients post hip joint replacement and assigned to the above mentioned setting approximately **52** nurses. They were classified according to level of education into **2** technical and **50** diploma nurses.

Tool:

One tool was developed by the researcher titled (***Safe nursing practices applied for patients post hip joint replacement-observational checklist)*** based on review of related relevant literatures [36-45] to observe safe nursing practices applied for patients post hip joint replacement and utilized for data collection in this study which in addition to nurses' socio demographic data as age, gender, marital status, qualifications, years of experience and previous attendance of training programs. This tool was comprised of the following **five** parts:

Part (1): It was comprised of **5 items** related to safe nursing practices applied for patients during day **(0)** post hip joint replacement. As follow:

- Putting patient in abduction position and maintaining warmth.
- Assessing and documenting of vital signs, neurovascular status of operated leg, operative site and pain level.
- Encouraging performance of deep breathing and coughing exercises, ankle, feet exercises and starting oral fluids intake.
- Ensuring call bell and belongings within reach, elevation of bed side rails and locked bed wheels.
- Checking follow of hip precautions as avoiding hip bending past 90° in standing, sitting or lying position, crossing of legs in sitting, in/out twisting of the operated hip

Part (2): It was comprised of **5 items** related to safe nursing practices applied for patients during day (**1**) post hip joint replacement. As follow:

- Assessing and documenting of vital signs, neurovascular status of operated leg, operative site, pain level and signs of hip dislocation.
- Encouraging performance of deep breathing, coughing exercises, ankle, feet exercises and starting solid food intake.
- Ensuring floor is kept dry and free from crowdedness.
- Assisting patient in getting out of bed, walking for few steps, getting in/out chair, walk short distance and safe usage of assistive devices.
- Hip precautions reinforcement.

Part (3): It was consisted of **3 items** related to safe nursing practices applied for patients post hip joint replacement during the following **three** procedures:-

- Frequency of hand washing, it contained of items related to frequency of hand washing.
- Safe medication administration, as preparation of nurses, equipment, patient and environment, technique of drug administration and documentation.
- Safe wound dressing, it consisted of items related to wound dressing as nurse' preparation as checking physician written orders and wearing mask, equipments' preparation as checking sterility and expiry date of supplies, patient' preparation as identifying patient and explaining procedure, environment' preparation as close the doors and windows.

Part (4): It comprised of **4 items** related to safe nursing practices applied for patients **during maintenance** of safe hospital environment post hip joint replacement. As follow:

- Patient's protection from falling as correct arrangement of patient's room, cleaning up spills, floor clean and free from crowdedness and keeping ventilated quiet environment around patient.
- Patient's protection from fire hazards as instructing patient not to smoke.
- Patient's protection against chemical hazards as drug toxicity and usage of cleansing agents.
- Patient's protection against biological hazards as safe disposal of infectious wastes and sharp instruments.

Part (5): It was comprised of **4 items** related to safe nursing practices applied **pre** hospital discharge for patients post hip joint replacement. As follow:

- Safe patient ambulation pre hospital discharge post hip joint replacement as getting up/down stairs, observing the independent usage of assistive devices and reinforcement of hip precautions.
- Safe home environment instructions as no wrinkles of carpets, arranged furniture, electric appliance and cords away of patient's way, rugs are secured, using raised mattress, night light along the path from bedroom to the bath, immediate cleaning up of liquid on the floor, easy reach of cooking equipment, installing of grab bars on bathroom walls, using raised toilet seat and stairways with strong both sides handrail.
- Patient education about care of operative site, getting in/out of the toilet, taking a bath/shower, performing household activities, time of resuming sexual relation, hip precautions, signs and symptoms of postoperative complications, medication schedule, safe usage of assistive devices, safe getting in/out the car, starting to drive and resuming of work.
- Providing written forms of discharge instructions for patients.

Scoring system: - each nurse' practice response to each task was scored on **3** points Likert scale [33] as "Done correctly and adequately" = **2** means that the nurses practice each task according to the standardized criteria of safety practice procedure. "Done correctly but not adequately" = **1** means that the nurses practice each task but not according to the standardized criteria of safety practice procedure or missed certain steps of procedures. "Not done/wrongly done" = **0** means that the nursing practices weren't completely done or wrongly done by the nurse. A Total score for safe nurses' practices were classified as; A total score of **75% and above** for nurse' practices was considered **good** nursing practices, scores of **60% to less than 75%** was considered **fair**, while **less than 60%** was considered **poor**.

