Improving Nurses 'Compliance with Standard patients' Fall Prevention Protocol in Surgical Departments

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Abstract

Background: Fall in hospitals is an important clinical, legal, and directing problem, which is considered one of the most nursing-sensitive quality indicators for international patient safety goals. Nursing education about fall prevention programs is the key in improving nurses' adherence and reducing patient falls. **The aim of this study** was to improve nurses 'compliance with standard patients' fall prevention protocol in surgical departments **Design:** Quasi-experimental design was applied to achieve the aim of the study. **Setting**: this study was conducted in orthopedic and neurosurgical inpatient departments affiliated to Ain Shams university hospitals. **Subjects:** A convenient sample included all nurses (60) working in previously mentioned study settings. **Tools:** data were collected through 3 tools; first tool: A self-administered nurses' structured questionnaire, second: Nurses' attitude scale, and third: Nurses' observational checklist. **Results:** It revealed that nurses' knowledge, compliance and attitude regarding fall prevention protocol, were statistically significantly improved at post and follow up phases after educational program intervention as compared to pre-intervention phase (x=41.016& 34.143 at p <0.001; x=85.714 & 77.260 at p<0.001 ; x=24.740 & 26.494 at p <0.001 respectively).**Conclusion:** nurses 'compliance with standard patients' fall prevention protocol in surgical departments was improved in the form of improvement of the level of knowledge, practice, and attitude of studied nurses after educational intervention in the immediate post and follow up phases as compared to pre-intervention phase **Recommendation:** Provision and availability of study booklet about fall risk assessment and prevention in all hospital settings to encourage and reinforce its application

Introduction

One prevalent adverse occurrence in hospitals is inpatient falls. Falls are the most common kind of safety incident that acute hospitals record, and they can harm patients in both physical (e.g., hip bone injury) and non-physical ways (e.g., low confidence). In order to avoid falls in hospitals, patients should get a multifactorial falls risk assessment and a multifactorial intervention tailored to their specific risk factors. A method like this is expected to reduce the annual cost of falls by up to 25% and the incidence of inpatient falls by 25%–30%. Yet, there is a large, unexplained variation in the number and kind of assessments conducted and the approaches taken between health institutions **(Randell et al., 2021)**.

Falls, the second leading cause of global mortality, result in approximately 646,000 deaths annually, with 37.3 million falls requiring medical attention. The third strategic objective of the World Health Organization's Global Patient Safety Action Plan 2021–2030 states that incidence rates and reduction related to specific patient safety outcomes measures at the national, subnational, and health care facility level, related to avoidable deaths due to patient falls during hospitalization, are intended to achieve the greatest possible reduction in avoidable harm worldwide due to unsafe health care **(World Health Organization, 2021)**.

Hospital falls remain a global problem despite continuous efforts to prevent them in both public and private health care settings. Falls are incidents that are frequently seen in hospital settings. In hospitals, there were between two to ten falls for every 1,000 patient days which raised to 700 to 3,500 fall accidents each year in hospitals where 1,000 beds are occupied **(Takase, 2022)**.

Fall prevention measures are nursing interventions designed to improve patient safety. Medical institutions are emphasizing the value of fall prevention programs due to the deployment of evaluations and an increase in medical legal actions. The most reported safety

hazards are falls in hospitals, it can result in serious problems for patients. Falls are a serious issue because they can lead to financial losses, physical pain for patients, and diminished quality of life for those who are admitted to hospitals longer than necessary and have to pay more for diagnostic measures, surgeries, or rehabilitation **(Cho & Jang, 2020)**.

There are many factors predispose risks of falls among hospitalized patients. Environmental factors raise the risk of falls. Falls are more common when an aged person is moving to a new place or when they need to exercise more postural control and mobility (such as while walking on an uneven or slippery surface). An increased risk of falls might result from age-related alterations to the nervous system, which is important in stability and balance maintenance. Maintaining or regaining balance in response to any disturbance (such walking on an uneven or slippery surface) may be hampered by age-related eyesight loss, muscular power reductions, and velocity changes. Any kind of muscular weakness significantly increases the risk of falling. The use of drugs, along with certain acute and chronic diseases, are risk factors **(Vaishya & Vaish ,2020)**.

The human cost of falling also includes the dread of falling again, as well as the resulting loss of confidence, independence, and social isolation. Even if the physical injury is minor, it can prolong healing and have long-term ramifications for the patient's health, since fear of falling can lead to limitation of exercise and related loss of muscle and balance function, raising the chance of falling even more. Falls may also be quite upsetting for families and professionals. Falls in hospitals are a major source of complain and can lead to lawsuit. Falls in the hospital are also connected with a longer duration of stay and greater utilization of health care resources **(Ali et al., 2017)**.

Adult patients after surgery are more likely to fall because of a variety of risk factors, including altered gait and balance, multiple medications following surgery, changes in circulation status, and unfamiliarity with the perioperative setting. There are two primary categories of fall risk factors among perioperative patients that have been identified:

(a) intrinsic factors, which include age, gender, musculoskeletal disorders, patient imbalance, and drug use; and (b) extrinsic factors, which include health system's shortcomings in terms of medical equipment maintenance and design, human resources, communication, training, and teamwork. **(Taheri-Kharameh et al., 2020).**

Medical-surgical patients are more at risk of falls and injuries during hospital stays than patients in critical care, with the occurrence of these events depending on the features of the unit. In the USA, there are 3.67 to 6.26 falls for every 1000 patient days (PDs) reported by medical-surgical facilities. A percentage of 20% of falls in medical-surgical units cause some kind of damage, and 2% cause major harm. The patient's recently changed mobility, adverse drug reactions, prior fall history, frequent urination, and changed mental state all in an unfamiliar setting may put them at higher risk of falling **(Cuttler et al., 2017)**.

Fall prevention is a major concern. As a result, several national recommendations have been established to reduce patient falls. Improving patient safety requires the implementation of fall prevention strategies for patients who are at risk **(Saadati et al., 2020).**

Compliance is the level of someone in implementing a rule in the recommended behavior. Compliance is obedience to the commands and the starting point of a change in the attitude and behavior of individuals. Several studies suggest that nurses lack an understanding of patient safety culture and have bad compliance with fall risk assessment. Based on the introduction, this study was conducted in order to evaluate the effect of educational program on the level of nurses' compliance with fall prevention protocol in surgical departments **(Putri & Permanasari, 2018)**.

Hospital falls prevention measures include training nursing staff, clinicians, changing surroundings, using assistive devices, therapeutic exercises, medication reviews, ensuring optimal nutrition, treating cognitive impairment, and implementing policies, procedures, and leadership that minimize falls **(Heng et al., 2020)**.

