Safety Nursing Practices for Fall Control for Patients Post Internal Fixation Surgeries of the Lower Limb

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Abstract

Fall control is a vital component for patient safety goal for both hospitals and long term care facilities. Fall post internal fixation surgeries can result in negative outcomes among patients and healthcare providers. **Aim**: the aim of this study is to assess safety nursing practices for fall control for patients post internal fixation surgeries of the lower limb. **Study design**: a descriptive research design. **Subject**: all available nurses (80 nurses) involved in providing direct care for patients post internal fixation surgery at El-Hadara Orthopedic and Traumatology University Hospital and Damanhur National Medical Institute Hospital. **Tool**: safety nursing practices for fall control for patients post internal fixation surgeries of the lower limb: observational checklist. **Results**: this study showed that 90% of nurses had unsatisfactory level of practice regarding fall control post internal fixation surgeries. Moreover, it reveals that there is a positive statistical significant relationship between the safe nurses' practices and their level of education. **Conclusion**: this study concluded that the majority of nurses had unsatisfactory practices regarding environmental safety, safe use of mobility aids for walking and safe exercises. **Recommendation**: In-service education program for nurses about fall control and update procedure manual to be available in each orthopedic unit.

Keywords: Safety nursing practices, Fall control, Internal fixation surgeries, Lower limb.

Introduction:

Lower limb fractures often are associated with high energy trauma. Musculoskeletal trauma may also result in joint dislocation, soft tissue edema of muscle and joints, nerve, tendon, and vascular damage, injuries to body organs. The burden of long bone fractures has impacts on the patient physical, social, financial, occupational and psychological health. Additionally, it has impact on society through the loss of productivity, the direct and indirect costs of treatment and the additional contribution to morbidity and mortality. The management and treatment of lower limb fractures add significantly to the expenses of any health care system because of the cost of surgery, possible rehospitalisation and the physical rehabilitation of patients. So, the initial evaluation and treatment of the patient must occur simultaneously (Alsheikhly & Alsheikhly, 2018; Singaram, & Naidoo, 2019).

Open Reduction and Internal Fixation (ORIF) represent the gold standard for the treatment of lower limb fractures to restore anatomical alignment, ensure immediate stabilization, adequate bone healing, avoiding future cartilage degeneration, and is essential for allowing early motion postoperative that may place patients at increased risk for fall. Postoperative falls are common and have a considerable impact on postoperative morbidity, life quality worsening and health care costs (Macera, Carulli, Sirleo, & Innocenti, 2018; Savvidou, Zampeli, Koutsouradis, Chloros, Kaspiris, & Sourmelis, et al., 2018).

Falls cause a slew of physical symptoms, including increased injury, decreased mobility, reduced physical activity and function, hospitalization and/or nursing home placement, and increased morbidity and death (Ott, 2018). Furthermore, Patients' emotional, and social health are all affected by falls following internal fixation surgery. Individuals who fall may stay in the hospital for an additional 12.3 days on average, and the occurrence of such occurrences may raise hospital costs by up to 61 percent. Requiring assistance with Activities of Daily Living (ADL), using a walking aid, and a history of falling either in a hospital or prior to admission are associated with injurious post-operative falls. Therefore, fall incidents and their resultant negative outcomes are a considerable problem for the inpatient population and healthcare providers (Mata, Azevedo, Policarpo, & Morae, 2017).

Falls post internal fixation surgery are more likely to result in physical injury and increased risk for fractures. Requiring assistance with Activities of Daily Living (ADL), using a walking aid, and a history of falling either in a hospital or prior to admission are associated with injurious post-operative falls. Therefore, fall incidents and their resultant negative outcomes are a considerable problem for the inpatient population and healthcare providers (Hill, Hoffmann, & Haines, 2013). According to the Center for Disease Control (CDC),2020, reported that the prevalence of fall in the United States, in year 2018, about 28% of adults. This results in about 36 million falls each year. While in the British National Health System, multicentre study estimated that falls comprised about 40% of all reported patient incidents (Dooley, 2019).

Moreover, according to WHO Global Report on Falls at Africa, 2015, no data are available on the incidence of falls in Africa. Globally, the incidence may vary depending on interaction of intrinsic and extrinsic factors. Prospective studies have reported an incidence of 30% to 60% falls per year. While the statistical records of El Hadara Orthopedic and Traumatology University Hospital in Alexandria, illustrated that the prevalence of fall post internal fixation surgeries about 3.6% in 2018 and increased to 4% in 2020. So, there are high levels of evidence to recommend effective interventions for fall control, including a standardized assessment of risk factors for falls, universal fall precautions, effective & safe walking aids, non-slip floors, side railings in beds, and patient and caregiver instructions, and home environmental safety. All of these intervention depend on multidisciplinary care to ensure that staff provide the best safety practices to patients postoperatively (Mata, Azevedo, Policarpo, & Morae, 2017).

Fall control is an international patient safety goal for both hospitals and long term care facilities. According to Maslow's pyramid of human needs people work to meet their needs for safety and security after their physiological needs have been satisfied. Safety is a concept that includes measures and practices taken to preserve the life, health, and integrity of individuals. Patient safety consists of the avoidance, prevention, and amelioration of adverse outcomes or injuries stemming from the processes of health care. So, keeping patient safe while in the postoperative period is a topic of great concern for patients and nurses (Weheida, Abdullah, & Mahran, 2017).

Nurses have an important role in assisting patients with lower limb internal fixation surgeries to attain and maintain a maximum therapeutic environment for patients to control fall. They providing the patients with appropriate postoperative interventions and different safety measures during all procedure processes to control fall during the initial phase of care will greatly enhance the result of long term care (El Gammal, Weheida, & ElAbasi, 2016). Postoperative nursing practices and instructions are a major factor in the success of surgery as well as reducing the incidence of fall post internal fixation surgery. Education is a fundamental part for fall control to nurses and patients. The use of written and video-based educational material in addition to a follow-up by nurses to provide information and directions at the patient 's bedside proved to be significantly more effective than providing the patient with the educational material only s (Khalifa,2019).

The American Nurses Association (ANA) and the National Quality Forum (NQF) use patient falls as a nursing sensitive quality indicator. Fall control is a significant concern for the healthcare system and because nurses are at the frontline of patient care and play a fundamental role in this aspect. They are directly responsible for conducting patient safety and fall control procedures within acute care settings (Avanecean et al.,2017; King et al., 2018). Furthermore, satisfactory practices of nurses can significantly influence the success of any fall prevention programs (Khalifa,2019). Additionally, nurses may have the greatest impact on reducing patient falls. Due to their 24-hr presence, nurses have the most consistent contact with patients and continually monitor for conditional changes (King, Pecanac, Krupp, A. Liebzeit, & Mahoney, 2018).