Method

- **Official permissions** were obtained from the Faculty of Nursing; Alexandria University was directed to responsible authorities at the previous mentioned settings to take permission to conduct the study after explanation of its purpose.
- **Tool development:** The tool was tested for its content validity by five experts in the study field. The reliability of the tool was assessed using Cronbach-alpha coefficient statistical test (α= 0.74). A pilot study was carried out on seven nurses after obtaining their oral approvals (not included in the study sample). According to the findings of the pilot study and comments of the jury members, the necessary modifications had been done (absence of I.V fluids intake during zero day, so it was deleted from the observational checklist).
- **Data collection:** Each nurse was observed (concealed observation) three times (two mornings and one evening shift) to assess safe nursing practices that were applied to patients from the first day postoperative till discharge by the researcher once daily for 3 days by the researcher. The data was collected in a period of four months by the researchers from the beginning of June till the end of September 2015.
- **Ethical considerations:** An approval was obtained ethical committee, Faculty of Nursing; Alexandria University. Informed consent was obtained from the participants. The anonymity, confidentiality and privacy of responses have been asserted, voluntary participation and right to withdraw from the study were emphasized before inclusion in the study sample**.**
- **Statistical analysis:** Data was fed to the computer and analyzed using IBM SPSS software package version 20.0. Qualitative data were described using numbers and percent. Quantitative data were described using minimum and maximum, mean and standard deviation (SD). The significance (P) of the obtained results was judged at ≤ 0.05 level. For normally distributed data, comparison between two independent populations was done using independent t-test while more than two populations were analyzed F-test (ANOVA) [(46)] to be used.

III. RESULTS

Table (1): Shows the percentage distribution of the studied nurses according to their socio demographic data. Regarding department, this table revealed that half of the studied nurses (50%) were working in the male wards and the remaining half (50%) were working in female wards. Concerning gender of the studied nurses, it was found that majority of the nurses were female while only three of them were male. Also, As regards to their age, the table shows that also nearly one third of the nurses (30.8%) were in the age group of 25 < 35 years, while a lower proportion of the studied nurses (21.2%) was in the age group of < 25 years. Most of studied nurses were married (88.5%) while the lowest proportion (1.9%) was single. In relation to studied nurses' qualifications, the result showed that the highest proportions of the studied nurses (96.2%) had diploma degrees in nursing, while a minor proportion (3.8%) had technical institute. Concerning years of experience, it was observed that the higher proportion (30.8%) of the studied nurses had experience between 10 < 20 years, while (21.2%) had experience <10 years. Finally as regards attendance of training programs, all the studied nurses (100%) didn't attend training programs related to patient safety.

Table (1): Percentage distribution of the studied nurses according to their socio demographic data.

Nurse' socio demographic data	Frequency (n=52)	Percentage %
Department		
▪ Male ward	26	50.0
▪ Female ward	26	50.0
Gender		
▪ Male	3	5.8
▪ Female	49	94.2
Age (years)		
▪ <25	11	21.2
▪ 25 <35	16	30.8
▪ 35 <45	13	25.0
▪ ≥ 45	12	23.1
Marital status		
▪ Single	1	1.9
▪ Married	46	88.5
▪ Divorced	0	0.0
▪ Widow	5	9.6
Qualifications		
▪ Diploma	50	96.2
▪ Technical	2	3.8
Years of experience		
▪ <10	11	21.2
▪ 10 <20	16	30.8
▪ 20 <30	13	25.0
▪ ≥30	12	23.1
Safety educational course/training programs attendance		
▪ Yes	0	0.0
▪ No	52	100

Table (2): Shows the percentage distribution of studied nurses in relation to *patient's assessment* during zero day post hip joint replacement. It was found that the majority of nurses (80%) put patient in supine position with abducting pillow between legs immediate postoperative while, all of them (100%) didn't adequately warm patients using extra blanket or keep belongings within patients' reach. Regarding vital signs measurements, it was observed that all of the nurses (100%) didn't measure both respiratory rate and blood pressure; moreover all of them (100%) didn't adequately document the measurements of vital signs.

Concerning neurovascular assessment of operated leg, this table revealed that the highest proportion of the nurses 75% was adequately checking only the temperature of the operated leg, while all of them (100%) didn't document the neurovascular assessment. Concerning revising of hip precautions, it was seen that about two thirds of the nurses (67.3%) instructed patients but not adequately to avoid hip bending past 90° in lying or sitting position, while all of them did not instruct patients to avoid crossing of legs in sitting and in/out twisting of the operated hip.

Table (2): Percentage distribution of studied nurses in relation to *patient's assessment during zero day* post hip joint replacement.