Nurses are in a unique position to identify patients who are at risk and implement fall prevention programs since they are the healthcare professionals who conduct assessment upon admission. Nurses have the most regular touch with patients and are constantly on the lookout for conditional changes due to their 24-hour presence. It is possible to achieve extremely favorable outcomes by increasing the training that these professionals get in preventative programs and including their leaders in a culture of accountability **(Montejano-Lozoya et al., 2020)**.

Significance of the study.

The most frequent adverse events documented in hospitals are patient falls. In U.S. hospitals, there are between 700,000 and 1 million patient falls annually, which result in between 250,000 injuries and up to 11,000 deaths. Approximately 2 percent of hospitalized patients experience at least one fall while they are there. 10% of falls cause serious injuries, accounting for around one in four injuries overall. Nursing staff play an essential role in developing fall prevention programs. Nurses are essential stakeholders in fall prevention projects. They are the largest group of healthcare staff, and their efforts are crucial in integrating fall prevention policies and achieving outcomes **(Mikos et al., 2021)**.

Preventing falls after surgery requires knowledge of fall circumstances, timing, and related injuries. So, assessing level of nurses' compliance (knowledge, practice & attitude) regarding fall prevention protocol and assessing the factors/ barriers affecting nursing compliance with Hospitals' fall prevention protocol are major concerns for effective fall prevention measures (**Cho & Jang (2020).**

Falls are a probable and avoidable health hazard that can be decreased by following effective fall prevention measures. Some findings show that inpatient falls might reflect nurse quality. Despite the various benefits of patient fall prevention programs being established, few interventional trials have been carried out in Egypt on this subject especially in surgical in-patient units. Therefore, this study was conducted to develop nursing educational programs regarding fall prevention and evaluate its effect on improving compliance with fall prevention protocol in surgical departments. Hoping this study aids in the development of new policies, strategic plans and protocol at the hospitals to enhance health care quality regarding fall prevention.

Aim of the Study:

The aim of this study was to improve nurses 'compliance with standard patients' fall prevention protocol in surgical departments through:

- Assessing the level of nurses' compliance (knowledge, practice & attitude) regarding standard patients' fall prevention protocol.
- Developing and implementing an educational program to improve nurses' compliance regarding standard patients' fall prevention protocol.
- Evaluating the effect of educational program on nurses' compliance (knowledge, practice & attitude) regarding standard patients' fall prevention protocol.

Research Hypothesis:

The current study hypothesizes that:

The fall prevention nursing program intervention will reflect positively on improving nursing compliance regarding standard fall prevention protocol in surgical departments, it was substituted into the following hypotheses.

- H1: The level of knowledge among nurses regarding patients' fall prevention protocol will show improvement following the nursing educational intervention.
- H2: Nurses' practices regarding compliance with patients' fall prevention protocol will show improvement following the nursing education intervention.
- H3: Nurses' attitudes toward patients' fall Prevention protocol will be positively assumed following the nursing educational intervention.

Operational definitions:

Nurses' compliance: it is operationally defined as the extent to which nurses adhere to the procedures stated in the fall prevention protocol, including nurses' practice about all fall prevention measures. This practice should

be linked to adequate knowledge and positive attitude about fall prevention strategies.

Standard Fall prevention protocol: it is an established set of rules and procedures established by hospital setting based on Egyptian ministry of health policy and relative reviewed standard procedures for patient safety and in-patients fall prevention in hospital.

Subjects and Methods:

This study will be portrayed under the four main designs as follows:
I.   Technical design.
II. Operational design.
III. Administrative design.
IV. Statistical design.

Technical design:

It includes research design, setting, subject and tools for data collection.

Research design:

Quasi-experimental research with pre-post-intervention design was used to conduct this study. This type of research design in which the same dependent variable is measured in one group of participants before (pretest) and after (posttest) a treatment is administered **(Harris et al., 2006).**

Setting:

The study was carried out in orthopedic surgical (2,3) and neurosurgical inpatient departments affiliated to Ain Shams University Hospitals. These departments deal with surgical patients who were undergoing orthopedic or neurosurgical surgeries either in pre- or post-operative hospitalization time. These patients are at a high risk of falling during the postoperative period, when pain, weakness, and expected mobility limitations, and balance disorders might impair their walking abilities.

Subjects:

A convenient sample included all nurses (60) working in orthopedic surgical (31) and neurosurgical inpatient departments (29) affiliated to Ain Shams University Hospitals. They were from both genders, with different age groups, educational levels, and years of experience, and were willing to participate in the study.

Tools for data collection:

Tool I-A self-administered nurses 'structured questionnaire

It was designed by researchers in an Arabic language based on the review of recent and related literature regarding fall prevention. It comprised of the following parts:

Part one: it addressed demographic characteristics of nurses under study such as age, marital status, qualifications, working hours, years of experience and previous fall prevention program, and availability of manual guide regarding fall prevention intervention.

Part two: It was structured by the researchers based on the related literature **(Koh et al., 2009 ; Myoung-Hee et al., 2015 & Burns et al., 2020)** to assess nurse's knowledge regarding fall prevention including fall definition (2 items), causes (5 items), types of fall accidents (4 items) , risk factors (28 items covering three main domains including patients-related factors 10, health care related factors 8 & environmental factors 10), complications (6 items), fall risk assessment (10) , fall prevention measures (15 items). Total items equal 70 items. The questions were in the form of true/ false and multiple-choice questions. Translation and retranslation into Arabic language were done.

Scoring system

A correct response was scored one and the incorrect got zero. For each domain of knowledge, the scores of the items were summed-up and the total score divided by the number of the items. These scores were converted into a percentage score. Knowledge level was considered satisfactory if score was equal or more than 85% (59.5) and unsatisfactory if score was less than 85% (59.5).

Tool II: Nurses' Attitude Scale

It concerned with assessment of nurses' attitude regarding fall prevention protocol, it is adapted from **Choi and Oh (2013)** and modified by the researchers**,** it includes 13 items to assess attitude of nurses toward fall prevention protocol based on their self-report with options of agree, disagree, and getting a higher score means having a positive attitude towards fall prevention. The measuring scale of

attitude towards falls consisted of 3 main areas including interest in falls, responsibilities for falls' occurrence, and fall prevention. Items 2, 8, 9, 11, and 12 were reverse scored. Higher scores indicated higher levels of positivity in nurses' attitudes. Translation and retranslation into an Arabic language for the scale items were done.

Scoring system:

The nurses' total attitude was classified as negative attitude if the total score was less than 60% and positive if the total score was equal or more than 60% on a cut of value of 60%.