Obviously, nurses should be more fully aware of the consequences of fall post internal fixation surgeries of the lower limb and responsible for creating a smooth recovery with positive outcomes for the patient and providing assistance and oversight that is safe and comfortable for the patient. Further, application of high quality of nursing care plan and different safety measures during all procedure processes to control patients falls and promote their health (Odom-Forren, Reed,

& Rush, 2017). So, this research was carried out to assess safety nursing practices for fall control for patients post internal fixation surgeries of the lower limb to inquire and contribute evidence for safe nursing practices.

Aim of Study:

The aim of this study is to: Assess safety nursing practices for fall control for patients post internal fixation surgeries of the lower limb.

Research question: What are the safety nursing practices for fall control for patients post internal fixation surgeries of the lower limb?

Operational Definition: Internal fixation surgeries of the lower limb: Refers to any surgery performed unilaterally from proximal to distal part of the lower limb

Method:

Research design: A descriptive survey research design was utilized to collect data in this study. **Settings:** The study was conducted at inpatient orthopedic units of two hospitals: El-Hadara Orthopedic and Trumatology University Hospital and Damanhour National Medical Institute Hospital.

l- Hadara Orthopedic and Trumatology University Hospital; There are ten orthopedic wards female and male. The female ward includes room (A) which comprises of 22 beds, (B):20 beds, (G):20 beds, (D):20 beds and (H):21 beds. The male ward involves 5 rooms; room (A) which comprises of 19 beds, (B):18 beds, (G): 19 beds, (D): 18 beds and (H):20 beds. This hospital serves 2 governorates: Alexandria and Matroh.

2- Damanhour National Medical Institute Hospital; There are eight orthopedic wards 4 female and male wards. The female wards include room (A) which comprises of 7 beds, (B) :10 beds, (G):8 beds, (D): 9 beds. The male ward involves room (A) which comprises of 10 beds, (B):4 beds, (G): 13 beds and (D) :5 beds. This hospital serves El Behira governorate

Subjects: The study comprised all available nurses (80 nurses) in these settings involved in providing direct care for patients post internal fixation surgery. Fifty-six nurses available at El-Hadara Orthopedic and Trumatology University Hospital (those nurses were distributed as 31 nurses in male ward, 25 nurses in the female & their qualifications are 5 bachelor and 51 diploma holders). and twenty-four nurses available at Damanhour National Medical Institute (those nurses were distributed as 11 nurses in male ward, 13 nurses in the female & their qualifications are 2 bachelor and 22 diploma holders).

Tool of the study: One tool was used to collect data in this study.

Tool: Safety Nursing Practices for Fall Control for Patients Post Internal Fixation surgeries of the lower limb observational checklist: It was developed by the researchers based on literature review (World Health Organization, 2017; Fekry et al., 2016; Faltas, 2018) to assess safety nursing practices for fall control for patients post internal fixation surgeries of the lower limb. It was consisted of two parts:

Part I: Nurse's Sociodemographic Data: This part aim to collect data related to nurse's sociodemographic as: age, gender, marital status, level of education, qualifications, years of experience and training related to patient`s safety.

Part II: Safety Nursing Practices for Fall Control for Patients Post Internal Fixation Surgeries of the lower limb: It was developed to observe nurses' practices related to 9 points as mentioned below:

1. Patients fall risk factors
2. Universal fall precautions
3. Environmental safety
4. Safe nursing activities
5. Safe and proper use of different mobility aids for walking applied for patients post internal fixation surgeries of the lower limb.
6. Safe exercise practices
7. Instruction on safe methods of carrying out activities of daily living
8. Teaching patients about safe precautions postoperative to control fall.
9. Pre discharge safety

Scoring system: A scoring system related to nurses` safety practices responses was scored on three point Likert scale for each item as the following:

- Done correctly and completely (2)
- Done correctly but incompletely (1)
- Not done / wrongly done (0)

Total score for nurses` practices will be classified as the following:

- A score of more than 75% will be considered "satisfactory nursing practices."

- A score of less than 75% will be considered "unsatisfactory nursing practices.".

Approval from the ethics research committee, Faculty of Nursing Alexandria University was obtained.

- Approval from research affeirs committee was obtained.
- An official letter was obtained from the Faculty of Nursing Alexandria University to the administrative authorities in El-Hadara Orthopedic and Trumatology University Hospital and Damanhur National Medical Institute Hospital to take their permission to carry out the study after explaining its purpose.
- An official approval was obtained from the administrative authorities' department heads in the identified setting to take permission to carry out the study after explaining its purpose.
- Tool of the study was developed by the researcher after a thorough review of current literature
- The developed tool was submitted to a jury of 2 experts in the field of Orthopedic surgery and 3 experts in Medical Surgical Nursing, faculty of Medicine and Nursing, Alexandria University, to assess its content validity. Comments and suggestion were reviewed and necessary modifications were done.
- Reliability of the tool was identified using Cronbach's Alpha statistical test. The reliability coefficient was (0.76 %).
- A pilot study was conducted on 10% of the study sample (8 nurses) to ascertain the applicability, clarity and feasibility of the developed tool and necessary modifications were done. Those nurses were excluded from the study sample.
- Each nurse caring for patients post internal fixation surgery was observed three times in different shifts (morning and evening) for each item of practice to assess safe nursing practices for fall control at any time in the period between the first post-operative day till discharge.

- Data were collected throughout a period of 3 months``` from thirteen of June to fifth of October 2020 by the researcher.
- Data were collected and analyzed to assess safe nursing practices for fall control for patients post internal fixation surgeries of the lower limb.

Ethical Considerations:

- Witness informed written consent was obtained from head nurses after explanation of the aim of the study.
- The nurses were informed that his or her participation in the study is voluntary and he / she can withdraw at any time.
- Privacy of the study participants was asserted.
- Data confidentiality was assured.

Statistics analysis:

- The collected data were coded and entered in special format to be suitable for computer feeding.
- Following data entry, checking and verification process were carried out in order to avoid any errors.
- Data were analyzed using the statistical package for social science SPSS (Version 20).
- The following statistical analysis measures were used:
- Descriptive statistical measures, included: numbers, percentages, and averages (Minimum, Maximum, Arithmetic mean (X), Standard deviation (SD).
- Statistical analysis tests, included: Chi square, student T test and ANOVA (Kirkpatrick, & Feeney, 2013).

Results:

The results of the current study included four main parts as follows:

Part I: This part includes the results related to the sociodemographic data of the studied nurses.

Table (1): Shows the distribution of the nurses according to their sociodemographic data (total n=80): As regards the sex of the studied nurses, this table shows that the majority (88.8%) of nurses were female while only nine of them were male. Also, in relation to their age, the table reveals that nearly half of the studied nurses (42.5%) were in the age group of 35 > 45 years, while the lowest

proportion of the studied nurses (8.8%) were in the age group of < 25 years. Also, as regards marital status, the results show that most of the studied nurses were married (80.0%) while the lowest proportion were single and widowed (10.0%) respectively.

