

Effect of Implementing Clinical Pathway Management Program for Patients undergoing Fracture Neck Femur Surgery on Nurses' Knowledge, Practice and its' Designing

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Abstract: Use of a multidisciplinary clinical pathway during care of patients undergoing fracture neck femur surgery tends to be more effective during patients' management than routine hospital care because it was found to be significantly improve quality of care. **Aim:** This study was conducted to determine the effect of implementing the clinical pathway management program of patients undergoing fracture neck of femur surgery on nurses' knowledge, practice and its' designing. **Design :** A quasi experimental design was utilized. **Setting:** The study was carried out at Department of Orthopedic Surgery at Tanta Main University Hospital. **Sample:** All nurses (43) from above mentioned settings who are providing direct care for patients with fracture neck of femur surgery. **Tools:** three tools were used for data collection: Tool (I); Assessment of nurses' knowledge questionnaire about implementation of clinical pathway on patients with fracture neck of femur surgery, Tool (II); Clinical pathway practice checklist to evaluate nurse's practice regarding implementation of the clinical pathway on patients with fractured neck of the femur surgery and Tool (III); assessment of designing clinical pathway map practice. **Results:** there were improvements in nurses' knowledge from pre to immediate post and after one month of the implementing the program (31.70 ± 3.563 , 61.40 ± 3.296 to 56.41 ± 3.705) respectively, and practice (32.069 ± 3.326 , 60.65 ± 3.408 to 54.91 ± 3.902) respectively and there were improvements in designing of clinical pathway immediate post (11.79 ± 2.774) and after one month post of implementing the program (16.88 ± 1.867) during care of fracture neck of the femur surgery. **Conclusion and Recommendation:** The study findings lead to the conclusion that implementation of clinical pathway was successful for improving nurses' knowledge, practice and designing of clinical pathway. Therefore, it is recommended to generalize implementation of clinical pathway in other clinical settings to manage fracture neck of the femur patients. **Keywords:** Fracture neck of the femur surgery, Clinical pathway, Nurses ' Practice.

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I. Introduction

A fractured neck of femur is one of the most common injuries that are accompanied with high morbidity and mortality rates through one year after surgery, and profound temporary and sometimes permanent impairment of independence and quality of life⁽¹⁾. A fractured neck of femur accounting for 50% of hip fractures worldwide.⁽²⁾ The incidence of fractured neck of the femur is increasing with a steady increase in the elderly population and can also occur in the young patients usually due to severe trauma that were associated with longer hospital stay (more than 4 weeks) for patients with fracture neck of femur^(3,4)

The femur (thigh bone) is one of the largest and strongest bones in the body. A fractured neck femur occurs when the top part of this bone is broken. The fractures neck of the femur is caused by mild or moderate trauma, multiple medications, osteoporosis, poor vision and problems in the balance which are considered from the most common causes^(5,6). The symptoms of a broken neck of femur bone can include: pain in the hip and groin area, inability to walk or put weight or pressure on the affected hip and leg, bruising and inflammation of the hip⁽⁷⁾. Options for managing fractures neck of femur include non-operative and operative management with either internal fixation or arthroplasty. In recent years, operation for fractures neck of femur was the main treatment^(8,9). Surgery must be followed by physical therapy with taking into consideration steps to maintain bone density and avoid falls which can help in preventing repetition of a hip fracture⁽¹⁰⁾.

Patients undergoing fracture neck femur either in the acute settings or rehabilitation department need standard of specific care^(11,12), that more patient focused and organization of the care process which is one of the main areas during management of these patients. Nowadays the main method to reorganize a care process is the development and implementation of the clinical pathway that can reduce variations in the processes of care and

improves patient' outcomes^(13,14). The clinical pathways are used worldwide for a variety of patient groups and it is continuously evaluated in the light of clinical evidence. It is defined as a complex intervention for tracking a patient's progress toward achieving a positive outcome within specific time frames.⁽¹⁵⁾ It includes four main phases, these are a timeline, categories of care or activities, intermediate and long term outcome criteria and variance record to allow deviations to be documented and analyzed⁽¹⁶⁾.