Tool III-Nurses' observational checklist:

The researchers designed the nursing observational checklists with guidance of standard checklists adapted from **Morse et al. (1989); Egyptian Ministry of Health, 2013 Perry et al. (2018) and Teo (2019)** to assess nurses' compliance with fall prevention protocol. The checklists were used to assess the degree of compliance with the fall prevention protocol measures and categorized into four main checklists.

The first checklist was concerned with nurses 'practice regarding the fall risk assessment to assess nurses' identification of patients at high risk for falls guided by Morse Fall Scale (12) steps. The second checklist was used to assess nurses' practice regarding hospital fall prevention protocol (measures) which highlight measures regarding universal hospital fall precautions, pain-related fall precautions, medication-related fall precautions, reporting fall incidence, in addition to patient orientation and education with total 30 steps. The third one was regarding assessment of hospital environmental-related fall prevention measures, it covers 6 main items including floor, furniture, lighting, easy access, paths, and equipment with total 25 steps. The fourth checklist was used to assess postoperative fall prevention measures including safe patient ambulation measures with a total of 18 steps.

Scoring system

The procedure steps were observed to be done correctly which was scored "1"and the steps which not done or incorrectly done were scored"0" with equal one grade for each step.

The total score for the checklists was 85 steps. For each procedure, the scores of the items were summed - up and the total score was divided by the number of the items. These scores were then converted into a percentage score. The sum of the total practice score practice was considered high compliance if the total percent score was equal or more than 90 % (≥76.5 grades) and moderate compliance if the percent score was ranged between 60% to less than or equal 75% (51 - ≤ 64 grades) while it was considered low compliance if the percent score less than 60% (<51 grades).

Fall prevention educational program.

It was designed by the researchers to improve nurses 'compliance with standard patients' fall prevention protocol in surgical departments and achieve study aims. Its content was developed based on baseline data in assessment phase regarding knowledge, practice compliance and attitude of studied nurses regarding fall prevention and guidance of scientific relative literatures. The researchers created an Arabic language booklet to reinforce the learning process among studied nurses. It includes introduction, goals, and theoretical as well practical parts regarding fall prevention. The booklet's color printing and picture illustrations improved its readability and made the material easier for nurses to comprehend. Its content was validated by a panel of academic medical surgical nursing professors. It was guided basically by **Kementerian Kesihatan Malaysia (2018); DiGerolamo *and* Chen-Lim (2021); Agency for Therapeutic Services Ministry of Health Saudi Arabia, (2022)**

<u>**II. Operational design**</u>:

It includes preparatory phase, pilot study and field work.

Preparatory Phase

It includes reviewing the related literature and theoretical knowledge of varies aspects of the study using books, articles and periodicals.

<u>**Tool validity and reliability:**</u>

Validity:

It was ascertained by a group of experts (7) from Medical Surgical Nursing specialty (5 professors & 2 assistant professors). Their opinions were elicited regarding the tools format layout, consistency and scoring system. The contents of the tools were tested regarding the tool items accuracy, relevance , competence and the necessary modifications were done accordingly.

Reliability:

The self-administered nurses 'structured questionnaire (tool 1), nurses' attitude scale (tool 2), and nurses' observational checklist (tool 3). Reliability of the study tools were confirmed statistically by Cronbach's alpha coefficient. Alpha test was equal 0.0.89, 0.85 and 0. 91 for tools 1, 2 and 3 respectively which indicate good study tool consistency.

Ethical Considerations:

The research ethical approval was obtained from the scientific research ethics committee of the faculty of nursing at Ain Shams University with code 23.04.53 on 14/4/2023. Also, another ethical approval was obtained from the ethical research committee of surgical departments affiliated to Ain Shams university hospitals when conducting this research in study setting. The researchers clarified the objective and aim of the study to the nurses who participated in the study before starting. The aim of the research was explained to the participants. Verbal consent was obtained from each nurse to participate in the study, after clarifying the procedures of the study. Participants were informed about their right to refuse participation and to withdraw at any time without any consequences. Confidentiality of data was ensured for the study subjects. Ethics, values, culture, and beliefs will be respected.

Pilot Study:

A pilot study was carried out on 10% (six nurses) of the study subjects to test the feasibility and applicability of the study; as well as to estimate the time that will be needed for each tool to be filled in. The modifications were done according to the results of the pilot study. The modifications were very minimal, so the nurses included in the pilot study were included in the study.

Field work:

Before starting the data collection process, the researcher investigates the presence of policy, manual and protocol regarding fall prevention measures in study setting. The nursing administration staff declared that there was a hospital policy and protocol regarding fall prevention measures according to Egyptian health ministry standards of patient safety. The researcher during baseline data collection process tried to assess nurses 'compliance regarding it.

Data collection and educational sessions intervention for this study was carried out through five months period in the period from mid-April 2023 till the end of September 2023. The researchers visited the orthopedic and neurosurgical department three days per week at morning and afternoon shift work. It was conducted in three phases.

A. Assessment and planning phase (pre-program intervention phase):

This phase began with a study of the relevant literature and an assessment of establishing data gathering tools. The researcher visited the selected setting 3 days per week using the previously mentioned tools after obtaining experts opinions to ensure tools validity and measurement of reliability. The researchers on the first visit meet with the nurses to explain the aim of the research and obtain their consent to participate. Nurses' cognitive knowledge and practice compliance in addition to their attitude were assessed using study tools before the intervention of educational program.

The researchers first observed nurses using observational checklists to evaluate their fall prevention practice compliance. Each nurse was observed by indirect observation during her shift work. The studied nurses were observed for their practices regarding fall risk assessment of new admission cases, application of universal fall prevention measures including patient orientation of hospital setting, their compliance to hospital environmental related fall prevention measures, as well safe postoperative patients 'ambulation and transferring measures.

The researcher then distributes a designed questionnaire and attitude scale to the investigated nurses in the clinical setting to measure their knowledge and attitudes toward fall prevention. It took 20-30 minutes to be fulfilled. The baseline assessment before program intervention consumed one month.

Considering the findings of the assessment phase, the researchers designed the educational program to address nurses' needs and deficiencies in knowledge, practice, and attitude of studied nurses. After reviewing relevant scientific resources, fall prevention protocol in the context of the Egyptian Ministry of Health protocol was incorporated with rules and procedures for fall prevention in hospital as part of an educational program. Nurses' educational program was designed according to relevant literature, baseline data and nurses 'needs. It included theoretical and practical parts regarding fall prevention interventions. This phase identified the teaching-learning strategies that were used in the program, which comprised small lecture, small group discussions for the theoretical portion, demonstrations, and re-demonstrations as well clinical training. The media used includes colored printed booklet, power-point presentation on 10.1 tablet monitor, and related videos.