In relation to their Qualification, the table clears that the highest proportion of the studied nurses (91.3%) had diploma degrees, while only (8.7%) had a bachelor's graduate. Concerning Years of experience, the results show that about one third of the studied nurses (31.3%) had experience from 20 > 30 years. while only (10.0%) had experience ≥30 years. Finally, the table also illustrates that near three quarters of the studied nurses (70.0%) didn't attend educational courses\ training programs related to patient safety practices.

Part II: This part illustrates the percentage, mean and standard deviation of the studied nurses according to their safety nursing practices for patients post internal fixation of the lower limb for fall control.

Table (2): Illustrate percentage distribution of nurses according to safety nursing practices assessment for patients post internal fixation of the lower limb for fall control (total n=80):

Regarding **assessment of patient mobility problems** this table shows that about three quarters of nurses didn't **assess patient mobility problems on bed & out of bed with their gait** (76.2% & 78.7%) respectively. Concerning **assessment of use or require assistive device for mobility,** the results show that slightly above half of nurses (56.2%) were do it correctly and completely. While, near three quarters of nurses (71.2%) didn't **assess the medications that could cause sedation or confusion.** As regard the mean and standard deviation of nurses practice according to **patients fall risk factors** equal 5.15 ± 3.47.

Table (3): Illustrate percentage distribution of nurses according to universal precautions for safety nursing practices for patients post internal fixation of the lower limb for fall control (total n=80):

In relation to this table, it was noted that slightly more than half of nurses (51.2%) were correctly but incompletely **orient the patient with the health care environment.** While, the majority of nurses (82.5%) didn't **shows call light use for the patients.**

Regarding **keep hospital bed brakes locked** and **ensure that the chair wheels are locked when stationary,** the table reveals also that the highest proportion of nurses (87.5 % & 90.0%) had practice it correctly and completely respectively. While slightly more than half of nurses (53.7%) had correctly but incompletely **keep patient care areas uncluttered.** Concerning the mean and standard deviation of nurses practice according to **universal fall precautions** were 12.25 ± 4.47.

Table (4): Shows percentage distribution of nurses according to their practices for safe environment for patients post internal fixation of the lower for fall control (total n=80):

Concerning **furniture**, this table shows that the majority of nurses (80.0%) were correctly and completely **keep commode beside the patient bed**. Moreover, about two fifths of nurses (43.7%) were correctly but incompletely **ensure a firm, straight back chair with armrests.**

Regarding **bathroom safety**, the results illustrate that all studied nurses (100%) didn't **ensure a slip resistant rug is next to the bathtub.** Also, about two thirds of nurses (68.7%) didn't ensure **a raised toilet seat with armrests**. While, about two thirds of nurses (63.7%) were correctly and completely **assist unsteady patients when going to the bathroom**.

In relation to **paths and stairways**, the table represents that the highest proportion of nurses didn't **check that stairways have a strong handrail on both sides & ensure that the paths free from any obstacles**, (65.0%&78.6%) respectively.

Concerning **the floor**, this table reveals that slightly more than half of nurses (56.2%) were correctly but incompletely **ensure that the throw rugs are removed from the floor**. While, the majority of nurses didn't **ensure repairing or replacing the floor covering & ensure replacing high, broken, or missing thresholds** (66.2% & 77.5%) respectively.

As regard the **lightning**, the results show that about two thirds of nurses (61.2%) were correctly and completely **ensure that the bedroom has enough nightlights**. On the other hand, the majority of nurses (76.2%) didn't **ask for replacing broken call light cords or lengthen cords.**

Concerning **easy access**, the results reveal that the majority of nurses (82.5%) didn't **maintain call bell/ light within safe reach**.

As regard the mean and standard deviation of nurses practice according to **environmental safety** were 23.39 ± 11.09. With maximum Mean $\pm$ SD for **furniture** followed by **lightening** were $(6.44 \pm 3.05 \ \& \ 5.86 \pm 3.37)$ respectively and minimum Mean $\pm$ SD for **easy access** equal (1.88 ± 1.24).

Table (5): Display percentage distribution of nurses according to their practices for safe patients' ambulation post internal fixation of the lower limb for fall control (total n=80):

Concerning **positioning patient in bed postoperatively**, this table notes that the percent of nurses were correctly and completely **maintain bed rest immediately usually in supine position** and **elevate the operative leg above the level of the heart with billow** (66.2% & 50.0%) respectively.

Regarding **sitting standing balance**, this table reveals that the highest proportion of nurses didn't instruct the patient to **sit at the bedside, move buttocks to the bed edge and sit for a few minutes to prevent orthostatic hypotension** (77.5%, 81.2% & 86.2%) respectively. In relation to **safe patient ambulation**, this table represents that about two thirds of nurses (68.7%) didn't instruct the patient to **move walking aid forward.**

As regard **getting on the chair,** the results show that about two thirds of nurses didn't instruct the patient to **slide operated leg forward & push the body to the back of the chair** (68.7% & 57.5%) respectively**.**

Concerning **getting out of the chair,** the results illustrate that slightly above half of nurses (55.0%) were correctly and completely instruct the patient to **place the un affected leg at the edge of the chair**. While, the same percent of nurses (55.0%) didn't educate the patient to grasp the walking aid by the hand of the affected side.

Regarding **getting upstairs safely**, the results represent the highest proportion of nurses (83.7%) didn't instruct the patient to step up with unoperated leg, then step up with operated leg, and move walking aid.

Concerning **getting down stairs safely**, the table show that majority of nurses (87.5%) didn't instruct the patient to down with walking aid first, step down with an operated leg, then step down with unoperated leg.

As regard the mean and standard deviation of nurses practice according to **safe patient ambulation** were 25.54 ± 14.98. With maximum Mean $\pm$ SD for **getting on the chair** and minimum Mean $\pm$ SD for **getting upstairs safely** were $(5.90 \pm 3.83, 1.93 \pm 3.37)$ respectively.

Table (6): Illustrate percentage distribution of nurses according to their safety nursing practices in relation to use of different mobility aids post internal fixation of the lower limb for fall control (total n=80):

Concerning to **safe and proper use of different mobility aids for walking**, this table shows that about two thirds of nurses (61.2%) didn't **observe independent and safe usage of assistive devices**. While, about two thirds of nurses (62.5%) were correctly and completely **ensure that they have sufficient unobstructed maneuver ability and circulation space**. In addition to, about half of nurses (50.0%) didn't **ensure that all handle height adjustment fastenings are secured**. As regard the mean and standard deviation of nurses practice according to **safe and proper use of different mobility aids** equal 2.99 ± 2.10.

Table (7): Shows percentage distribution of nurses according to safety exercise practices for patients post internal fixation of the lower limb for fall control (total n=80):

Concerning **isometric exercises**, this table represents that the majority of nurses had no instruct the patient to **avoid holding breathing during exercises**, **relax completely for several seconds** and **practice isometric exercises 3 times/day** (83.7% & 86.2% & 67.5) respectively.