Care of patients undergoing fracture neck of femure are complex and challenging⁽¹⁷⁾ and need new approach as clinical care pathways that aim to standardize and streamline the efficiency of the management and decrease patients' length of stay in the hospital and improvement of nurses' performance^(18,19,20). The pathway for fractured neck of the femur should be developed through the collaborative effort of health care team that are composed of; surgeon, nurse, physiotherapist, pharmacists, and occupational therapist⁽²¹⁾. It integrates nursing care plans, medical treatment, and the other care allied to healthcare professionals into a single care plan, which clearly defines the expected progress and outcomes of a patient through the hospital system⁽²²⁾. Nurses are responsible for initiating and updating clinical pathway that is used to guide and evaluate patient' care and ensuring that the various events of the best practice occur in a format that a multidisciplinary team can follow and end the chain of staff involved in delivering care^(23,24).

Because nurses have a key role in all aspects of clinical pathway during care of patients undergoing fractured neck of the femur through participation in the development and implementation of the care pathway⁽²⁵⁾. So organizing and implementing clinical pathway strategies for nurses as specific for patients with a fractured neck of the femur who requires the courses of management where clinical pathway appeared to be a suitable method for providing nurse valuable knowledge and practice about patients care during patients hospitalization to decrease their hospital stay^(26,27,28). The Nursing pathway in fractured neck of the femur focused on pre- and postoperative care related to pain management, activity and mobility, diet advancement, bowel management and psychological interventions, patient education and discharge planning, during the anticipated ten-day hospital stay following the surgery⁽²⁹⁾.

The clinical pathway is very helpful for the team and nurses to work by describing the standard of expected outcomes for a given time frame; it helps the nurse to evaluate patient's progress regarding any variances from the normal⁽³⁰⁾. Nursing staff need to understand about their roles through ensure that best practices and good patient care are incorporated into critical pathways⁽³¹⁾. So they should be included in the development, implementation, and continual evaluation of any clinical care pathway phase for patients, to be able to provide a clinical care in standardize way which improves patients' clinical outcomes⁽³²⁾.

Significance of the study:-

Nowadays clinical pathways are widely used in the hospitals to manage care processes across surgical specialties to enhance care efficiency⁽³³⁾ and decrease patients' length of stay by 40% for open invasive surgery such as fracture neck of the femur surgery⁽³⁴⁾. clinical pathways maximize the expertise of multi health care team and avoid inconsistent of practice because it has a positive effect on teams work including: better team communication, better documentation between professionals and lower risk of burnout and task orientation^(35,36). Staff nurse is a key factor in the successful of implementation of clinical care pathways; however best strategies for organizing and carrying out clinical pathway can improve quality of nursing care through improving nurses' knowledge, enhancing their practice with specific team regarding management of patients undergoing fractured neck of the femure surgery that it is difficult to provide standard of care that can reduce variations in the processes of management. Therefore this study aimed to determine the effect of implementing clinical pathway on nurses ' knowledge, practice and designing of pathway during management of patients undergoing fractured neck of the femur surgery.

Aim of the study is to:

Determine the effect of implementing clinical pathway management program for patients undergoing fracture neck femur surgery on nurses' knowledge, practice and its' designing.

Research hypothesis

- knowledge scores of nurses will be expected to be improved after implementation of clinical pathway during management of patients undergoing fracture neck of femur surgery.
- Practice scores of nurses will be expected to be improved after implementation of clinical pathway during management of patients undergoing fracture neck of femur surgery.
- Nurses' practice regarding designing of clinical pathway will expected to be improved post education of clinical pathway during management of patients undergoing fracture neck of femur surgery.

II. Subjects and methods

Research design:

A quasi-experimental research design was used in the present research.