Theoretical parts of educational program included: introduction about fall prevention and its purposes, goals and importance, in-patient hospital falls, definition, causes, types of fall accidents, risk factors including patients-related factors, health care related factors and environmental factors, complications of falls, fall risk assessment, fall prevention measures. Practical parts included: training regarding nurses 'practice about the fall risk assessment to assess nurses' identification for patients at high risk for falls guided with Morse Fall Scale, measures regarding universal hospital fall precautions, pain-related fall precautions, medication related fall precautions, reporting fall incidence, in addition to patient orientation and education, hospital environmental related fall prevention measures, including floor, furniture, lighting, easy access, paths, and equipment in addition to postoperative fall prevention measures including safe patient ambulation and transferring measures.

Arabic booklet regarding theoretical and practical parts of the program was formulated and developed by researchers based on planned program content and relevant literature. Its content was validated by a panel of 7 academic professors including nursing (5) and surgical professors (2) from faculties of nursing and medicine.

B. Implementation phase:

Program sessions were held in the nursing room and sometimes in lecture hall beside the study setting department if available. The nurses' educational program was presented in 3 theoretical and 3 practical sessions. Each session lasted between 35 and 45 minutes. The total number of studied nurses was 60, split into 10 groups. Each group had six nurses in each session. The first session was devoted to orientation of study participants with program objectives, content, and time plan as well as pre-test while, the last session was devoted to the program summary and post-test. Whats app group was established for all study participants to answer any questions and follow-up phase time plan. Each educational session was started with summary review to the previous session and end with conclusion of its content. Arabic booklet was distributed to all studied nurses to reinforce the learning process.

C. Evaluation phase:

The effect of educational program on nurses' compliance regarding fall prevention protocol was evaluated immediately after implementing the educational program (the post-intervention phase) and 2 months later (the follow up-phase), the nurses were evaluated using the same study tools (tool I, II, III) in the same order and sequence as the pre-intervention phase. Then, comparison between pre, post and follow up results was done using statistical test analysis to investigate nurses 'compliance improvement after educational intervention.

III. Administrative design:

An official approval with a written letter, clarifying the purpose and setting of the study will be obtained from the dean of the Faculty of Nursing, Ain Shams University. Another approval will be obtained from the director of Ain Shams University Hospital.

IV. Statistical design:

Recorded data were analyzed using the statistical package for social sciences, version 22.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage. The following tests were done Chi-square (x2) test of significance was used to compare proportions between qualitative parameters. Paired sample t-test of significance was used when comparing between related sample. Pearson's correlation coefficient (r) test was used to assess the degree of association between two sets of variables .The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following: Probability (P-value)

– P-value <0.05 was considered significant.
– P-value <0.001 was considered as highly significant.
– P-value >0.05 was considered insignificant.

Results

Table (1) displays the demographic characteristics of the sample under study. The mean age of the studied nurses is 30.58±5.72 years and 60% of them are between 20 years to less than 30 years. It was found that 51.7 % of nurses under study are working in orthopedic surgical departments and 48.3 % of them are working in neurosurgical department. Also, 86.7 % of studied nurses are females and 83.3 % of them are married. Diploma nursing graduates account for 43.3 % of studied nurses while only 15% of them are Bachelor nursing graduates with mean years of experience equal 6.52±1.81. Furthermore, 80 % of study participants had no previous training regarding fall prevention protocol and none of them (0%) reported presence of manual booklet regarding fall prevention protocol.

Table (2) demonstrated highly statistically significant increase of satisfactory knowledge level among studied nurses regarding fall definition, causes, risk factors, types and complications of fall at post-program and follow up phases as compared to pre-program phase as evident by statistical test and p—values between pre and post program phases as well pre and follow up phases respectively as 45.837 & 32.069 , 39.065 & 24.300 , 49.807 & 36.667, 45.684 & 43.212, 37.337 & 32.613 and p value <0.001.

Furthermore, this table showed highly statistically increase of satisfactory knowledge level among studied nurses regarding fall risk assessment and fall prevention measures at post-program and follow up phases as compared to pre-program phase as evidenced by statistical test (X^2) and p—values between pre and post program phases as well pre and follow up phases respectively as 45.684 & 41.016 and 30.008 & 18.888 with p value <0.001.

Figure (1) illustrated that, 23.3% the studied nurses had total satisfactory knowledge level regarding fall prevention prior to program intervention compared to 83.3% of them at the immediate post-program, and 78.3% at the follow up phases with high statistically significant difference between pre/post, and pre/follow-up phases with (x^2=41.016, P<0.001) and (x^2=34.143, P<0.001 respectively).

Table (3) demonstrates mean scores of practice compliance among studied nurses regarding fall prevention measures prior, immediate, and post 2 months of educational intervention, It was noticed there was highly statistically significant increase of mean scores of nurses compliance immediately and two months (follow up) after program intervention as compared to pre-program phase regarding fall risk assessment, general fall prevention measures, hospital environmental fall prevention measures, and safe postoperative patient ambulation and transferring measures (t = . 29.992 & 30.644; 27.806 & 27.806; 29.590 & 27.460; 22.426 & 21.326 with p <0.001 respectively).

As evidenced from table 3, the total mean scores of practice compliance regarding fall prevention prior to program intervention phase was 15.3±3.33 then increased significantly to 62.13±13.04 immediately and 58.2±12.06 two months after program intervention as evidenced by t-test and p-significance values between pre-post and pre-follow up phases (t=27.455 & 22.809 respectively and p value<0.001.

Table (4) shows comparison between the total level of practice compliance among

studied nurses regarding fall prevention measures among studied nurses prior, immediate, and post 2 months after educational program intervention. The findings revealed that 100% of nurses under study had low compliance level prior to program intervention while, 66.7 % of them had moderate level of compliance immediately and two months following program intervention with highly statistically significant increase of level of compliance at post-program and follow up phases as compared to pre-intervention phase at X2=85.714 and p <0.001.

Figure (2) displayed the total attitude toward fall prevention among studied nurses throughout program intervention phases , it was found that only 20 % of nurses under study had positive attitude regarding fall prevention prior to program intervention , this percentage was heightened significantly to 66.7% immediately after program intervention and still heightened to 68.3 % at follow up phase with highly statistically significant difference between pre and post intervention phases (X^2= 24.740; p<0.001) and pre/ follow-up phases (X^2= 26.494; p<0.001).