Regarding **range of motion exercise**, this finding reveals that the highest proportion of nurses **didn't adjust the bed to a comfortable height, position the patient in correct body alignment, ask the patient to take a period of rest at the end of each motion, and practice each series of exercises 2 or 3 times daily** (78.7% & 93.7% & 86.2% & 67.5%). In relation to the mean and standard deviation of nurses practice according to **safe exercises** equal 8.34 ± 8.63.

Table (8): Shows percentage distribution of nurses according to safety nursing practices for activities of daily living for patients post internal fixation of the lower limb for fall control (total n=80).

In relation to this table, it was found that the majority of nurses were correctly and completely

instruct the patient to **wear clothes with a suitable length** and **the footwear should be fit-sized** (61.2% & 81.2%) respectively.

On the other hand, the highest proportion of nurses didn't instruct the patient **to wear adaptive footwear with Velcro straps and zippers, use the installed grab bars during the shower& toilet, avoid long time bathing to prevent orthostatic hypotension and use a shower chair** (66.2%, 81.2%, 87.5% & 90.0%) respectively. As regard the mean and standard deviation of nurses practice according to **safe methods of carrying out activities of daily living** equal 11.65 ± 2.58.

Table (9): Display percentage distribution of nurses according to safety nursing practices for patients post internal fixation of the lower limb in relation to instructions given pre discharge for home environment (Third observation only) (total n=80).

This table emphasized that the highest proportion of nurses didn't instruct the patients to keep **carpets secured with no wrinkles, don't keep small pets at the home, raised mattress is available, fix any uneven flooring in doorways & slip resistant rug is next to the bathtub** (75.0%,93.7, 73.7%, 86.2% & 95.0%) respectively.

Furthermore, all of nurses (100%) didn't instruct the patients to **install grab bars on the bathroom walls if applicable & didn't provide written discharge instructions to control fall**. As regard the mean and standard deviation of nurses practice according to **safe home environment instructions pre hospital discharge** equal 10.03 ± 4.49.

Part III: This part presents distribution of the nurses according to their level of safe practice, mean percent score and it's ranking.

Table (10): Illustrate percentage distribution of the nurses regarding patient safety level by domains (total n=80):

In relation to this table, it was clarified that the total scores of the studied nurses practice (90.0%) regarding the patient safety practices were **unsatisfactory** with mean ± SD equal 99.33 ± 37.38.

As regard **the environmental safety**, the table reflects that overall percent score of the studied nurses practice (88.8%) were unsatisfactory. Also, concerning **safe exercise practices**, the results represent that overall percent score of the studied nurses practice

(100%) were unsatisfactory. Further regarding **Instruction on safe methods of carrying out activities of daily living and safe home environment instructions pre hospital discharge** it is representing that overall percent score of the studied nurses practice (97.5% &98.8%) respectively were unsatisfactory.

Table (11): Represents the overall mean percent score, and ranking of nurses practice regarding patient safety by domains (total n=80):

This table reveals that the descending ranking from the maximum mean percent score of nurses practices was (55.68%) for **universal fall precautions**. This followed by **Instruction on safe methods of carrying out activities of daily living** that represent (48.54%). while the minimum mean percent score of nurses practices was (29.19 %) for **safe exercise practices**.

Part IV: This part demonstrates the relationship between the studied nurses' practice levels, mean score and their sociodemographic data.

Table (12): Illustrate the relationship between nurses' practice levels and their sociodemographic data (total n=80):

The findings reveal that there are a **positive statistical significant** relationship between the safe nurses' practices and their level of education, years of experience and attendance of training programs were represent (χ^2=69.041 ^{FE}p<0.001* , χ^2=7.425 ^{MC}p=0.033* & χ^2=13.995 ^{FE}p=0.001*) respectively. While **No statistical significant difference** was detected between safe nurses' practices and their sex, age and working department.

Table (12): Represents the relationship between nurses' practice mean scores and their sociodemographic data (total n=80):

Concerning **level of education**, there are a **positive statistical significant difference** between the safe nurses' practices and their qualifications, where (t=27.926 p<0.001*) which indicates that the practice improved with increasing level of education. Regarding **the years of experience,** there are a **positive statistical significant difference** between the safe nurses' practices and their years of experience, where (F=3.198 p=0.028*) which indicates that the practice improved with increasing years of experience**. Moreover,** concerning attending training programs, there are a **positive statistical significant difference**

between the safe nurses' practices and attending training programs, where (t=3.075 p=0.004*) which indicates that nurses that attend training programs have satisfactory practice than others.

While **No statistical significant difference** was observed between safe nurses' practices and their sex, age and working department where (t=0.975 p=0.332, F=1.041 p=0.380 & t=0.533 p=0.596) respectively.

Table 1: Distribution of the nurses according to their sociodemographic data (total n=80):

Nurses' sociodemographic data	Total N=80	
	No.	**%**
Sex		
• Male	9	11.3
• Female	71	88.8
Age (years)		
• <25	7	8.8
• 25-	26	32.5
• 35-	34	42.5
• ≥45	13	16.3
Min – Max 22-51 Mean ± SD 37.33 ± 9.551		
Level of education		
• Diploma degrees in nursing	73	91.3
• Bachelor degrees in nursing	7	8.7
Marital status		
• Single	8	10.0
• Married	64	80.0
• Widowed / Divorced	8	10.0
Working department		
• Male ward	42	52.5
• Female ward	38	47.5
Years of experience		
• <10	24	30.0
• 10-	23	28.8
• 20-	25	31.3
• ≥30	8	10.0
Min – Max 2-32 Mean ± SD 11.33 ±4.017		
Attendance of training program about patient safety		
• Yes	24	30.0
• No	56	70.0
Forms of the training program about patient safety	**N= 24**	
• Educational course	11	45.8
• Training program	3	12.5
• Conference	8	33.3
• Workshop	2	8.3
Duration of the training program	**N= 24**	
• Less than one week	12	50.0
• One week	3	12.5
• Two weeks	5	20.8
• Three weeks and more	4	16.7

Table (2): Percentage distribution of nurses according to safety nursing practices assessment for patients post internal fixation of the lower limb for fall control (total n=80

Items of assessment	Levels of practice					
	Not done / wrongly done (0)		Done correctly but incompletely (1)		Done correctly and completely (2)	
	No.	**%**	**No.**	**%**	**No.**	**%**
Assess patient's fall risk factors						
History of falls in the past 3 months.	30	37.5	23	28.6	27	33.8
Patient mobility problems on bed.	61	76.2	5	6.2	14	17.5
Patient mobility problems out of bed with their gait.	63	78.7	6	7.5	11	13.7
Use of or require assistive device for mobility.	16	20.0	19	23.7	45	56.2
Type of prescribed medications.	52	65.0	14	17.5	14	17.5
Medications that could cause sedation or confusion.	57	71.2	13	16.2	10	12.5
Min- Max **Mean ± SD**	**0.0 – 12.0** **5.15 ± 3.47**					