Setting:

This study was carried out at Department of Orthopedic Surgery of Tanta Main University Hospital.

Subjects:

All nurses (43) from above mentioned setting who are providing direct care for patients undergoing fractured neck of the femur surgery.

Tools of the study:-

Three tools were used to collect data. These tools were aimed to determine the effect of implementing clinical pathway management program of patients undergoing fracture neck of femur surgery on nurses' knowledge, practice and its' designing.

Tool (I): Assessment of Nurses' Knowledge Questionnaire:

It was comprised of three parts:-

Part (A) - A socio-demographic characteristics of nurses; nurses' code, age, gender, level of education, years of experiences, job description, and previous training about care of patients undergoing fracture neck of the femur surgery by using the clinical pathway.

Part (B):- Nurses' Knowledge about fractured neck of the femur surgery:

It was developed by the researchers based on related literature ⁽³⁷⁻³⁹⁾ to evaluate nurses' knowledge about fracture neck of the femur surgery at pre, immediate and post one month from the implementation of the clinical pathway management program. It was included the following:

-knowledge about fracture neck of the femur (16) questions which included; definition, causes, risk factors, symptoms, complication of fracture neck of femur surgery, site of neck femur bone, types of treatment and nursing care.

-knowledge about pre-operative assessment & preparation (15) questions which included; assessment of patients, physical examination, precautions before surgery, preparation, type of anesthesia and signs of infection.

-knowledge about about immediate & late post-operative care (16) questions which included; immediate assessment in recovery room and care, neurovascular assessment, medications, position of patients, signs of infection and DVT.

Part (C):- Nurses' Knowledge about the clinical pathway

It was developed by the researchers based on related literature ⁽⁴⁰⁻⁴²⁾ to evaluate nurses' knowledge about the clinical pathway at pre, immediate and post one month from the implementation of the clinical pathway. It was included the following: -

- Knowledge about clinical pathway (17) questions which included; definition, importance, steps, times, team, function of each team, and preparation of environment for the clinical pathway.

-Knowledge about the clinical pathway for fractured neck of the femur surgery (13) questions which included; importance of clinical pathway for patients, pre and post operative steps of clinical pathway specific for fracture neck femur, role of nurse and team.

Scoring system of knowledge:

Two level of scoring for questions were as the following:

-Correct answer scored (1)

-Don't know or incorrect answer scored (0)

The total scoring systems of nurses' knowledge were (77).

The total scoring systems of nurses' knowledge were classified as follows: -

-Good → > 60% (more than 46.2) of the total score

-Fair → ≥ 50% - 60% (more than 38.5 to less than 46.2) of the total score

- Poor → < 50 % (less than 38.5) of the total score.

Tool (II): The Clinical Pathway Practice Checklist: -

Clinical pathway practice checklist was developed by the researchers in cooperation with clinical effectiveness team, in order to construct a database for all participants in this study after reviewing relevant literatures ⁽⁴³⁻⁴⁷⁾ to evaluate the effect of implementing clinical pathway on nurses' practice; pre, immediate post and after one months during management of patients undergoing fracture neck of the femur surgery, it was included the following;

-Immediate preoperative assessment within 4 hours from admission (12) steps which included; taking history, physical examination, neurovascular, nutritional, cognitive assessment and assessment of all body system for patients.

-Immediate preoperative preparation within 4 hours (16) steps which included; physical and Psychological preparation of patients, medication and IV fluids.

-Immediate post operative care (in the recovery room, during the day of surgery) (11) steps which included; assess vital signs, pain, respiratory rate, assess sensation, circulation and movement to feet, wound care, check Pressure areas, signs of infection and bleeding, medication, IV fluids.

-Care from 24- until 72 hours following surgery (17) steps which included; monitor vital signs, level of pain, complications of surgery, wound dressing, signs of infection, bleeding, hygienic care, and medication.