Patient's assessment during day of surgery (day 0)	Studied nurses (n=52)					
	Done correctly & adequately (2)		Done correctly but not adequately (1)		Not done/ wrongly done (0)	
	No.	%	No.	%	No.	%
• Supine position with a pillow to abduct legs.	42	80.0	10	19.2	0	0.0
• Warm patient using extra blanket.	0	0.0	52	100.0	0	0.0
Keep						
• Call bell within patient's reach.	0	0.0	0	0.0	52	100.0
• Belongings within reach.	0	0.0	0	0.0	52	100.0
Ensure						
• Side rails are elevated during sleep.	0	0.0	0	0.0	52	100.0
• Bed wheels are locked.	52	100.0	0	0.0	0	0.0
Vital signs measurement.						
• Temperature	0	0.0	52	100.0	0	0.0
• Pulse	0	0.0	52	100.0	0	0.0
• Respiration	0	0.0	0	0.0	52	100.0
• Blood pressure	0	0.0	0	0.0	52	100.0
- Vital signs documentation.	0	0.0	52	100.0	0	0.0
Neurovascular assessment of the operated leg.						
• Temperature : Warm/cold	39	75.0	13	25.0	0	0.0
• Pulse : Present/absent	0	0.0	25	48.1	27	51.9
• Pain during movement	0	0.0	44	84.6	8	15.4
• Abnormal sensation	0	0.0	0	0.0	52	100.0
• Color : Normal/Abnormal	0	0.0	32	61.5	20	38.5
• Neurovascular documentation.	0	0.0	0	0.0	52	100.0
- Level of pain.	0	0.0	0	0.0	52	100.0
- Wound site for bleeding.	30	57.7	22	42.3	0	0.0
Encourage						
• Deep breathing exercises.	0	0.0	0	0.0	52	100.0
• Ankle and feet exercises.	0	0.0	0	0.0	52	100.0
• Oral fluids intake.	52	100.0	0	0.0	0.0	0.0
Checking of hip precautions.						
• Avoiding hip bending past 90° in lying or sitting position.	0	0.0	35	67.3	17	32.7
• Avoiding crossing of legs in sitting position.	0	0.0	0	0.0	52	100.0
• Avoiding In/out twisting of the operated hip.	0	0.0	0	0.0	52	100.0

Table (3): Shows the percentage distribution of studied nurses in relation to *safe patient's ambulation during day one* post hip joint replacement. Regarding *safe patient ambulation during day one postoperatively***,** it was observed that majority of the nurses (71.2%) correctly and adequately assisted the patients to sit at the bed side, get out of the bed safely, walk for few steps, sit on the chair and using assistive devices in a safe correct manner. On the other hand; more than three quarters of them (78.8%) correctly but not adequately ensured that the floor was kept dry and free from crowdedness.

Table (3): Percentage distribution of studied nurses in relation to *safe patient's ambulation during day one* post hip joint replacement.

Safe patient's ambulation during day (1) postoperatively	Studied nurses (n=52)					
	Done correctly & adequately (2)		Done correctly but not adequately (1)		Not done / wrongly done (0)	
	No.	%	No.	%	No.	%
Ensure: Floor kept dry/free from crowdedness.	0	0.0	41	78.8	11	21.2
Sit at the bed side. Move buttocks to the bed edge.	37	71.2	15	28.8	0	0.0
Bring legs over the bed edge keeping them apart and toes pointed forward.	37	71.2	15	28.8	0	0.0
Get out of the bed safely						
• Keep operated leg in front of other until standing.	37	71.2	15	28.8	0	0.0
• Stand safely using walker.	37	71.2	15	28.8	0	0.0
Walk for few steps						
• Move walking aid forward.	37	71.2	15	28.8	0	0.0
• Step with the operated leg.	37	71.2	15	28.8	0	0.0
• Step with un operated leg.	37	71.2	15	28.8	0	0.0
Sit on the chair						
• Sit in a firm, straight back chair with arm rests.	37	71.2	15	28.8	0	0.0
• Use both arms and un operated leg to push self up to the standing position.	37	71.2	15	28.8	0	0.0
• Walk for short distance using walker safely.	0	0.0	19	36.5	33	63.5

Table (4): Percentage distribution of studied nurses in relation to *health education* applied for patient's pre hospital discharge post hip joint replacement**.** *Regarding health education applied for patients*, it was noted that all the nurses didn't educate the patient about getting in/out the toilet, taking a bath/shower, taking in/off clothes, time of resuming sexual relation, safe getting in/out to the car and time of resuming work again, while the percent of nurses, were correctly and adequately educating the patient about keeping site of wound dry and clean, observing signs and symptoms of both wound infection and postoperative complications 55.8%, 40.4%, 42.3% respectively. About *providing written discharge instructions* for patient at the time of discharge, it was noted that all of the nurses provide the

patient with inadequately written discharge instructions which was written by the resident physician.

Table (5) and figure (1): Show the overall percent score, mean and standard deviation of studied nurses in relation to safe nursing practices applied for patients post hip joint replacement *during zero, first and pre discharge days.* As regards the overall percentage score of safe nursing practices during zero, first, pre hospital discharge days, it was found that all of the nurses' practices were poor (<60%).While the mean and standard deviation of safe nurses' practices were 38.22 ± 6.61 in day one postoperative followed by 20.16 ± 3.92 pre discharge day.

Table (4): Percentage distribution of studied nurses in relation to *health education* applied for patients pre hospital discharge post hip joint replacement.