Table (3): Percentage distribution of nurses according to universal precautions for safety nursing practices for patients post internal fixation of the lower limb for fall control (total n=80):

Items of universal fall precautions	Levels of practice					
	Not done / wrongly done (0)		Done correctly but incompletely (1)		Done correctly and completely (2)	
	No.	%	No.	%	No.	%
Universal fall precautions						
Orient the patient with the health care environment.	21	26.2	41	51.2	18	22.5
Shows the patient call light use.	66	82.5	5	6.2	9	11.2
Check that sturdy handrails in patient bathrooms, room, and hallway.	44	55.0	26	32.5	10	12.5
Place the hospital bed in a low position when a patient is resting in bed	44	55.0	5	6.2	31	38.7
Raise bed to a comfortable height when the patient is transferring out of bed.	38	47.5	2	2.5	40	50.0
Keep hospital bed brakes locked.	4	5.0	6	7.5	70	87.5
Ensure that the chair wheels are locked when stationary.	3	3.7	5	6.2	72	90.0
Use night lights or supplemental lighting.	22	27.5	13	16.2	45	56.2
Ensure that the floor surfaces clean and dry.	27	33.7	27	33.7	26	32.5
Ensure cleaning up all spills from the floor promptly.	33	41.2	26	31.4	21	26.2
Keep patient care areas uncluttered.	26	32.5	43	53.7	11	13.7
Min- Max **Mean ± SD**	**3.0 – 22.0** **12.25 ± 4.47**					

Table (4): Percentage distribution of nurses according to their practices for safe environment for patients post internal fixation of the lower limb for fall control (total n=80):

Safety environment items	Levels of practice					
	Not done / wrongly done (0)		Done correctly but incompletely (1)		Done correctly and completely (2)	
	No.	%	No.	%	No.	%
Floor						
Ensure that the floors free of crowdedness.	32	40.0	26	32.9	22	27.1
Ensure that the throw rugs are removed from the floor.	32	40.0	45	56.2	3	3.7
Ensure that the floor not broken or uneven ground.	36	45.0	20	25.0	24	30.0
Ensure repairing or replacing the floor covering.	53	66.2	11	13.7	16	20.0
Ensure replacing high, broken, or missing thresholds.	62	77.5	6	7.5	12	15.0
Min- Max **Mean ± SD**	**0.0 – 9.0** **3.41 3.03**					
Lighting						
Ensure that the bedroom has enough nightlights.	30	37.6	1	1.25	49	61.2
Ensure that the bathroom has enough nightlights.	45	56.3	4	5.0	31	43.7
Ensure that the ward has enough nightlights from the bedroom to the bath.	44	55.0	4	5.0	32	45.0
Ask for replacing burned out or flickering bulbs.	29	36.2	23	28.7	28	35.3
Ask for repairing broken room lights or call lights.	15	18.7	48	60.0	17	21.3
Ask for replacing broken call light cords or lengthen cords.	61	76.2	8	10.0	11	13.7
Min- Max **Mean ± SD**	**0.0 – 12.0** **5.86 ± 3.37**					
Easy access						
Arrange room & keep belongings within safe reach as (walking aids).	16	20.2	17	21.2	47	58.7
Maintain call bell/ light within safe reach.	66	82.5	2	2.5	12	15.0
Min- Max **Mean ± SD**	**0.0 – 4.0** **1.88 ± 1.24**					
Total score for environmental safety **Min- Max** **Mean ± SD**	**8.0 – 50.0** **23.39 ± 11.09**					

Safety environment items	Levels of practice					
	Not done / wrongly done (0)		Done correctly but incompletely (1)		Done correctly and completely (2)	
	No.	%	No.	%	No.	%
Environmental safety						
Furniture						
Ensure that the unstable and broken furniture are fixed or replaced with stable one.	40	50.0	2	2.5	38	47.5
Push bed to the wall.	45	56.1	29	36.3	6	7.5
Ensure that the loose bathroom handrails are secured.	69	86.3	0	0.0	11	13.7
Keep commode beside the patient bed.	5	6.2	11	13.7	64	80.0
Check that wheelchairs are properly functioning before transferring the patient.	25	31.2	14	17.5	41	51.2

		Levels of practice				
Ensure a firm, straight back chair with armrests.	31	38.6	35	43.7	14	17.5
Min- Max	2.0 – 13.0					
Mean ± SD	6.44		3.05			
Bathroom						
Ensure a slip resistant rug is next to the bathtub.	80	100.0	0	0.0	0	0.0
Ensure a raised toilet seat with armrests.	55	68.7	12	15.0	13	16.2
Assist unsteady patients when going to the bathroom.	11	13.7	18	22.5	51	63.7
Min- Max	0.0 – 4.0					
Mean ± SD	2.11		1.26			
Paths and Stairways						
Check that stairways have a strong handrail on both sides.	52	65.0	11	13.7	17	21.3
Ensure that paths free from any obstacles.	63	78.6	11	13.7	6	7.5
Remove unused equipment as canes/walkers / bedside commode.	17	21.2	15	18.7	48	60.0
Put the bedside table next to the bed or across the bed.	45	56.3	16	20.0	19	23.7
Tie electrical cords out of path (TV, phone).	40	50.0	21	26.2	19	23.7
Min- Max	0.0 – 8.0					
Mean ± SD	3.69 ± 2.14					

Table (5): Percentage distribution of nurses according to their practices for safe patients' ambulation post internal fixation of the lower limb for fall control (total n=80):

Safe patients ambulation items	Level of practice					
	Not done / wrongly done (0)		Done correctly but incompletely (1)		Done correctly and completely (2)	
	No.	%	No.	%	No.	%
Safe Nursing Activities:						
Positioning in bed postoperatively:						
Immediately maintain bed rest usually in supine position.	10	12.5	17	21.2	53	66.2
Elevate the operative leg above the level of the heart with billow.	34	42.5	6	7.5	40	50.0
Help the patient to change position at least every 2 hours while on bed rest.	57	71.2	17	21.2	6	7.5
Educate the patient didn't sleep on affected leg if lateral position.	54	67.5	0	0.0	26	32.5
Min- Max	0.0 – 8.0					
Mean ± SD	3.75 ± 2.21					
Sitting standing balance:						
Instruct the patient to:						
Sit at the bedside.	62	77.5	0	0.0	18	22.5
Move buttocks to the bed edge.	65	81.2	2	2.5	13	16.2
Sit for a few minutes to prevent orthostatic hypotension.	69	86.2	0	0.0	11	13.7
Keep operated leg forward until standing.	34	42.5	7	8.7	39	48.7
Stand safely using an assistive device.	29	36.2	18	22.5	33	41.2
Min- Max	0.0 – 9.0					
Mean ± SD	4.38 ± 2.75					
Safe patient ambulation:						
Instruct the patient to:						
Move walking aid forward.	55	68.7	4	5.0	21	26.2
Step with the operated leg.	46	57.5	6	7.5	28	35.0
Step with unoperated leg.	46	58.6	8	10.0	26	32.5
Min- Max	0.0 – 6.0					
Mean ± SD	2.49 ± 2.81					
Getting on the chair:						
Ask the patient to:						
Sit in a firm, straight back chair with armrests.	30	37.5	42	52.5	8	10.0
Secure the chair against the wall.	40	50.0	6	7.5	34	42.5