Table (5) shows statistically significant positive correlations between total score of knowledge, total score of practice compliance and total score of attitude in post and follow up phases, with p-value (p<0.05); while there is no statistically significant correlation in pre-program, with p-value (p>0.05).
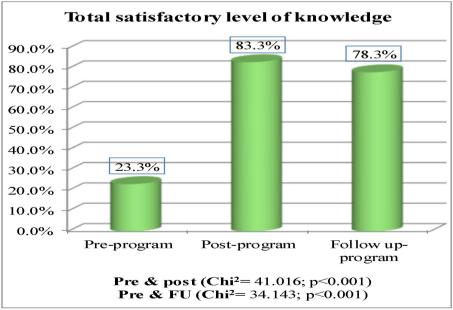
Table (1): Distribution of nurses according to their demographic and general characteristics (n=60).

Items	n= 60	%
Age		
▪ 20 - <30	36	60.0
▪ 30 - <40	18	30.0
▪ ≥ 40	6	10.0
▪ **Mean ±SD (years)**	30.58±5.72	
Gender		
▪ **Male**	8	13.3
▪ **Female**	52	86.7
Working unit		
▪ Orthopedic Surgical department	31	51.7
▪ Neurosurgical department	29	48.3
Academic qualifications		
▪ Diploma	26	43.3
▪ Technical health institution	25	41.7
▪ Bachelor's degree	9	15.0
Marital status		
▪ Single	10	16.7
▪ Married	50	83.3
Years of experience		
▪ <5	31	51.7
▪ 5-10	22	36.7
▪ >10	7	11.7
▪ **Mean ±SD (years)**	6.52±1.81 years	
*Previous training regarding fall prevention		
▪ Yes	12	20.0
▪ No	48	80.0
Presence of manual booklet regarding fall prevention protocol		
▪ Yes	0	0.0
▪ No	60	100.0

Table (2): Comparison between satisfactory level of nurses' knowledge regarding fall prevention prior, immediate, and post 2 Months after educational intervention (n=60)

Knowledge items	Satisfactory level						Chi-square/ p-value			
	Pre-program		Post-program		Follow up		Pre & post		Pre & follow up	
	N	%	N	%	N	%	X²	P	X²	P
• Fall definition	13	21.7	51	85.0	45	75.0	45.837	<0.001**	32.069	<0.001**
• Causes of falls	16	26.7	51	85.0	44	73.3	39.065	<0.001**	24.300	<0.001**
• Risk factors for fall	16	26.7	55	91.7	50	83.3	49.807	<0.001**	36.667	<0.001**
• Types of fall accidents	12	20.0	50	83.3	49	81.7	45.684	<0.001**	43.212	<0.001**
• Complications	18	30.0	52	86.7	50	83.3	37.337	<0.001**	32.613	<0.001**
• fall risk assessment	10	16.7	48	80.0	46	76.7	45.684	<0.001**	41.016	<0.001**
• Fall Prevention measures	15	25.0	46	76.7	44	73.3	30.008	<0.001**	18.888	<0.001**

Non-significant>0.05   significant <0.05*   High significant <0.001**   *satisfactory level if score ≥ 85%

Figure (1): Comparison between satisfactory total level of nurses' knowledge regarding fall prevention prior, immediate, and post 2 months after educational intervention.

Total satisfactory level of knowledge

Pre-program: 23.3%
Post-program: 83.3%
Follow up-program: 78.3%

Pre & post (Chi²= 41.016; p<0.001)
Pre & FU (Chi²= 34.143; p<0.001)

*Satisfactory level if score ≥ 85%

Table (3): Comparison between mean scores of compliance among studied nurses regarding fall prevention measures prior, immediate, and post 2 months after educational intervention (n=60).

practice items	Pre-program		Post-program		Follow up		t-test			
							Pre & post		Pre & Follow up	
	Mean	SD	Mean	SD	Mean	SD	t-	P	t-	P
• **Fall risk assessment**	1.20	0.26	7.40	1.58	6.60	1.34	29.992	<0.001**	30.644	<0.001**
- Min-Max. (0-12)	(1-3)		(5-8)		(4-8)					
• **General fall prevention measures**	5.20	1.14	21.13	4.50	21.10	4.28	27.806	<0.001**	27.806	<0.001**
- Min-Max. (0-30)	(3-16)		(16-26)		(10-24)					
• **Hospital environmental fall prevention measures**	4.10	0.87	19.70	3.99	18.30	3.91	29.590	<0.001**	27.460	<0.001**
- Min-Max. (0-25)	(4-14)		(14-21)		(9-21)					
• **Safe postoperative patient ambulation and transferring measures**	4.80	1.06	13.93	2.97	12.20	2.47	22.426	<0.001**	21.326	<0.001**
- Min-Max. (0-18)	(3-9)		(8-14)		(7-12)					
Total Mean Scores	15.3±3.33		62.13±13.04		58.2±12.06		27.455	<0.001**	22.809	<0.001**
- Min-Max. (0-85)	(11-19)		(40-78)		(37-72)					

* Non-significant>0.05   significant <0.05*   High significant <0.001**

Table (4): Comparison between total level of compliance among studied nurses regarding fall prevention measures prior, immediate, and post 2 months after educational program intervention (n=60)

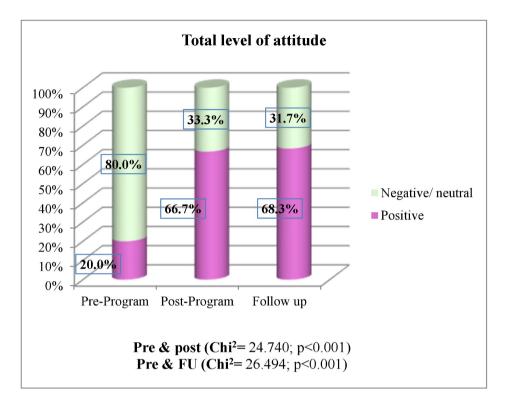| practice items	Pre n=60		Post n=60		Follow up n=60		Chi-square			
							Pre & post		Pre &follow up	
	N	%	N	%	N	%	X^2	P	X^2	P
• High compliance	0	0	10	16.6	7	11.7	85.714	<0.001**	77.260	<0.001**
• Moderate compliance	0	0	40	66.7	40	66.7				
• low compliance	60	100	10	16.7	13	21.6				

High significant at p<0.001**

Fig. (2): Comparison between total nurses' attitude regarding fall prevention prior, immediate, and post 2 months of educational program intervention (n=60).

Total level of attitude

Pre & post (Chi²= 24.740; p<0.001)
Pre & FU (Chi²= 26.494; p<0.001)

Table (5): Correlation between the studied nurses' knowledge with practice and attitude regarding fall prevention prior, immediate, and post 2 Months of educational program intervention (n=60).