-Care from 72 hours-until 10 days following surgery (11) steps which included; diet, physical therapy, hygienic care, patient safety, medications, wound dressing, sign of infection, use assistive devices

-Instruction before discharge and home care for fracture of neck the femur (9) steps which included; instruction about position, movement, diet, hygiene, medication, exercise program and follow up schedule.

Scoring system for practice will be as following:

-Done practices take (1).

-Not done practices take (0).

The total score of nurses' practices score were (76).

The total scoring systems of nurses' practices score were classified as: -

-Satisfactory → $\geq 60\%$ (more than 45.6) of the total score

-Unsatisfactory → $< 60\%$ (less than 45.6) of the total score

Tool (III): Assessment of designing the clinical pathway map practice: -

The scale of Rubric was developed by McMurray⁽⁴⁸⁾ and^(49,50) and modified by the researchers. It was used to evaluate the ability of the nurse to design the clinical pathway for patients undergoing fractured neck of the femur surgery immediately and after one month during follow up post implementation of the program. It consisted of (5) statements that cover following points; knowledge, thinking, hierarchical structure, content and design.

Scoring system: It was consisted of four points categorical score (4-1) that was offered for each statement, therefore (4) means excellent, (3) means good, (2) means satisfactory and (1) means unsatisfactory. The total scoring system was (24), classified as the following:

-Satisfied clinical pathway → $> 60\%$ (more than 15) of the total score

-Average clinical pathway → $50\% - 60\%$ (more than 12 to less than 15) of the total score

-Unsatisfied clinical pathway → $< 50\%$ (less than 12) of the total score

Ethical consideration:

An official permission was obtained from the Faculty of Nursing Dean and head of the Orthopedic Department of Tanta Main University Hospital to conduct the study. Informed consent was taken from every nurse to participate in the study and included the right to withdrawal at any time. Confidentiality was taken into consideration regarding data collection. A code number was used instead of names.

Methods of data collection:

1- All tools of the study were developed by the researchers after reviewing relevant literature and used to collect data except tool (III): Rubric assessment scale for assessing nurses' practice regarding designing of the clinical pathway was developed by McMurray⁽⁴⁸⁾.

2-The developed tools were submitted to a jury of five experts in the area of Medical Surgical Nursing and physicians related to the Orthopedic field for its content validity, their opinions were elicited regarding tools format, consistency and scoring system, based on their comments; necessary modifications were done. It was calculated and found to be = (98%). The reliability for the study tools was done by measuring the internal consistency of its items using the Alpha Cronbach's coefficient: it was 0.90 for tool (1), 0.960 for tool (II), 0.940 for tool (III) and 0.980 for tool (IV)

3- A pilot study was carried out to test the study tools. It was conducted 10% of the total sample size to test the feasibility and applicability of the tools, evaluate the research plan and to determine any obstacles that may be encountered during the period of data collection; accordingly, needed modification was done.

4-Data collection for this study was carried out at the beginning of April 2018 to the end of August 2018.

5- Educational program about the clinical pathway was conducted in (4) sessions (two sessions for theoretical knowledge and two sessions for practical demonstration) to all nurses who are divided into (8) groups; each group was contained (5) nurses except the last group consisted of (8) nurses, three days/ week, and the time of

each session was about one hour. It was carried out through four phases (assessment, planning, implementation and evaluation):-

Assessment phase; The nurses were assessed in the 1st week before starting education about clinical pathway by using tool (I) part (A) to collect baseline data and Tool I part (B, C) and Tool II were used to assess nurses' knowledge and practice regarding implementation of the clinical pathway during management of patients undergoing fracture neck of femur surgery and to determine the needs of the nurses and number of the sessions. The knowledge questionnaire sheet was filled by the nurse within 20 minutes and observational checklist was filled by the researchers within 20 minutes.

Clinical pathway map planning for patients undergoing fractured neck of the femur surgery was designed by the surgical multidisciplinary clinical pathway team post reviewed the main team and nurse's activities during care of patients who are admitted to the hospital for fractured neck of the femur surgery based on review of literature (43,46,47, 51- 58).