Safe patients ambulation items	Level of practice					
	Not done / wrongly done (0)		Done correctly but incompletely (1)		Done correctly and completely (2)	
	No.	%	No.	%	No.	%
Slide operated leg forward.	55	68.7	1	1.2	24	30.0
Lower body slowly into a chair using armrests.	24	30.0	13	16.2	43	53.7
Push the body to the back of the chair.	46	57.5	12	15.0	22	27.5
Keep leg out in front of chair.	28	35.0	20	25.0	32	40.0
Min- Max	0.0 – 11.0					
Mean ± SD	5.90 ± 3.83					
Getting out of the chair:						
Instruct the patient to:						
Move forward to the edge of the chair.	32	40.0	8	10.0	40	50.0
Place the un affected leg at the edge of the chair.	30	37.5	6	7.5	44	55.0
Grasp the walking aid by the hand of the affected side.	44	55.0	9	11.2	27	33.7
Grasp the arm of the chair by the hand on the un	32	40.0	8	10.0	40	50.0

affected side.						
Use both arms and un operated leg to push self-up from the chair.	21	26.2	45	56.2	14	17.5
Min- Max **Mean ± SD**	**0.0 – 10.0** **5.18 ± 2.99**					
Getting upstairs safely:						
Instruct the patient to:						
Step up with unoperated leg.	67	83.7	0	0.0	13	16.2
Step up with an operated leg.	67	83.7	0	0.0	13	16.2
Move walking aid.	67	83.7	0	0.0	13	16.2
Use a handrail with the free hand.	71	88.7	0	0.0	9	11.2
Min- Max **Mean ± SD**	**0.0 – 8.0** **1.93 ± 3.37**					
Getting down stairs safely:						
Instruct the patient to:						
Down with walking aid first.	70	87.5	0	0.0	10	12.5
Step down with an operated leg.	70	87.5	0	0.0	10	12.5
Step down with unoperated leg.	70	87.5	0	0.0	10	12.5
Min- Max **Mean ± SD**	**0.0 – 8.0** **1.94 ± 2.99**					
Total score of Safe patient ambulation **Min- Max** **Mean ± SD**	**0.0 – 52.0** **25.54 ± 14.98**					

Table (6): Percentage distribution of nurses according to their safety nursing practices in relation to use of different mobility aids post internal fixation of the lower limb for fall control (total n=80):

Safety nursing practices items for use of different mobility aids	Levels of practice					
	Not done / wrongly done (0)		Done correctly but incompletely (1)		Done correctly and completely (2)	
	No.	%	No.	%	No.	%
Safe and proper use of different mobility aids for walking						
Observe independent and safe usage of assistive devices.	49	61.2	18	22.5	13	16.2
Ensure that they are fitted properly.	28	35.0	27	33.7	25	31.2
Ensure that they have sufficient unobstructed maneuver ability and circulation space.	30	37.5	0	0.0	50	62.5
Make sure all handle height adjustment fastenings are secured.	40	50.0	11	13.7	29	36.2
Min- Max **Mean ± SD**	**0.0 – 7.0** **2.99 ± 2.10**					

Table (7): Percentage distribution of nurses according to safety exercise practices for patients post internal fixation of the lower limb for fall control (total n=80):

Safety exercise practices items	Levels of practice					
	Not done / wrongly done (0)		Done correctly but incompletely (1)		Done correctly and completely (2)	
	No.	%	No.	%	No.	%
Safe exercise practices						
Isometric exercise:						
Instruct the patient to:						
Avoid holding breathing during exercises.	67	83.7	1	1.2	12	15.0
Hold muscles tightly contracted for 5-15 seconds.	49	61.2	21	26.2	10	12.5
Relax completely for several seconds.	69	86.2	0	0.0	11	13.7
Repeat exercises for 10-15 times for each muscle group	39	48.7	23	28.7	18	22.5
practice isometric exercises 3 times/day.	54	67.5	19	23.7	7	8.7
Min- Max **Mean ± SD**	**0.0 – 8.0** **2.71 ± 2.95**					
Range of motion exercise:						
Adjust the bed to a comfortable height.	63	78.7	2	2.5	15	18.7
Lower bedside rail only on the side of working.	40	50.0	8	10.0	32	40.0
Position the patient in correct body alignment.	75	93.7	0	0.0	5	6.25
Instruct the patient that all motions should be done slowly and gently.	39	48.7	18	22.5	23	28.7
Ask the patient to take a period of rest at the end of each motion.	69	86.2	0	0.0	11	13.7
Increase the frequency of motion gradually.	30	37.5	0	0.0	50	62.5
The joint should be moved until there is resistance.	40	50.0	11	13.7	29	36.2
Do not exercise patients to the point of pain.	40	50.0	11	13.7	29	36.2
practice each series of exercises 2 or 3 times daily.	54	67.5	18	22.5	8	11.4
Min- Max **Mean ± SD**	**0.0 – 14.0** **5.63 ± 5.86**					
Total score of safe exercises **Min- Max** **Mean ± SD**	**0.0 – 20.0** **8.34 ± 8.63**					

Table (8): Percentage distribution of nurses according to safety nursing practices for activities of daily living for patients post internal fixation of the lower limb for fall control (total n=80):

Activities of daily living items	Levels of practice					
	Not done / wrongly done (0)		Done correctly but incompletely (1)		Done correctly and completely (2)	
	No.	%	No.	%	No.	%
Instruction on safe methods of carrying out activities of daily living:						
Instruct the patient to:						
Clothes should be easy to wear and take off.	28	35.0	27	33.7	25	31.2
Wear cotton and fit clothes.	22	27.5	19	27.1	39	48.7
Wear clothes with a suitable length.	31	38.7	0	0.0	49	61.2
Avoid wearing loose clothing.	25	31.2	27	33.7	28	35.0
Footwear should be fit-sized	9	11.2	6	7.5	65	81.2
The sole of footwear should be non-slippery.	40	50.0	7	8.7	33	41.2
Avoid wearing slippers or socks-only when going out.	39	48.7	7	8.7	34	42.5
Ensure shoelaces are properly tided.	25	31.2	27	33.7	28	35.0
Wear adaptive footwear with Velcro straps and zippers.	53	66.2	8	10.0	19	23.7
Use the installed grab bars during the shower& toilet.	65	81.2	0	0.0	15	18.7
Avoid long time bathing to prevent orthostatic hypotension.	70	87.5	0	0.0	10	12.5
Use a shower chair.	72	90.0	0	0.0	8	10.0
Min- Max **Mean ± SD**	**4.0 – 18.0** **11.65 ± 2.58**					