Patient education during day of discharge	Studied nurses (n=52)					
	Done correctly & adequately (2)		Done correctly but not adequately (1)		Not done / wrongly done (0)	
	No.	%	No.	%	No.	%
• **Care of incision site**						
- Keep site of wound dry and clean.	29	**55.8**	23	44.2	0	0.0
- Observe signs and symptoms of wound infection as redness, swelling, pain and purulent discharge.	21	**40.4**	31	59.6	0	0.0
• Getting in to the toilet (a raised toilet seat with arm rests).	0	0.0	0	0.0	52	100.0
• Getting out of the toilet.	0	0.0	0	0.0	52	100.0
• Taking a bath/shower.	0	0.0	0	0.0	52	100.0
• Taking in clothes.	0	0.0	0	0.0	52	100.0
• Taking off clothes.	0	0.0	0	0.0	52	100.0
• Resuming of sexual relation 4-6 weeks postoperatively.	0	0.0	0	0.0	52	100.0
• Ensure safe hip precautions followed.	0	0.0	0	0.0	52	100.0
• Signs and symptoms of possible postoperative complications as loosening of the prosthesis or hip dislocation.	22	**42.3**	30	57.7	0	0.0
• Follow the medication schedule.	0	0.0	52	100.0	0	0.0
• Items of well-balanced diet.	0	0.0	0	0.0	52	100.0
• Safe usage of assistive devices.	0	0.0	0	0.0	52	100.0
• Safe getting in to the car (elevating the car seat with a pillow, getting into the car by the non-operated leg first).	0	0.0	0	0.0	52	100.0
• Safely getting out of the car by the operated leg first.	0	0.0	0	0.0	52	100.0
• Resuming of work 6-8 weeks postoperatively according to the nature of work.	0	0.0	0	0.0	52	100.0

• Sit in a firm, straight back chair with arm rests.	0	0.0	52	100.0	0	0.0
Provide written discharge instructions.	0	0.0	52	**100.0**	0	0.0

Table (5): Overall percentage score, mean and standard deviation of studied nurses in relation to safe nursing practices applied for patients post hip joint replacement *during zero, first and pre discharge day.*

Safe nursing practices	Day 0 (n=52)		Day 1 (n=52)		Pre discharge day (n=52)		Average (n=52)
	No.	%	No.	%	No.	%	No.
Scoring system							
Poor (<60%)	52	100	52	100	52	100	52
Fair (60<75%)	0	0.0	0	0.0	0	0.0	0
Good (≥75%)	0	0.0	0	0.0	0	0.0	0
Percent score							
Min. – Max.	26.0 – 38.0		23.75 – 47.50		11.76 – 29.41		21.21 – 37.88
Mean ± SD.	32.73 ± 3.84		38.22 ± 6.61		20.16 ± 3.92		30.63 ± 4.04

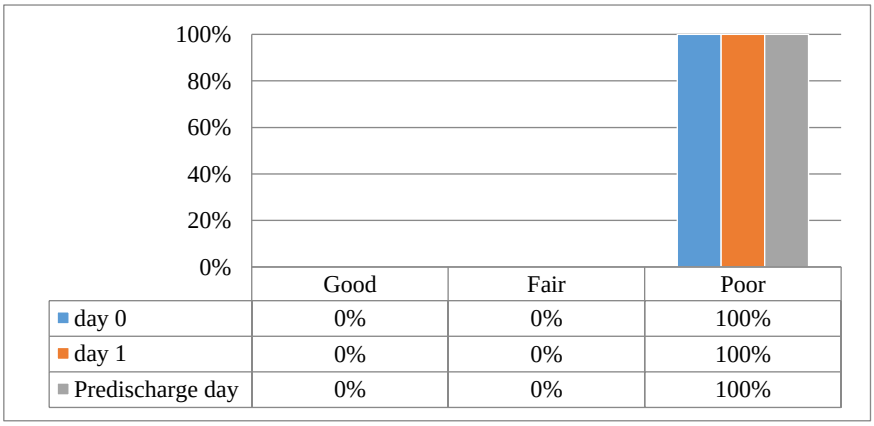

Fig.1: Overall percentage score of safe nursing practice post hip joint replacement during zero, first and pre discharge day.

Table (6): Show the overall percent score, mean and standard deviation of studied nurses in relation to *frequency of hand washing* applied for patient post hip joint replacement during zero, first and discharge days. Concerning *nurses' practice according to frequency of hand washing*, it was found that overall percentage score of the studied nurses 100% were poor in the performance of hand washing during zero, first and discharge days. The mean and standard deviation of hand washing was 8.33 ± 0.0 during all times of observations.

Table (6): Overall percent score, mean and standard deviation of studied nurses in relation to safe nursing practices in relation to *frequency of hand washing* applied for patient post hip joint replacement during zero, first and discharge days.

