The Effectiveness of Training program in Improving the Performance and Practices of the Nursing Staff Inside the Operating Theatre for Patients with Upper Femoral Fracture Surgery by Using the PFN Technique

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ABSTRACT

Background: Femoral neck fractures are one of the most common fracture types occurring in the elderly worldwide, which are associated with significant mortality, morbidity and disability rates.

Methods: A quasi -experimental design, purposive study carried out at three teaching Hospitals in Mosul City from the period of January 2022 to January 2023, twenty nurses from orthopedic theater were subjected to this study, all the nurses were evaluated by the checklist and they attended the training program which taken from the Iraqi Ministry of Health guide for organizing nursing operations and practices inside orthopedics theatre.

Results: More than half of the study sample had a poor score in the initial evaluation, where the percent of nurses who were competent did not exceed "20.7%" in pre intervention of the program, after implementing the training program, the competence of the nursing staff have improved significantly.

Conclusion: The study concluded that there is a significant and clear weakness in the performance and practices of the nursing staff towards patients with upper femoral fractures in the orthopedic theater, and that the training program greatly and successfully improve their competence.

Keywords: Effectiveness, Training Program, Nurses Performance, PFN Technique.

INTRODUCTION

Proximal femur fractures are frequently seen by orthopedic surgeons due to trauma. Fractures of the femoral neck, trochanter, and proximal shaft show a range from no displaced simple fractures to extensively comminuted fracture patterns due to osteoporosis or high-energy trauma. Internal fixation with an intramedullary or extra medullary device, hemi arthroplasty, or complete hip arthroplasty are all viable options for patients with proximal femur fractures (1). The proximal femoral nail (PFN) made of titanium or steel and can be used for either the left or right side of the body. It is 240 millimeters in length, and the distal portion of the nail can have a diameter of 10, 11, or 12 millimeters. The proximal portion has a diameter of seventeen millimeters. The angle formed by both components is 6 degrees, and they are located 11 centimeters away from the top of the nail. Two screws can be put into the femoral neck through the proximal section. One of the screws is a lower 11.0 mm load bearing neck screw, and the tip of the screw should be placed subchondral in the lower half of the femur(2). The proximal femoral nail allows for a far less invasive procedure with a smaller incision, which in turn reduces the risk of wound-related problems(3). Another study indicated that PFN fixation has the benefit of providing a more biomechanically stable architecture since it shortens the distance between the hip joint and the implant(4). Seamless operating room nursing is a style of nurse intervention that has emerged alongside the evolution of medical practices(5). The high mortality and morbidity rates associated with hip fractures have led to a focus on early ambulation and early fixation, particularly in the elderly(6). This study aimed to evaluate the effect of training program on nursing staff in the orthopedic theater during the PFN technique operation.

MATERIALS AND METHODS

Study design: A quasi -experimental design, the study carries out at three teaching Hospitals in Mosul City from the period of January 2022 to January 2023. A purposive sample of (20) nurses was collected from orthopedic theatre. The tool of the study relied on the guide of the Iraqi Ministry of Health regarding the job description and basic duties of nurses within the hospital departments in making the work form (checklist), The nurses' performance was evaluated based on it. After end the first evaluation a training program has been implemented to enhance the nurses' skills and practices when preparing the patient and dealing with him before and during anesthesia and operation. The training program on nurses 'practices toward patients with proximal femur fractures treated by proximal femoral nailing (PFN) was implemented via four months by six sessions to include all study samples, then another evaluation was done after this program (post 1 test), then second evaluation was done after two months (post 2 test) To know the stability and success of the training program. The guide of Iraqi Ministry of Health include: intra-operative steps (Check the admission of patients in the operating theaters, check chart for the patients, transfer patient safely, demonstrate ability to assist in positioning patient in the following positions with or without the use of positioning aids, Implement practice for the prevention of infection, Practice principles of asepsis, Nurse skills in operation). "Statistical Package for the Social Science" (SPSS) application was used to analyze the data. Data analysis using frequency and percentages as well as the Friedman test.

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Inclusion Criteria: All the nurses who are working in the morning and evening shift at orthopedic theater in these Hospitals.