Item		Total score of Knowledge		Total score of Practice	
		r	p-value	r	p-value
Pre	Score of Practice	0.256	0.722		
	Score of Attitude	0.090	0.832	0.248	0.724
Post	Score of Practice	0.824	<0.001**		
	Score of Attitude	0.784	<0.001**	0.390	0.036*
Follow up	Score of Practice	0.484	<0.001**		
	Score of Attitude	0.303	0.038*	0.498	<0.001**

Non-significant p>0.05   significant p<0.05*   High significant p<0.001**

Discussion:

Many factors influence how compliant nurses are. Certain criteria, such as age, job experience, and educational attainment, have an impact on nurses who adhere to fall prevention protocols well. Barriers including a lack of experience with the protocol, insufficient knowledge to conduct risk assessments, and inadequate training in fall risk assessment and management might affect a health care team's adherence to fall prevention protocols. Patient fall rates can be significantly decreased by staff education and adherence to the fall prevention program. A fall prevention program's inability to be implemented successfully is hampered by nurses' lack of understanding and concern. A key factor in lowering the patient fall rate is nursing staff education and adherence to the fall prevention program **(Wilbert 2013 & Cunha et al., 2022)**.

The current study aim to improve nurses 'compliance with standard patients' fall prevention protocol in surgical departments through assessing the level of nurses' compliance (knowledge, practice & attitude) regarding standard patients' fall prevention protocol, developing and implementing an educational program to improve nurses' compliance regarding it in addition to evaluating the effect of educational program on nurses' compliance regarding standard patients' fall prevention protocol.

Primarily, while examining the demographic characteristics of nurses under study, it was revealed that three-fifths of study participants, their age ranged between 20-30 years with a mean age of about thirty. Approximately, the studied nurses were distributed equally according to their working area to orthopedic and neurosurgical departments. Most of the nurses under study were females and married because, until a few years ago, nursing was only available to girls in Egyptian nursing institutions, this fact might contribute to the explanation of the high percentage of females in the current study's findings.

Regarding the qualifications of studied nurses, it was found that the majority of them were diploma and technical institute nursing graduates with an average of experience exceeding 6 years. The poor qualifications of current study participants may be due to the fact that nurses with low qualifications are always recruited within hospital wards more than hot and critical areas and this reflect their need for more reinforcement strategies during program intervention. Only a low proportion of study participants had previous training attendance regarding fall prevention and none of them reported presence of manual booklet regarding fall prevention protocol. This finding reflects the poor prerequisite of study participants regarding fall prevention and indicates their need for education and training regarding it.

Similarly, **Saadati, et al., (2020)** in their study titled " Effect of Patient Fall Prevention Program on Nurses' Knowledge and the Number of Patient Falls in one of the Teaching Hospitals in Mashhad during 2019″ found that the mean age of the studied nurses was 39.3 years, and most of the participants were female (72.8%). Moreover, the mean work experience was estimated at 6.5±4.9 years.

In this regard, the results of the study titled ″ Effect of Implementing Fall Prevention Strategies on Nurses' Performance at Neurological Diseases Intensive Care Unit" revealed that the mean age of studied nurses was 33.45±5.78 years, more than half of them had a Bachelor degree in nursing and, majority of them were females and more than half of them were married and nearly half of them, their years of experience in the neurological care unit were from five to ten years with a mean ±SD of years of experience (12.32±4.9) years. Moreover, it was observed majority of nurses did not attend any training courses before carrying out the program **(Elbasiony et al., 2021)**. The discrepancy regarding nurses' qualifications between both studies might be due to different study settings since the other study was conducted in ICU in which, nurses were recruited with bachelor's degree and high qualifications.

Also, **Cho and Jang (2020)** reported in their study titled "Nurses' Knowledge, Attitude, and Fall Prevention Practices at South Korean Hospitals: A Cross-Sectional Survey" that slightly more than three-quarters of nurses had previous participation in educational programs on fall prevention. This contradiction was due to the difference in study setting in the other study since safety and fall prevention programs are crucial prerequisites for nursing enrollment at Korean hospitals.

Notably, inadequate knowledge among nursing staff can lead to noncompliance with fall prevention protocol in hospital setting, resulting in more hospital falls **(King et al., 2018).** Providing nurses with the necessary knowledge and resources to actively participate in the fall prevention process promote their compliance to fall prevention protocol which results in a significant reduction in fall incidents and fall-related injuries, indicating the positive impact of providing relevant information and tools on patient safety and well-being **(Dykes et al., 2020).**

Comparing satisfactory level of nurses' knowledge regarding fall prevention prior,

immediately, and 2 months after educational intervention illustrated that the satisfactory level of knowledge was obtained among one fifth to nearly one third studied nurses at pre-program intervention, this percentage was increased significantly immediately and 2 months after program intervention to the majority of studied nurses regarding fall definition, causes, risk factors, types, and complications This indicates the effectiveness of the theoretical part of the program and associated booklet in coverage of all the data and information regarding abovementioned items.

This was supported by **Elbasiony et al. (2021)** who reported in their study that analysis of the mean nurses' knowledge score of the study group before, just after, and one month after program implementation displayed statistically significant differences among study phases pertaining their knowledge about risk factors of fall in neurological condition patients and fall prevention measures among three phases of the study. Also, the findings of **Bhardwaj and Chugh (2021)** in their study to evaluate the effectiveness of fall prevention program on nurses' knowledge and fall prevention practices were in the same line with the current study findings. They found that the highest mean score in the post-test knowledge questionnaire was in the area of 'risk factors and causes of fall' in addition to universal fall precautions after the implementation of an educational session on fall prevention.

Moreover, **Faltas (2018)** found in her study titled ″ Effect of Nursing Guideline on Performance of Nurses regarding Prevention of Patients' Fall in Intensive Care Units" that there were highly statistical evident improvement of satisfactory knowledge regarding definition, causes and types of fall in ICU, fall precautions , safety measures and nursing role immediate and 3 months following the guidelines implementation. Additionally, **Abou El Enein, et al. (2012)** in earlier study about knowledge and performance among nurses before and after a training program on patient falls revealed that there was a significant difference before and after the educational program application concerning the knowledge pertaining to environmental factors and patient education.

Regarding the overall satisfactory level of knowledge, the present study's findings revealed that, in contrast to the majority of nurses who gained satisfactory level of knowledge immediately following the program and more than three-quarters of them during the follow-up phases, less than one-fourth of nurses got satisfactory level of knowledge prior to program intervention with evident statistical difference between the pre/post and pre/follow-up phases.