Frequency of hand washing	Day 0 (n=52)	Day 1 (n=52)	Pre discharge Day (n=52)	Average (n=52)

	No.	%	No.	%	No.	%	No.
Poor (<60%)	52	100.0	52	100.0	52	100.0	52
Fair (60 <75%)	0	0.0	0	0.0	0	0.0	0
Good (≥75%)	0	0.0	0	0.0	0	0.0	0
Percent score							
Min. – Max.	8.33 – 8.33		8.33 – 8.33		8.33 – 8.33		8.33 – 8.33
Mean ± SD.	8.33 ± 0.0		8.33 ± 0.0		8.33 ± 0.0		8.33 ± 0.0

Table (7): Shows the percentage distribution of studied nurses in relation to *safe medication administration* practiced for patients post hip joint replacement. Concerning *nurse preparations in medication administration***,** it was detected from this table that all nurses (100%) were *checking* but not adequately the *written physician prescription and medication rights*. Also regarding *equipment preparations* 40.4% of the nurses weren't adequately checking the sterility and expiry date of medication and equipment. Moreover regarding *patient's preparations*, it was found that all of the nurses (100%) didn't perform hand washing, explain procedure, check patient for allergies and level of pain.
Regarding *environmental preparations***,** it was observed that all of the nurses (100%) didn't excuse visitors, close doors and windows, check lighting, keep the patient's privacy, put the medication tray and safety needle box beside bed. Moreover, all of them didn't adequately administer the medication correctly according to the right site and discarding the used needle in the safety needle box. Also all of them didn't wear gloves during administering the medication and didn't observe the patient for any side effects/allergy. Additionally all of the nurses didn't adequately document the administered medication.

Table (8): Demonstrates the relation between nurses' socio demographic data and safe nursing practices during zero, one, pre discharge days. No statistical differences were observed between safe nurses' practices and their qualifications during day zero, one, pre discharge days, where p = 0.921, 0.431, 0.338 respectively. However, there was a positive statistical relation between nurses' practices during day of discharge with age and years of experience where p = 0.027* and 0.027* respectively which indicates that the practice improved with increasing age and years of experience.

Table (7): Percentage distribution of studied nurses in relation to *safe medication administration* practiced for patients post hip joint replacement.

Safe medication administration	Studied nurses (n=52)					
	Done correctly & adequately (2)		Done correctly but not adequately (1)		Not done / wrongly done (0)	
	No.	%	No.	%	No.	%
Nurse preparations: Check						
• Written physician prescription.	0	0.0	52	**100.0**	0	0.0
• Medication rights: Right patient.	0	0.0	52	**100.0**	0	0.0
• Right medication.	0	0.0	52	**100.0**	0	0.0
• Right dose.	0	0.0	52	**100.0**	0	0.0
• Right frequency.	0	0.0	52	**100.0**	0	0.0
• Right time.	0	0.0	52	**100.0**	0	0.0

• Right route.	0	0.0	52	**100.0**	0	0.0
• Right site.	0	0.0	52	**100.0**	0	0.0
• Right documentation.	0	0.0	52	**100.0**	0	0.0
• Hand washing.	0	0.0	0	0.0	52	**100.0**
Equipment preparations : Check						
• Sterility of medication and equipment.	0	0.0	21	**40.4**	31	59.6
• Expiry date of medication and equipment.	0	0.0	21	**40.4**	31	59.6
Patient preparations: Check:						
• Patient name.	0	0.0	52	100.0	0	0.0
• Allergies.	0	0.0	0	0.0	52	**100.0**
• Level of pain.	0	0.0	0	0.0	52	**100.0**
• Explain the procedure.	0	0.0	0	0.0	52	**100.0**
• Adjust safe patient position.	0	0.0	52	**100.0**	0	0.0
Environment preparations:						
• Excuse visitors.	0	0.0	0	0.0	52	**100.0**
• Close the doors and the windows.	0	0.0	0	0.0	52	**100.0**
• Check light.	0	0.0	0	0.0	52	**100.0**
• Keep the patient's privacy.	0	0.0	0	0.0	52	**100.0**
• Put the medication tray and safety needle box beside bed.	0	0.0	0	0.0	52	**100.0**
Administering medication:						
• For oral medications: (ensure that the patient is able to swallow, take adequate amount of water)	0	0.0	52	**100.0**	0	0.0
• For injections: Wearing of gloves	0	0.0	0	0.0	52	**100.0**
• Administer the medication correctly according to the right site.	0	0.0	52	**100.0**	0	0.0
• Discard the used needle in the safety needle box.	0	0.0	52	**100.0**	0	0.0
• Remove& discard gloves in the red bag.	0	0.0	0	0.0	52	100.0
• Hand washing.	0	0.0	15	**28.8**	37	71.2
• Observe for any side effects.	0	0.0	0	0.0	52	**100.0**
Documentation:						
• Date, time.	0	0.0	52	**100.0**	0	0.0
• Drug.	0	0.0	52	**100.0**	0	0.0
• Dose.	0	0.0	52	**100.0**	0	0.0
• Site.	0	0.0	52	**100.0**	0	0.0
• Signature.	0	0.0	52	**100.0**	0	0.0

Table (8): Relation between nurses' socio demographic data and safe nursing practices during zero, one, pre discharge days.