Ethical consideration: The official permission was taken from the Ethical Research Committee of the Iraqi Ministry of Health\Nineveh Health Department under the code “722” in 8\1\2023 and the approval of the nursing staff working in the field of fracture wards was obtained after the first observations were made and the results appeared. Explain the purpose of the study and agree to participate in the program.

RESULTS

The results demonstrate that proficiency levels regarding Intraoperative care steps prior implementation of the training program in the step of "Check the admission of patients in the operating theaters only 4.6% showed competence. Similarly, in "Check chart for the patients, 4.4% were competence, in "Transfer patient safely 1.0%. in demonstrate ability to assist in positioning patients" had 2.5% with competence proficiency, while "Implement practice for the prevention of infection" had 3.8%. In "Practice principles of asepsis," 20.7% were in competence level. The majority of participants demonstrated good competence after applying the training program for all the nurses in good percentage especially in posttest 1 and 2.

Table (1) reveals that in the step of "Check the admission of patients in the operating theaters only 4.6% showed competence. Similarly, in "Check chart for the patients, 4.4% were competence, in "Transfer patient safely 1.0%. in demonstrate ability to assist in positioning patients" had 2.5% with competence proficiency, while "Implement practice for the prevention of infection" had 3.8%. In "Practice principles of asepsis," 20.7% were in competence level.

It is evident from table (2) that the step with the highest proportion of participants at the "Competent" level is "Nurse skills in operation," with 42.9%. Conversely, the step with the lowest percentage of participants at the "Competent" level is "Demonstrate ability to assist in positioning patients in the following positions with or without the use of positioning aids," with only 5.0%.

Table (3) that the majority of participants demonstrated competence in Check the admission of patients in the operating theaters, Check chart for the patients, and Transfer patient safely to or bed by steps, with around 30.8%, 26.1, and 25.0% of participants respectively. However, in contrast, a significant proportion of participants only showed limited

Table 1. Categorization of Proficiency Levels regarding Intraoperative care steps prior implementation of the training program

Nursing practice	No proficiency %	Limited proficiency %	Acceptable proficiency %	Competent proficiency %	Total %
Check the admission of patients in the operating theaters	23.1	39.2	33.1	4.6	100
Check chart for the patients	27.8	32.8	35	4.4	100
Transfer patient safely	27	21	51	1	100
Demonstrate the ability to assist in positioning patients with or without the use of positioning aids	37.5	32.5	27.5	2.5	100
Implement practice for the prevention of infection	40	32.5	23.8	3.8	100
Practice principles of asepsis	13.8	43.1	38.1	0.5	100
Nurse skills in operation	20	22.1	37.1	20.7	100

Table 2. Categorization of Proficiency Levels regarding Intraoperative care of patients after implementation of the training program (post-1)

Nursing practice	No proficiency %	Limited proficiency %	Acceptable proficiency %	Competent proficiency %	Total %
Check the admission of patients in the operating theaters	8.1	25.8	40.8	25.4	100
Check chart for the patients	10.6	18.3	36.1	35	100
Transfer patient safely	10	21	42	27	100
Demonstrate the ability to assist in positioning patients with or without the use of positioning aids	20	20	55	5	100
Implement practice for the prevention of infection	17.5	25.6	34.4	22.5	100
Practice principles of asepsis	4.4	21.3	40.6	33.8	100
Nurse skills in operation	4.3	15.0	37.9	42.9	100

Table 3. Categorization of Proficiency Levels regarding Intraoperative care of patients after implementation of the training program (post-2)

Nursing practice	No proficiency %	Limited proficiency %	Acceptable proficiency %	Competent proficiency %	Total %
Check the admission of patients in the operating theaters	15.4	23.5	23.5	30.8	100
Check chart for the patients	12.2	33.9	33.9	26.1	100
Transfer patient safely	14	31	31	25	100
Demonstrate the ability to assist in positioning patients with or without the use of positioning aids	42.5	20	20	5	100
Implement practice for the prevention of infection	22.5	33.1	33.1	12.5	100
Practice principles of asepsis	10	31.9	31.9	20.6	100
Nurse skills in operation	8.6	15.7	15.7	36.4	100

Table 4. Comparing Pre, Post-test 1, and Post-test 2 Measurements using Friedman's Two-Way Analysis of Variance by Ranks