- The clinical pathway team who involved in the patient care were; surgeon, anaesthesiologist, a clinical nurse, physical and occupational therapy and pharmacy services was met in separated sessions to explain the clinical pathway in brief and outline the main roles to be played by each one.
- Specific events of the clinical pathway were included; patients' assessment immediately within 4 hours from admission, immediate preoperative preparation within 4 hours, immediate post operative care (in the recovery room, during the day of surgery), care from 24-until 72 hours following surgery, care from 72-until 10 days following surgery and instruction before discharge, and home care for fractured of the neck femur.
- An illustrative structured booklet about the clinical pathway was prepared and written in simple Arabic language as a guide for the nurses, and different methods were used as video, group discussion and power point for theoretical part and demonstration and re-demonstration for the practical part. A booklet was given to each nurse during sessions to refresh their knowledge.

Implementation phase: Education of clinical pathway was implemented by the researchers that included the schedule of specific team and nurse's activities during care of patients who are admitted to hospital for fracture neck femur from the date of admission throughout 10 days during morning and afternoon shifts. It was divided into four sessions as the following:- **The First session:** was given to the nurses regarding knowledge about fracture neck of the femur, pre-operative care and post-operative care of patients undergoing fracture neck of the femur surgery. **The second session:** was given to the nurses regarding knowledge of the clinical pathway management and practice of design of clinical pathway map for fracture neck of the femur patients. **The third session:** was included demonstration and re-demonstration of the nurses regarding immediate preoperative assessment within 4 hours from admission, immediate preoperative preparation within 4 hours. **The fourth session:-** was included demonstration and re-demonstration of the nurses regarding immediate post operative care, care from 24-until 72 hours following surgery, care from 72 hours-until 10 days following surgery and instruction before discharge to home.

Evaluation Phase: Immediately and post 1- month later, the researchers were reassessed knowledge and practice of the nurses regarding clinical pathway to test if there were any improvement and retained knowledge and practice over time among the participants by using Tool (I) part B, C and Tool II. For about Tool III that was used to evaluate the ability of the nurse to design clinical pathway map for patients with fractured neck of the femur surgery immediately and one month later during follow up.

Data analysis:

All data were collected, coded, tabulated and subjected to statistical analysis. Statistical analysis is performed by statistical Package SPSS in general (version 20), also Microsoft office Excel is used for data handling and graphical presentation variables. Data expressed as Mean and SD. F-test and Z-test are used to determine significant for numeric variable. Pearson's Correlation analysis was used to show strength and direction of association between two quantitative variables. A probability level of p-value ≤ 0.05 was adopted as a level of significance for testing the research hypotheses.

Results:

Table (1): Distribution of studied nurses according to their socio-demographic characteristics

Variables	The studied nurses (N=43)	
	N	%
Age		
▪ 20 < 25 years	11	25.6
▪ 25 > 40 years	14	32.6
▪ ≥ 40 years	18	41.8
Sex		
▪ Female	43	100
▪ Male	0	0.00
Level of education		
▪ Baccalaureate degree	15	34.9
▪ Deplome	28	65.1
Years of experiences for care of patients undergoing fracture neck of femur		
▪ ≤ one year	12	27.9
▪ > 1-5years	5	11.6
▪ >5 years	26	60.5
Job description		
▪ Nurse	31	72.1
▪ Supervisors	12	27.9
Previous attendance of training courses about clinical pathway		
▪ Yes	12	27.9
▪ No	31	72.1

Table (1) showed the distribution of the studied nurses according to their socio-demographic characteristics. As regard to age, the table showed that the majorities (41.8 and 32.6%) of the nurses were in the age group (≥ 40 and 25 > 40) years old respectively, and all (100%) of them were female. Regarding level of education, the table revealed that (65.1%) from nurses were deplome and only (34.9%) were Baccalaureate degree. As regard to years of experience and job description, the table showed that more than two thirds (60.5%) of the nurses had >5 years of experience and nearly three quarter (72.1%) of them were nurses. Also the table showed that the majority (72.1%) of the nurses had no previous training about clinical pathway management program and only (27.1%) from them have training course for only one day.