Socio demographic data	Safe nursing practices		
	Day 0	Day1	Pre discharge day
Age (years)			
▪ <25	31.64 ± 3.78	37.95 ± 5.74	18.32 ± 3.80
▪ 25 <35	33.50 ± 4.10	36.95 ± 6.88	18.84 ± 3.05
▪ 35 <45	32.0 ± 3.46	38.94 ± 6.06	21.95 ± 3.52
▪ ≥ 45	33.50 ± 4.01	39.38 ± 7.99	21.69 ± 4.44

F (p)	0.820(0.489)	0.361(0.781)	3.321*(0.027*)
Qualifications			
▪ Diploma	32.72 ± 3.87	38.08 ± 6.69	20.06 ± 3.96
▪ Technical	33.0 ± 4.24	41.88 ± 2.65	22.79 ±1.04
t (p)	0.100 (0.921)	0.794 (0.431)	0.967 (0.338)
Years of experience			
▪ <10	31.64 ± 3.78	37.95 ± 5.74	18.32 ± 3.80
▪ 10 <20	33.50 ± 4.10	36.95 ±6.88	18.84 ± 3.05
▪ 20 <30	32.0 ± 3.46	38.94 ± 6.06	21.95 ± 3.52
▪ ≥30	33.50 ± 4.01	39.38 ± 7.99	21.69 ± 4.44
F (p)	0.820(0.489)	0.361(0.781)	3.321*(0.027*)

t: Student t-test, F: F test (ANOVA), *: Statistically significant at $p \leq 0.05$

IV. DISCUSSION

Nurses are responsible for ensuring the safety and quality of patient care at all times [47]. Patient safety should be a top strategic priority for healthcare organizations and its leaders [47]. Developing a patient safety culture was one of the recommendations made by the World Health Organization (WHO) to assist hospitals in improving patient 'safety. Assessing the organization's existing safety culture and practices is the first stage of developing a safety culture and the way to access the quality and accreditation [49]. The nurse plays a key role in managing the patients undergoing hip replacement (HR) through assessing, understanding needs and providing meaningful nursing care. Patients undergoing HR have physical, psychological and social needs. The nurse works in conjunction with other health team members to ensure these needs are addressed [50]. So that, this study carried out to assess safe nursing practices applied for patients post hip joint replacement.

Regarding **socio demographic data of the studied nurses**, the results of this study showed that almost of the studied nurses were females. A similar finding was observed in Oladimeji *et al* (2012) [51] study. Also, this finding is in agreement with Labrague *et al.* (2012) [52],Vaz *et al.* (2010) [53] and Hamid *et al.* (2010) [54] they revealed the dominance of females among most of their studied samples.

Moreover, the majority of the studied nurses had a diploma degree in nursing, while less proportion of them having technical institution degree. The age group of 35 < 45 years had the highest score in applying safe practices. This is incongruent with Alwutaib, *et al*. (2012) [55]. . Looking at the duration of professional experience of nurses, it was found that majority of them had 10 < 20 years of experience.

Finally, all of the studied nurses didn't attend **any training programs related to patient safety**. The finding of this study is consistent with Aderaw studies in Ethiopia (2013) [56] who found that majority of the nurses didn't receive any training on injection safety. Similarly, Chowdhury *et al.* (2011) [57] revealed that majority of the nurses didn't receive any training programs. Supporting this finding, Lavery (2010) [58] emphasized that regular and comprehensive training programs with theoretical and practical elements are given to nurses for safe and effective practices and skills kept up to date throughout their practice lifetime.

Concerning **frequency of hand hygiene,** the present study revealed that all of the nurses were performing hand hygiene but not adequately only after exposure to patients' body fluids. All of them didn't perform hand washing before touching patient, before doing a procedure with the patient, after touching patient, after touching patient surroundings and between one patient and another. This result is in harmony with that of Ramadan (2016) [59] who reported that the majority of the studied nurses didn't comply with performing hand washing before direct contact with each patient, after contact with a patient's intact skin and

after contact with patient environment. While the nurses' compliance with hand washing after touching blood, body fluids, secretions and mucus was good but still not satisfactory. Also this finding related to the safe hand washing practice is supported by the study result of Shehata (2015) [60], who reported that, the majority of the nurses didn't practice hand washing.

In this regards, from the researcher point of view, infrequent hand washing may be due to long distance between patient room and hand washing place, a heavy clinical workload and lack of knowledge which increases the rates of infection. These results were supported by WHO (2009) [61] which reported that lack of knowledge of the correct hand hygiene technique, poor staffing and busy workloads also affect hand hygiene compliance.