Variable	Sample 1-Sample 2	Test Statistic	P-value	Sig.
Check the admission of patients in the operating theaters	Pre - Post1	-1.725	0.0001	H.S.
	Pre - Post2	-0.825	0.009	S.
	Post1 - Post2	0.900	0.004	S.
Check chart for the patients	Pre - Post1	-1.575	0.0001	H.S.
	Pre - Post2	-1.275	0.0001	H.S.
	Post1 - Post2	0.300	0.343	N.
Transfer patient safely	Pre - Post1	-1.475	0.0001	H.S.
	Pre - Post2	-0.925	0.003	S.
	Post1 - Post2	0.550	0.082	N.
Demonstrate the ability to assist in positioning patients with or without the use of positioning aids	Pre - Post1	-0.800	0.011	S.
	Pre - Post2	-0.175	0.580	N.
	Post1 - Post2	0.625	0.048	S.
Implement practice for the prevention of infection	Pre - Post1	-1.700	0.0001	H.S.
	Pre - Post2	-0.925	0.003	S.
	Post1 - Post2	0.775	0.014	S.
Practice principles of asepsis	Pre - Post1	-1.625	0.0001	H.S.
	Pre - Post2	-0.625	0.144	N.
	Post1 - Post2	1.000	0.005	S.
Nurse skills in operation	Pre - Post1	-1.475	0.0001	H.S.
	Pre - Post2	-0.850	0.007	S.
	Post1 - Post2	0.625	0.048	S.

proficiency in Demonstrate ability to assist in positioning patient in the following positions with or without the use of positioning aids 42.5%, Implement practice for the prevention of infection 33.1%, and Practice principles of asepsis 31.9% and with the Nurse skills in operation showing the highest percentage of participants (36.4%) demonstrating competence.

Table (4) presents there are high significant associations between pre and first post-test for all aspects of nursing care at different levels, also for all aspects between pre and second posttest at different levels, also showed significant improvements after training program. However, the "Post1 - Post2" comparison for "Demonstrate ability to assist in positioning patients" and "Practice principles of asepsis" had non-significant differences (p-values > 0.05). The "Post1 - Post2" comparison for "Transfer patient safely to or bed by" also showed a non-significant difference (p-value > 0.05).

DISCUSSION

A fracture of the proximal femur is the most common reason for hospitalization following trauma, over (90%) of these individuals are in their 50th or older. Women experience these breaks at a rate two to three times higher than men. According to their anatomical placements, thigh bone fractures are grouped into the "neck of femur," "inter trochanteric," and "sub trochanteric" groups. Each of these subsets of fractures presents its own unique set of difficulties and controversies(7). On the other side, (PFN) isn't without its risks, especially during surgery and the recovery period. Nonunion, fracture formation towards the distal aspect of the nail, cuts in the neck screws, Z-effect, reversed Z-effect, secondary Varus deformity, thigh discomfort from irritation of the iliotibial tract, and pain in the thigh are all possible late consequences(8,9). The researcher started by evaluating the performance and practices of nurses inside orthopedic theatre when admission patients and preparing them for surgeries according to standard checklist, it was found that there is a weakness in the performance efficiency of the nurses in most aspects: Check the admission of patients in the operating theaters, Check chart for the patients, Transfer patient safely to or bed by, Demonstrate the ability to assist in positioning patients with or without the use of positioning aids, Implement practice for the prevention of infection and Practice principles of asepsis. Nurses play a significant role in identifying and coordinating relevant therapies for elderly patients with complex health needs and requirements in order to enable a faster recovery and decrease postoperative difficulties. [10]. Intraoperative nursing care is a bridge between preoperative and postoperative care, putting patients at risk of complications at both stages of the process. As a result, nurses need to pay attention to the finer points of patient care to ensure the most positive outcome for their patients(11). Toale et al. (2023) mentioned in their study that the competency-based programs with several evaluation points are the most effective for raising proficiency(11). Another study conducted by Robertson et al., 2017 showed that nurses' abilities in the operating room can be enhanced through training programs(12). In this setting, in-depth familiarity with recommended practices for surgical care, anesthetic administration, invasive procedures, instrumental and surgical equipment, infection control, and patient safety is essential. From this point, nursing program was applied we have given a comprehensive and approved training program for nursing staff working in operation room, which includes all nursing procedures and measures necessary that must be given and applied to patients during surgical operations for many months. Then we conducted a second evaluation of the performance and it was found that there is a clear improvement in the nurses' practices. Then a third evaluation was conducted to check the stability of performance two months after the second examination, it appeared that the results were generally stable, and when making a statistical comparison between the first pre and post check and the second post check. It was found that the training program has achieved significant development and improvement in the performance and practices of the nursing staff in providing health care to patients in order to improve the quality of life and reduce the percentage of potential postoperative complications and increase the nursing staff happiness(13,14).