Table (2) Mean score of nurses' knowledge regarding care of patients undergoing fracture neck of the femur throughout all intervention periods of the study

Variables	The studied nurses (N=43)			F P
	Pre- implementation of clinical pathway program	Immediate post-implementation of clinical pathway program	1- month post-implementation of clinical pathway program	
	Mean ± SD	Mean ± SD	Mean ± SD	
Knowledge about neck femur fracture.	6.93±1.121	12.81±0.982	11.30±1.206	342.38 0.00*
Knowledge about pre-operative assessment and preparation for patients.	6.23±0.868	11.86±0.804	10.91±1.231	390.69 0.00*
Knowledge about immediate and late post-operative care for fracture neck of femur patients	6.51±0.798	13.12±1.117	11.88±1.159	436.30 0.00*
Total score	19.67±2.078	37.79±1.995	34.09±2.428	582.22 0.00*

* Significant at P < 0.05

Table (2): showed the mean score of nurses' knowledge regarding care of patients undergoing fractured neck of the femur throughout all intervention periods of the study. Highly statistically significant difference in the mean score of knowledge regarding different items about care of fracture neck of the femur patients related to; knowledge about fracture neck of femur, pre-operative assessment & preparation and immediate & late post-operative care were observed from pre to immediate and after one month later post implementation of the clinical pathway management program with p-value < 0.05.

Table (3) Mean score of nurses' knowledge regarding the clinical pathway management program throughout all intervention periods of the study

Variables	The studied nurses (N=43)			F P
	Pre- implementation of the clinical pathway program	Immediate post-implementation of the clinical pathway program	1-month post-implementation of the clinical pathway program	
	Mean ± SD	Mean ± SD	Mean ± SD	
General knowledge about clinical pathway strategies	6.56±1.623	13.19±1.075	12.72±1.869	193.80 0.00*
knowledge about clinical care pathway form for care of fracture neck of femur patients	5.47±0.827	10.42±0.932	9.60±1.072	402.18 0.00*
Total score	12.02±2.144	23.60±1.635	22.33±2.286	338.18 0.00*

* Significant at P < 0.05

Table (3): showed the mean score of nurses' knowledge regarding the clinical pathway management program throughout all intervention periods of the study. Highly statistically significant difference in the mean score of nurses' knowledge regarding different items of clinical pathway strategies related to; knowledge about clinical pathway strategies and clinical care pathway for fracture neck of femur were observed from pre to immediate and 1-month later post implementation of clinical pathway management program with p-value < 0.05.

Figure (1) Total mean score of nurses' knowledge regarding care of fracture neck of femur patients by using clinical pathway management program throughout all intervention periods of the study