Table (9): Percentage distribution of nurses according to safety nursing practices for patients post internal fixation of the lower limb in relation to instructions given pre discharge for home environment (Third observation only) (total n=80):

Safety nursing practices items pre discharge for home environment	Levels of practice					
	Not done / wrongly done (0)		Done correctly but incompletely (1)		Done correctly and completely (2)	
	No.	%	No.	%	No.	%
Safe home environment instructions pre hospital discharge						
Instruct the patient to keep:						
Carpets secured with no wrinkles.	60	75.0	7	8.75	13	16.2
Remove electric appliances, wires, cords, and water hoses from the floor.	37	46.2	24	30.0	19	23.7
The home furniture is well arranged.	36	45.0	21	26.2	23	28.7
Don't keep small pets at the home.	75	93.7	0	0.0	5	6.25
A lamp, telephone, assistive devices and cooking equipment are within reach.	39	48.7	18	22.5	23	28.7
A raised mattress is available.	59	73.7	11	13.7	10	12.5
Fix any uneven flooring in doorways.	69	86.2	5	6.2	6	7.5
Nightlights along the path from the bedroom to the bath.	28	35.0	27	33.7	25	31.2
Remove throw rugs from the floor.	28	35.0	27	33.7	25	31.2
Immediate cleaning up any liquid on the floor.	20	25.0	20	25.0	40	50.0
Install grab bars on the bathroom walls if applicable.	80	100.0	0	0.0	0	0.0
A slip resistant rug is next to the bathtub.	76	95.0	0	0.0	4	5.0
A raised toilet seat with armrests.	39	55.7	8	10.0	33	41.2
Safe usage of assistive devices.	49	61.2	18	22.5	13	16.2
Sit in a firm, straight back chair with armrests.	28	35.0	27	33.7	25	31.2
Provide written discharge instructions to control fall.	80	100.0	0	0.0	0	0.0
Min- Max **Mean ± SD**	**0.0 – 24.0** **10.03 ± 4.49**					

Table (10): Percentage distribution of the nurses regarding patient safety level by domains (total n=80):

Safety nursing practices	Unsatisfactory		Satisfactory	
	No.	%	No.	%
Patient's fall risk factors	68	85.0	12	15
Universal fall precautions	69	86.3	11	13.8
Environmental safety	71	88.8	9	11.3
• Furniture	72	90.0	8	10.0
• Bathroom	80	100.0	0	0.0
• Paths and Stairways	72	90.0	8	10.0
• Floor	69	86.3	11	13.8
• Lighting	60	75.0	20	25.0
• Easy access	64	80.0	16	20.0
Safe patient ambulation:	69	86.3	11	13.8
• Positioning in bed postoperatively	67	83.8	13	16.3
• Sitting standing balance	63	78.8	17	21.3
• Safe patient ambulation	52	65.0	28	35.0
• Getting on the chair	58	72.5	22	27.5
• Getting out of the chair	61	76.3	19	23.8
• Getting upstairs safely	60	75.0	20	25.0
• Getting down stairs safely	61	76.3	19	23.8
Safe and proper use of different mobility aids for walking.	72	90.0	8	10.0
Safe exercise practices	80	100.0	0	0.0
• Isometric exercise	79	98.8	1	1.3
• Range of motion exercise	69	86.3	11	13.8
Instruction on safe methods of carrying out activities of daily living	78	97.5	2	2.5
Safe home environment instructions pre hospital discharge	79	98.8	1	1.3
Total Patient Safety Practices	72	90.0	8	10.0
Total Patient Safety Practices Min- Max Mean ± SD	39.0 – 183.0 99.33 ± 37.38			

Table (11): The overall mean percent score, and ranking of nurses practice regarding patient safety by domains (total n=80):

Safety nursing practices	Mean Percent Score	Rank
Patient's fall risk factors	42.92 %	3
Universal fall precautions	55.68 %	1
Environmental safety	41.76 %	4
• Furniture	45.98 %	3
• Bathroom	35.21 %	5
• Paths and Stairways	36.88 %	4
• Floor	34.13 %	6
• Lighting	48.85 %	1
• Easy access	46.88 %	2
Safe patient ambulation:	40.16 %	5
• Positioning in bed postoperatively	46.88 %	3
• Sitting standing balance	43.75 %	4
• Safe patient ambulation	41.46 %	5
• Getting on the chair	49.17 %	2
• Getting out of the chair	51.75 %	1
• Getting upstairs safely	24.06 %	7
• Getting down stairs safely	24.22 %	6
Safe and proper use of different mobility aids for walking.	37.34 %	6
Safe exercise practices	29.19 %	8
• Isometric exercise	27.13 %	2
• Range of motion exercise	31.25 %	1
Instruction on safe methods of carrying out activities of daily living	48.54 %	2
Safe home environment instructions pre hospital discharge	31.33 %	7
Total Patient Safety Practices	40.7%	

Table (12): Represents the relationship between nurses' practice mean scores and their sociodemographic data (total n=80):

Sociodemographic data	Mean Scores of practice Mean ± SD	Test of significance
Sex		
• Male	45.40 ± 19.00	t=0.975
• Female	40.11 ± 14.85	p=0.332
Age (years)		
• <25	47.48 ± 16.33	
• 25-	42.84 ± 17.83	F=1.041
• 35-	39.25 ± 13.16	p=0.380
• ≥45	36.60 ± 14.55	
Level of education		
• Diploma degree in nursing	37.42 ± 11.50	t=27.926
• Bachelor degree in nursing	75.0 ± 0.2	p<0.001*
Working department		
• Male orthopedics	41.58 ± 15.83	t=0.533
• Female orthopedics	39.74 ± 14.89	p=0.596
Years of experience since graduation		
• <10	37.60 ± 12.26	F=3.198
• 10-	40.73 ± 14.27	p=0.028*
• 20-	46.98 ± 18.28	
• ≥30	30.33 ± 8.45	
Attendance of training workshops about patient safety		
• Yes	49.64 ± 18.81	t=3.075
• No	36.88 ± 11.81	p=0.004*

t: student t test   F: ANOVA test   *: Statistically significant at $p \leq 0.0$

Discussion:

Falls are considered a major global public health problem and the leading cause of accidental or unintentional injury and hospitalization. Also, it is a major patient safety problem that calls for global solutions. Patient safety is the main dimension of healthcare quality, considering minimizing, reporting, and analyzing incidents that often lead to avoidable adverse effects. Improving patient safety and quality of health care has therefore been brought forward as a priority issue for health services around the world especially fall prevention. (Ott, 2018); Khalifa, 2019).