The inadequate knowledge among studied nurses prior to program intervention from researchers' point of view might be due to poor nurses' qualification since the majority of them were diploma and technical institute nursing graduates, four fifths of participant nurses never received any prior training regarding fall prevention as well all studied nurses reported that there was no manual or procedure book regarding fall prevention protocol in study settings. However, the high significant increase of total satisfactory level at post-intervention and follow up phases prove effectiveness of the program content, media, teaching strategies and reinforcement techniques as well simplicity, comprehensiveness, and accuracy of attached booklet in enhancing knowledge regarding fall prevention among participant nurses following program intervention. Additionally, the aforementioned results corroborate research hypothesis number one, which states that the level of knowledge among nurses regarding patients' fall prevention protocol will show improvement following the nursing educational intervention.

This was like result of **DiGerolamo and Chen-Lim (2021)** in their study titled "An Educational Intervention to Improve Staff Collaboration and Enhance Knowledge of Fall Risk Factors and Prevention Guidelines″ and revealed that a comparison of the pre- and post-intervention score for each participant nurse in intervention group revealed that more than three fifths of participants had an increase in overall knowledge score due to effective fall prevention guidelines.

In the same line, the results of this study are consistent with **Bhardwaj and Chugh (2021)** whose study indicated that there was an increase in the average post-test knowledge

score compared to the average pre-test knowledge score among nursing staff after implementation of an educational session on fall prevention. They suggested that the educational intervention was successful in enhancing knowledge among nursing staff in this study. According to **Park, (2021)**, the program concerning fall prevention was effective for enhancing fall knowledge of both the patient and nurse and it was proved to be a successful approach in raising registered nurses' information about fall prevention measures. This will suggest future research to design and implement fall prevention educational program among nurses and risk patients on nursing and patient outcomes. No congruent findings were found on reviewing the previous research concerning this issue which indicates the efficiency of nursing education on attaining and sustaining knowledge pertaining to fall prevention.

According to **Sinuraya (2016),** nurses' compliance with fall prevention practices can be influenced by many factors, including their training, attitude, the availability of personnel, the necessary environment, and equipment. **Wilbert (2013)** demonstrated that staff education improves their performance and compliance with the fall prevention protocol which consequently results in crucial reduction of patient fall rate and maintain safety of patients in the postoperative period.

In the light of the current study, it was demonstrated that there was highly statistically significant increase of mean scores of nurses' practice compliance immediately and two months (follow up) after program intervention as compared to pre-program phase regarding the measures of fall risk assessment, general fall prevention measures, hospital environmental fall prevention measures, and safe postoperative patient ambulation measures. This enhancement of level of compliance with these procedures among study participants immediately and 2 months following program intervention perhaps due to many factors including; using effective standardized fall risk assessment procedure/ checklist as a part of educational program, effective guidance and supervision of the nurses under study when giving general and environmental fall prevention measures, accurate identification of

the deficient and incorrect practices regarding postoperative ambulation of patients and addressing the gap practices regarding these issues in the practical part of program intervention.

The previous explanation was supported by **Patricia (2015)** who declared that application of standards guidelines helps improve performance of nurses regarding assessment of fall risk, identifying safety indicators, applying fall precautions, determining environmental hazards and other risk factors which contributing to increase fall ratio among patients.

In the same line, **Singh and Okeke (2016)** in their study titled ″ Reducing inpatient falls in a 100% single room elderly care environment: evaluation of the impact of a systematic nurse training program on falls risk assessment (FRA)″ displayed increases in all areas of fall prevention compliance, including cognitive and environmental hazard assessment, and compliance with the protocol after training as compared to poor baseline assessment among studied nurses with inadequate falls assessment and low completion rates of the fall assessment tool.

The previous findings were also compatible with the findings of **Faltas (2018)** who reported that there was statistical evident difference among nurses at post and follow up phases regarding their practice of identifying fall risk factors, environmental hazards, and universal fall precautions. Also, **Joshi and Solankhi (2019)** declared in their study titled " Effects of "Fall Risk Assessment Training" on Knowledge and Skills of Nurses″ that there was improvement in knowledge and skills of nurses after a single, short duration fall risk assessment training session and the selected nurses' skills test scores were nearer to the expected maximum score at the end of training, They added that their study results also provide evidence that nurses were able to conduct effective fall risk assessment on actual patient after the training session.

Additionally, **Araiza (2019)** in her study titled "Implementing a Fall Prevention Program: A Quality Improvement Project to Promote Patient Mobility on the Medical-Surgical Unit" concluded that nursing education has a positive

effect in improving safe mobility measures among surgical patients and could subsequently reduce fall incidences.

As regards comparison between total level of practice compliance regarding fall prevention measures among studied nurses before, immediate, and post 2 months after educational program intervention. The findings revealed that all of nurses under study had low practice compliance level prior to program intervention while, about two thirds of them had moderate level of practice compliance immediately and two months following program intervention with extremely statistically marked rise in level of compliance at post-program and follow up phases as compared to pre-intervention phase.

The inadequate compliance to fall prevention protocols prior to program start from researchers point of view may be due to nurses ' delegation of direct patient care to nursing aides or family members due to a lack of time, unsafe care environment, ineffective supervision and guidance regarding application of fall prevention standards and procedures, inefficient communication with other health care team members, absence of fall incident reports as explained by nurses administrators, lack of training program among the majority of study participants in addition to most of research participants had low credentials because they were graduates of diploma nursing schools and technical institutions which reflects upon need to provision of in-service programs for such topic.

In this context, **Cunha et al. (2022)** in their study called " Adherence to a fall prevention protocol" and found that only small percentage of surgical nurses was adhered to fall prevention protocol in study hospital setting. They attributed the low adherence to the association of surgical unit patient with more comorbidities who are admitted to demanding longer hospitalization and/or more complex care and the higher incidence of they can present bleeding, changes in urination, fainting, and postural hypotension, increasing the risk of falls.

On the other hand, the marked increase in practice compliance among studied nurses may prove the effectiveness of research program

intervention in improving the practice compliance level after immediate and follow-up phases following program which was pertaining to many factors including improving nurses 'knowledge after program intervention, acquisition of skill performance regarding fall prevention protocol, integrated theoretical and practical components into program content, using effective practical teaching strategies (demonstration , redemonstration and video demonstration), distribution of Arabic booklet including procedure book for all fall risk assessment and fall prevention measures in addition to effective supervision and guidance of researchers during participants redemonstration of fall prevention measures and enforcing deficient practices and correcting malpractices. This finding supports the second research hypothesis and reflects the positive effect of educational program intervention on nurses' practices regarding compliance with patients' fall prevention protocol.