Findings related to nurse **preparation of medication administration;** concerning the checking of sterility and expiry date of medication and equipment, the findings revealed that, less than half of the nurses only were performing these safety measures. In this regards, Nursing and Midwifery Council NMC (2008) [62] reported that expiry dates should be verified prior to initiation or administration of therapy. Medications must not be administered and products and equipment must not be used beyond their expiry dates. Moreover, all medical equipment, dressings and solutions used during invasive procedures must be sterile. Findings related to **patient preparation in medication administration;** showed that all the nurses were checked but not adequately, patient name, medication rights and performing hand washing but all of them didn't explain the procedure to patients, check allergy, level of comfort and pain. These results were supported by Saad (2007) [63] in her study about Developing standards of intra-operative nursing intervention for general surgery. She reported that the operating room nurses had inadequate performance regarding patient preparation for anesthesia. In this regards, NMC (2008) [62] stressed that the nurse must check the patient not to be allergic to the medicine before administering it. In this respect, the Royal College of Nursing RCN (2003) [64] mentioned that explanation will help to relax the patient, and it is good practice to ensure that the patient is aware of the procedure.

Concerning the **environmental preparation of medication administration;** such as excuse visitor, close doors and windows, check lighting and keep patient privacy, the study results revealed that all of the nurses didn't practice these items. In these regards, Mahmood *et al* (2012) [65] reported that a supportive physical environment is important to reduce factors that may directly or indirectly contribute to errors. Both physical and organizational environments need to be addressed for an effective intervention to reduce medication and nursing errors.

In relation to **nurse' preparations of safe wound dressing**, it was detected that all the nurses had fair practices in checking written physician orders, patient's unit for supplies, gathering equipment, identifying patient, assisting patient to comfortable position for easy wound access, placing disposal bag within reach away from sterile area, opening sterile packet using aseptic technique, covering wound and hand washing. These findings were contradicting the results of Eskander *et al* (2013) [66] who reported that study sample showed acceptable performance in surgical wound care, especially in relation to dressing frequency, and following principles of aseptic techniques during dressing. In this regards, the key elements of postoperative wound management include timely review of the wound, appropriate cleansing and dressing, and early recognition and intervention of wound complications [67]. Accordingly, in this study concerning **safe dressing preparations,** all of the studied nurses didn't explain the procedure to the patient, preparing the environment, placing rubber sheet under patient and wearing of face mask, additionally all of them were documenting only the time of dressing. Hassan (2004) [68] Supported this findings regarding the nurses' performance. The results revealed that the majority of the nurses did not carry out or perform certain procedures in relation to infection control precaution in maternity and

child health (MCH) centers such as use of protective barriers e.g. gloves, mask, apron, correct disposal of needles and sharp instruments.

As regards the safe nursing practices applied for patients related to **positioning during day zero** post hip joint replacement, it was noted that majority of the nurses had good practices regarding putting patient in supine position with abducted pillow between legs postoperatively. In this regard, proper positioning of the affected extremity is vital in the initial postoperative period so, that the joint prosthesis will not dislocate [(26)]. All of the nurses had poor practices in relation to **vital signs monitoring** also, it was noted that all of them measured inadequately the temperature and pulse only, but concerning blood pressure and respiration measurement, they didn't.

Regarding **neurovascular assessment of the operated leg**, it was found that highest proportions of the nurses had good practice in checking the temperature of the operated leg, while all of them had poor practice in documenting the neurovascular assessment. According to Johnston and Hardcastle (2011) [(69)], early detection of neurovascular deterioration is vital in avoiding long term disability so that, the nursing staff should recognize the context of neurovascular assessment and should communicate clinical concerns to the appropriate treating team [(70)].

In relation to **encourage patient to perform both of deep breathing, coughing and ankle exercises postoperatively**, the results revealed that all nurses didn't encourage patients to perform deep breathing, coughing and ankle exercises, this may be due to lack of nurses' awareness about the importance of these exercises postoperatively. In this regard, coughing, deep breathing exercises and early mobility are essential postoperatively to reduce atelectasis and reinstate the muscoscilliary elevator as soon as possible [(71)]. Although many previous studies have reported that ankle exercise, and deep breathing separately, increases the velocity of venous return in the lower extremity, the study of Oh-Yun Kwon *et al*. (2003) [(72)] was the first to determine the effects of ankle exercise combined with deep breathing (ADB) on the blood flow velocity in the femoral vein.

Concerning **hip precautions checking**, it was seen that majority of the nurses instructing the patients but not adequately to avoid hip bending past 90° in standing, sitting or lying position, while all of them neither instructing patient to avoid crossing of legs in sitting position nor in/out twisting of the operated hip. In this regard, the patient should follow hip precautions as taught by the nurse for about 4 months post surgery which includes; avoid bending the hip more than 90 degrees, bending not more than a right angle at any time either sitting, getting up, or bending and avoiding twisting, rotating or swiveling the hip. In walking, keeping the toes pointing ahead and lift the feet at turning, avoiding of crossing legs or bringing the operated leg across the body midline [(29)].

Regarding **patient ambulation in the first day postoperative**, it was noted that the majority of nurses were good in assisting patient to sit at the bed side, getting out of the bed safely, walking for few steps, sitting on the chair and using assistive devices in a safe correct manner. On the other hand they had fair practice in ensuring that the floor was kept dry and free from crowdedness. In this regard early ambulation is the most significant general nursing measure to prevent postoperative complications, Lewis *et al* (2004) [(73)].