Nurses as the largest group of healthcare providers, their proximity to patients, and their vital role in health care system give them the responsibility to improve patient safety. Hence, Nurses should be capable to assess the risk of falls and make proper care plans or references to a physician or required parties. A nurse's role starts to form the early prevention of fall and further follow up and evaluation. Fall control continue to be a point of concern in the health care system to exclude further morbidity (Liu, Zheng, Liu, Baggs, Liu, Wu, & You, 2018). So, the orthopedic nurses should have

advanced knowledge and technical skills regarding appropriate nursing care for fall control and to achieve desired patient outcomes. Therefore, the current study was aimed to assess safety nursing practices for fall control for patients post internal fixation surgeries of the lower limb. In relation to socio demographic data

Regarding nurses' qualifications, and years of experience:

The present study revealed that; the highest proportion of the studied nurses had diploma degrees. This result was supported by Farahat, Alshamy, & Abbas (2020) at Assiut university who reported that all nurses were juniors having a diploma in secondary nursing school. A similar finding was found by Suliman&Aljezawi (2018); Alnuaimi, Ali, & Al Younis (2020) at Jordan they stated that the majority of nurses were diploma graduates. Also, the finding comes with Hassan, Elmolla, & Morsy (2018) in Egypt who found that the majority of the sample were technical nurses.

Regarding the Years of experience in the orthopedic ward, more than half of the study subjects had more than 10 years of experience. This is in agreement with Zyada, Mohamed, &

Mohamed (2017) in a study entitled "Nurses` knowledge and practices of body mechanics in the surgical units" which performed in Alexandria university, they reported that the majority of nurses had equal or more than 10 years of experience. But this result was in contradicted with Cutinho et al., (2018); Koros et al., (2018) who found that the majority of their participants had working experience (1-5) years.

Concerning the assessment of patients for fall risk factors:

Concerning **the total scores of the studied nurses' practices regarding the assessment of patients for fall risk factors**, the present study showed that the majority of nurses had unsatisfactory practices. This perhaps may be due to underestimation of continuous monitoring of the patient that had been risky for fall, nurses not qualified in this skills as well as the nurses relying on the physician to carry out those measures.

The present findings are inconsistent with another study in Saudi Arabia done by **Ganabathi, Mariappan, & Mustafa (2017)** entitled" Nurses knowledge, attitude and practices on fall prevention in King Abdul Aziz Hospital, Kingdom of Saudi Arabia" who reported that the majority of nurses had good practices regarding following the color coding system for high risk patients for fall. Also, **Najafpour et al., (2019)** emphasized in his study at Tehran university educational hospital that nurses must use the fall risk assessment tool to establish which patients are at risk on admission till discharge.

In relation to the universal fall precautions:

The present study revealed also that; the total scores of the studied nurses' practice regarding the universal fall precautions were unsatisfactory. This result may be related to lack of supervision and ineffective communication with patients. This finding is mismatched with **Jones et al., (2015)** who stated that two thirds or more of the seventy hospitals reported using six of the nine listed universal fall risk reduction interventions. Less than half reported using the universal interventions of increased lighting and low beds.

In relation to nurses' practice related to environmental hospital safety:

he current study results revealed that the majority of nurses provided unsatisfactory score practices related to hospital environmental safety. This may be attributed to a lack of knowledge about the importance of those measures, the lack of nurses' time spent on direct patient care and delegation these duties to nurse aids or family members. This finding is supported by **Faltas (2018)** who revealed that the level of knowledge and practice of his study regarding environmental hazards pre implementations of the nursing guideline are inadequate. This finding is mismatched with **Gandomani, & Masoudi Alavi (2020)** who emphasized that improving the work environment that was perceived by the nurses can result in greater professionalism, improved job satisfaction, and job engagement. Work environments that support professional nursing practice result in more positive outcomes for both the nurses and the patients.

In relation to safe patient ambulation post internal fixation of the lower limb:

It is revealed that the total scores of the studied nurses' practice regarding the safe patient ambulation, the present study showed that the majority of nurses had unsatisfactory practices. This may be due to nurses have too many patients to care for, didn't have time to complete all necessary care, and that this missed nursing care increases the odds of poor patient outcomes, as well as the lake of nurses' knowledge towards the standard of nursing care needed for patients post internal fixation surgery of the lower limb to control fall. This was in agreement with a study done by **Fekry et al., (2016); Said et al., (2020)** they found that their study nurses had poor practices related to safe patient activities as positioning in bed postoperatively, sitting standing balance, safe transfer, safe patient ambulation, and stairs climbing.

Regarding total practice scores of studied nurses, the present study showed that the majority of studied nurses had unsatisfactory total safety practice. This finding was in line with **Wahba et al., (2017); El-saidy, Weheida, Aziz, &El desoky(2019)** they reported that nearly most of the studied nurses

had unsatisfactory total practice. This result may be related to the most of the studied nurses had nursing diploma and didn't receive any training courses regarding patient safety, underinvestment in further education Also, lack of availability of updated manual procedures about safe nursing practices and Arabic colored educational booklet concerning causes and hazardous of falls that should be given to every nurses and patients in the Orthopedic Departments.On the other hand, from the researcher's point of views, some nurses worked by experience. Therefore, efforts needed to correct unsatisfactory nurses' practice as in service education and evaluation of the nurses' knowledge and practices. In addition to, nurses' shortages, workloads and poor working conditions. So, overcoming these shortages may also improve nurses' practices.

Regarding the relation between studied nurses' socio-demographic data and safe nursing practices for fall control post internal fixation surgeries, the results were noted that there was a positive statistical significant relationship between the studied nurses' practices and their qualifications. which indicated that the practice improved with increasing level of education as the bachelor nurses got higher practice scores than the diploma nurses. This result was supported by; **Suliman, Aloush, Aljezawi, & AlBashtawy (2018); El-saidy et al., (2019)** they found that bachelor degree nurses was significantly higher in knowledge and practice mean scores compared to diploma nurses.

This finding was contradicted with **Teshager, Engeda, & Worku (2015)** who reported in his study that diploma nurses were about two times more likely to practice when compared to those with a bachelor's degree or higher. From the researcher's point of view, the educational background is a significant predictor for providing satisfactory nursing practices for patients post internal fixation surgery and has a positive impact on fall control. There is no doubt to points out the need for the presence of bachelor's degree nurses in hospitals. A higher level of education has been associated with higher knowledge and practice level. The increased number of nurses with a low level of education might be due to the increased need for nursing staff to cover the

workload and staff shortage regardless of their level of education **Atiah, Bedeir, Ezzat, & Abd Elhafeez, (2020).**

Conclusion:

Based on the finding of the present study, it can be concluded that the majority of nurses had unsatisfactory level of overall practice regarding fall control post internal fixation surgeries. Moreover, it can be concluded that the most unsatisfactory nurses' practices were safe exercise practices followed by safe home environment instructions pre hospital discharge**.**

Recommendations:

Upon the completion of this study, the following recommendations are suggested:

- In service education program for nurses to update their practices concerning fall control and quality of care provided for patients post internal fixation surgeries of the lower limb.

- Guidelines should be available in each orthopedic ward.

- Replication of the study on large probability sample.

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