The previous findings were in accordance with the findings **of Elbasiony and her colleagues (2021)** who revealed in their study that a valuable portion of participated nurses had inadequate compliance levels about implementing fall prevention for patients in critical care units prior to the intervention. compared to the majority of them, as well, there was a sufficient and noticeable increase in compliance during the post-intervention and follow-up periods. Additionally, **Bhardwaj and Chugh (2021)** confirmed the previous finding and reported a significant increase, with 100% of nurses adhering to a good level of practice compared to 33.33% pre-intervention and suggested that the training of nurses improves fall prevention measures.

Within the same context, **Ibrahim. et al. (2023)** in recent study titled "Effect of an Educational Program about Fall Prevention and Pain Assessment on Nurses' Performance and Critically Ill Patients' Outcome" reported that the overall practice of nurses before and after the educational program was put into place. It shows that while major percentage of the examined nurses had good levels of practice with regard to fall prevention and pain assessment following implementation, a minority of them had satisfactory levels of practice prior to the educational program.

It is feasible that a lack of caring attitudes among nurses when delivering patient-centered care is the main cause of poor nurses' compliance with fall prevention protocol rather than a lack of professional skills and knowledge. Lack of knowledge and lack of caring attitude from nurses are the barriers in implementing a successful fall prevention program. Therefore, an understanding of the attitudes of nurses working at hospitals, would consequently affect their engagement in fall-prevention activities, Therefore, it is proposed that nurses' attitudes may be considered as potential for fall prevention intervention, and it should be acquired to ensure better fall-prevention measures **(Tzeng, 2011; Cho & Jang, 2020).**

As regards effect of educational intervention on the total attitude toward fall prevention measures currently among studied nurses, it was found that small proportion of nurses under study assumed positive attitude regarding fall prevention prior to program intervention, this percentage was markedly raised to two thirds of them at post-program and follow up phases with highly statistically significant difference between pre and post intervention phases as well pre/ follow-up phases. The negative attitude shown prior to program intervention may be due to poor knowledge of nurses, and lack of previous training regarding fall prevention goals and importance in addition to nurse's work overload which hinder their motivation and discourage their caring attitude toward fall risk assessment and fall prevention measures. From researchers' point of view, improving attitude of participated nurses immediately at post and follow up phases perhaps due to improvement of their knowledge and practices compliance which consequently reflect positively on their attitude toward fall prevention as well acquisition of program content including the goals and advantages of compliance with fall prevention protocol which enabling their understanding of the adverse effects of falls in addition to raising nurses 'awareness toward their role in fall prevention activities to promote quality of care and patient outcomes.

These findings agreed with **Breimaier et al. (2015)** who illustrated that nursing staff participated in the present study revealed positive attitudes regarding study guidelines and improved them after fall prevention guidelines implementation. The above mentioned finding also supports study hypothesis number three and prove the positive effect of educational intervention in improving attitude of studied nurses regarding fall prevention.

Noteworthy, the current research shows statistically significant positive correlation between total score of knowledge, total score of practice compliance and total score of attitudes in post and follow up phases while there is no statistically significant correlation in pre-program phase. These results could be explained as the application of the educational program and the knowledge that the nurses gained about falls, the risks associated with them, and the significance of fall prevention for patient safety affected the nurses' skills and their attitudes regarding it which consequently had a positive impact on their compliance level after program intervention.

This was to some extent in agreement with the findings of **Elbasiony and colleagues (2021)** who reported that there was a positive correlation found between total knowledge, total performance, and total compliance throughout the three study phases, which included the preintervention phase, the immediate post-intervention phase, and the follow-up phase. Additionally, **Ibrahim et al. (2023)** highlighted that high positive relationship was found between the knowledge and practice of all nurses before and after the implementation of program sessions indicating that there was a statistically significant positive correlation between both. The disparity between both studies regarding pre-program phase might be due to poor knowledge, and compliance prerequisite of participated nurses of current study before program intervention.

In this regard, the findings of study carried out by **Cho and Jang (2020)** and confirmed that nurses' attitudes regarding falls were positively correlated with their engagement in fall-prevention activities, but their knowledge regarding falls was not. They suggested that a multifaceted implementation program for fall prevention should be implemented to increase the positivity of nurses' attitudes. Moreover,

Rusdiana et al. (2022) who found a correlation positive relationship between the nurses' knowledge and nurses' compliance to the implementation of the standard operating procedures nurses' patient fall risk prevention.

In summary, the discussion of the current study documented that the studied nurses showed better improvement of the level knowledge, practice compliance and attitude at post and follow up phases following program intervention as compared to pre-educational program phase which supported all the study hypotheses.

Limitation of the study

The most reflective indicator for nurses' education regarding fall prevention was fall rate reduction. This was not possible with this current study aim and methodology due to absence of actual and accurate fall rate incidents records in study setting because hospitals do not release fall reports which suggest future research regarding this topic measuring fall rate reduction as an effective outcome for nurses' education regarding fall prevention protocol and measures.

Conclusion

Based on the exposed results, this study concluded that studied nurses 'compliance with standard patients' fall prevention protocol in surgical departments was improved in form of improvement of level of knowledge, practice, and attitude of studied nurses after educational intervention in the immediate post and follow up phases as compared to pre-intervention phase as a positive reflect of educational program intervention. It was suggested this educational intervention as an effective and low-cost method for improving nurses' compliance regarding fall prevention measures, maintaining health quality service, and promoting patient safety.

Recommendations:

According to findings of the current study results, the following recommendations were advocated:

▪ Suggesting current study nursing educational program as a cost-effective method to reduce patient falls in hospital

and improvement of nurses' knowledge and their compliance regarding fall prevention.

▪ Activation of fall incident report system in all hospital settings, assessing barriers for its application and provision of guidance and support for all health care personnel.

▪ Broadcasting fall prevention protocol in all hospital settings, all hospital wards, and units among all health care personnel.

▪ Effective supervision and guidance of all nursing staff regarding their adherence to fall risk assessment and prevention protocol in hospital setting.

▪ A manual guide booklet including nursing procedures related to fall assessment and prevention measures should be available in all hospital settings.

▪ Provision and availability of study booklet about fall risk assessment and prevention in all hospital settings to encourage and reinforce its application.

▪ Orientation programs for newly recruited nurses regarding fall assessment and prevention measures.

▪ This study could be replicated to larger sample of nurses in different hospital settings with high-risk patients for fall to generalize the findings.

▪ Subsequent future research to investigate if fall prevention educational program, may lower the incidence of fall incidents in hospitals.

▪ Suggesting future research to design and implement in- service fall prevention educational program for all health care teams to promote patient safety.

▪ The nursing staff seniors should be involved in the future approval of recommended policies or practices regarding patient safety and fall prevention to enhance their awareness and participation in such activities in addition to organizational changes such as increased staffing in hospital wards.

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