Concerning **safe home environment,** the results revealed that minority of the studied nurses were good in instructing patient about keeping electric appliance/cords out of patient's way, home furniture be arranged, and chairs be firm high with armrests. While all of them didn't instruct the patient about keeping lamp, flashlight and telephone are within reach. Also they didn't instruct patients to remove throw rugs from the floor, cooking equipment is easy to reach, stairways have a strong handrail on both sides and slip resistant rug is next to

bathtub. In this regard, the use of home assessments and appropriate modifications, home care providers are able to decrease the risks for patient falls, improve patients' accessibility in and around their homes, decrease patients' dependence on caregivers, allow patients to perform activities of daily living efficiently and keep patients living independently in their home environments as long as possible[74].

Regarding **patient education,** it was noted that all of the nurses had poor practice regarding educating the patient about getting in/out the toilet, taking a bath/shower, taking in/off clothes, wearing of socks, time of resuming sexual relation, safe getting in/out to the car and time of resuming work again. While about half of them, were adequately educating the patient about care of wound site, observing signs and symptoms of wound infection and the possible postoperative complications. This result is congruent with study of Fielden *et al* (2003) [75]. They investigated the discharge preparation of patients subjected to total hip replacement surgery. This study demonstrates that nursing care does not comprise systematically teaching treatment continuity to these patients. In this regard the discharge plan is a way for the nursing staff to express their care toward patients. Nurses are ethically responsible for the patient education process and should carefully determine what they need to know. In addition, nurses should recognize the best moment for patients to learn [75] and use interventions that would guarantee self-care continuity. Hospital discharge planning should start as soon as patients are admitted to the institution and should be developed throughout the hospitalization period [76].

As regarding the **overall percentage score of studied nurses in relation to safe nursing practices** during zero, first, pre discharge days, it was found that all the nurses' practices were poor. While the mean and standard deviation of safe nurses' practices in the day one postoperative was higher than the pre discharge day. Also, the same in relation to safe hospital environment, it was noted that the mean and standard deviation of safe hospital environment maintained by nurses during day one postoperative were higher than the pre discharge day. From the researcher point of view, this may be due to the importance of day one postoperative as it is the day of patients' ambulation as the patients are getting out of beds. It was noted also, in the same day, the nurses were more concerned in keeping safe environment in patients' wards as to maintain patients' safety during their transfer.

Regarding the **relation** between studied nurses' socio demographic data and safe nursing practices post hip replacement, safe medication administration, frequency of hand washing, safe wound dressing during zero, one, pre discharge day; it was noted that there was no significant statistical relation between studied **nurses' qualifications** and their **practices scores**. While in relation to **nurses' qualifications** and their practices scores in relation to **safe hospital environment**, there was a significant statistical relation between them and their practices scores; as the diploma nurses got the higher practice scores than the technical nurses. Similar to this result Philips *et al* (2002) [77] found that diploma nurses develop stronger professional level skills. But contradicting this result Shahin (2012) [78] found that bachelor nurses score was significantly higher in knowledge and practice scores compared to diploma nurses in the study about enteral nutrition.

In relation to **safe nursing practices applied for patients post hip joint replacement.** As noted from the current study, the findings revealed that all of nurses in general had poor practice which is interpreted as unsafe nursing care provided for post hip joint replacement patients. Poor nursing practice might be related to the unavailability of in service training program which has a negative impact on nurse's performance and the quality of care. On the other hand, from the researcher observations, some nurses worked by repetition, imitation and experience. Therefore efforts are needed to correct unacceptable nurses' practice.

Finally, the analysis of the present study findings had revealed many areas where nurses are lacking the competent skilful practices. Continuous in service nursing education and staff management will help in achieving safe and successful outcome of the treatment plan provided for patients post hip joint replacement surgery.

V. CONCLUSION

Based on the findings of the present study, it can be **concluded** that, diploma nurses had the higher level of practice than technical nurses. All the studied nurses didn't receive any training programs related to patient safety in Orthopaedic Department. Nurses' safety practices applied for patients post hip joint replacement were poor along the three days postoperatively. There was significant relation between the nurses' safety practices and their age, years of experience; as the practice level improved with increasing age and years of experience. Poor nurses' safety practices might be related to the unavailability of in service education and training programs which has a negative impact on nurses' level of safe practice and the quality of care.

VI. RECOMMENDATIONS

Based on the findings of this study, the following **recommendations** had been suggested:
Improving nurses' practices through encouraging them to participate in educational programs, attending seminars, workshops, lectures and recent researches related to safety post hip replacement. An updated procedure manual about safe nursing practices should be available to every nurse in the Orthopedic Department. Illustrated booklet in Arabic language including the most important points regarding patient safety post hip joint replacement surgery should be given to each patient.

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