CONCLUSION

The study concluded that there is a significant and clear weakness in the performance and practices of the nursing staff towards

patients with upper femoral fractures by PFN technique in the orthopedic theater, and that the training program that was given to them improved their performance and practices significantly and effectively.

Authorship Contribution: All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

Acknowledgements: We appreciate all the administration of Mosul teaching Hospitals for unlimited cooperative with researchers to achieve this work.

Potential Conflicts of Interest: None

Competing Interest: None

Acceptance Date: 20-08-2024

REFERENCES

1. Vig KS, Adams C, Young JR, et al. Patient Positioning for Proximal Femur Fracture Fixation: a Review of Best Practices. Curr Rev Musculoskelet Med 2021 Aug;14(4):272-281.
2. Simmermacher RK, Bosch AM, Van der Werken C. The AO/ ASIF-proximal femoral nail (PFN): a new device for the treatment of unstable proximal femoral fractures. Injury 1999; 30(5):327-32.
3. Xu H, Liu Y, Sezgin EA, et al. Comparative effectiveness research on proximal femoral nail versus dynamic hip screw in patients with trochanteric fractures: a systematic review and meta-analysis of randomized trials. J Orthop Surg Res 2022;17(1):292.
4. Sharma A, Sethi A, Sharma S. Treatment of stable intertrochanteric fractures of the femur with proximal femoral nail versus dynamic hip screw: a comparative study. Rev Bras Ortop 2017;53(4):477-481.
5. Jiang L, Fei Q, Song W, et al. Effect of nursing mode under the seamless connection between operating room and ward on severe traumatic brain injury patients in coma. Am J Transl Res 2021;13(5):5087-5093.
6. Kenyon-Smith T, Nguyen E, Oberai T, et al. Early mobilization post–hip fracture surgery. Geriatr Orthop Surg Rehabil 2019;10:2151459319826431.
7. Trincado RM, Mori MA, Fernandes LS, et al. Epidemiology of proximal femur fracture in older Adults in a Philanthropical hospital in SÃo paulo. Acta Ortopédica Brasileira 2022;30(6):e255963.
8. Kumar N, Vatsya P, Salaria AK. Indigenous Proximal Femoral Nails and Their Novel Complications. Cureus 2021;13(7):e16729.
9. Lin F, Gillespie BM, Chaboyer W, et al. Preventing surgical site infections: Facilitators and barriers to nurses' adherence to clinical practice guidelines—A qualitative study. J Clin Nurs 2019;28(9-10):1643-52.
10. Salazar Maya ÁM. Nursing care during the perioperative within the surgical context. Investigacion y educacion en enfermeria 2022;40(2):1-10.
11. Toale C, Morris M, O'Keeffe D, et al. Assessing operative competence in core surgical training: A reliability analysis. Am J Surg 2023 Nov;226(5):588-595.
12. Robertson JM, Dias RD, Yule S, et al. Operating Room Team Training with Simulation: A Systematic Review. J Laparoendosc Adv Surg Tech A 2017 May;27(5):475-480.
13. Tariq M, Hachani F. Effect of a training program on reducing health complications after operations of proximal femoral nailing (PFN) technique. Georgian med news 2024; 350(5): 63-67.
14. Nuphanudin N, Al-Muttar MY, Althanoon ZA, et al. The effect of spiritual intelligence on organisational happiness and the quality of nursing care for patients with COVID-19 virus in Russia. Int J Work Organ Emot 2023;14(4):320-38.