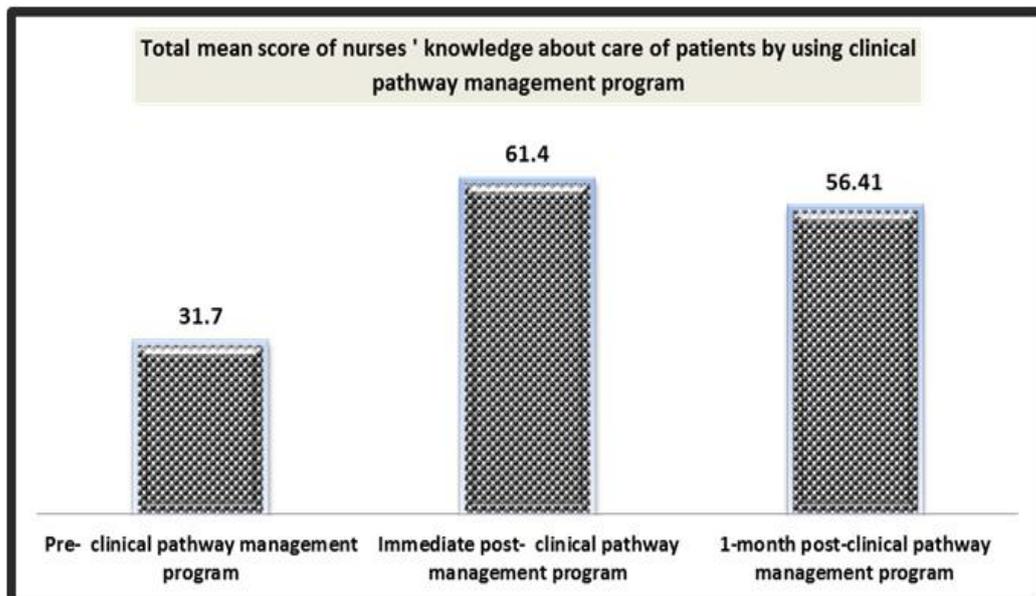


Figure (1): showed the total mean score of nurses' knowledge regarding care of fracture neck of femur patients by using clinical pathway management program throughout all intervention periods of the study. The figure revealed that there were statistically significant difference in the total mean score of knowledge which was observed from pre (31.70±3.563) to immediate (61.40±3.296) and (56.41±3.705) later post one month from the implementation of the clinical pathway management program.

Table (4): Mean score of nurses' clinical pathway practice regarding pre-operative care throughout all intervention periods of the study

Variables	The studied nurses (N=43)			F P
	Pre- implementation of clinical pathway program	Immediate post-implementation of clinical pathway program	1-month post-implementation of clinical pathway program	
	Mean ± SD	Mean ± SD	Mean ± SD	
Immediate pre-operative assessment within 4 hours from admission to emergency unit.	5.16±0.687	9.30±0.741	8.49±1.077	268.01 0.00*
Immediate pre-operative preparation within 4 hours from admission to emergency unit.	6.79±0.914	12.86±1.521	11.72±1.161	260.72 0.00*
Total score	11.95±1.308	22.16±1.772	20.21±1.794	349.38 0.00*

* Significant at P < 0.05

Table (4): showed the mean score of nurses' clinical care pathway practice regarding pre-operative care throughout all intervention periods of the study. Highly statistically significant difference in the mean score of clinical care pathway practice regarding different items of preoperative care related to; immediate pre-operative assessment within 4 hours from admission to emergency unit and immediate pre-operative preparation within 4 hours from admission to emergency unit were observed from pre to immediate and 1-month later post implementation of clinical pathway management program with p-value < 0.05.

Table (5) Mean score of nurses' clinical pathway practice regarding post-operative care throughout all intervention periods of the study

Variables	The studied nurses (N=43)			F P
	Pre- implementation of the clinical pathway program	Immediate post-implementation of the clinical pathway program	1- month post-implementation of the clinical pathway program	
	Mean ± SD	Mean ± SD	Mean ± SD	
Immediate post-operative assessment and care (in the recovery room, during the day of surgery)	4.60±0.728	8.79±0.989	7.79±1.036	254.33 0.00*
Care from 24 until 72 hours following surgery	7.04±1.132	13.42±1.332	12.53±1.279	227.20 0.00*
Care from 72 hours- until 10 days following surgery	4.74±0.847	8.95±0.872	7.79±0.861	217.25 0.00*
Instruction before discharge and follow -up home care post discharge.	3.72±0.766	7.33±0.865	6.58±0.906	190.49 0.00*
Total score	20.11±2.537	38.49±2.344	34.70±2.841	397.43 0.00*

* Significant at P < 0.05

Table (5): showed the mean score of nurses' clinical pathway practice regarding post-operative care throughout all intervention periods of the study. Highly statistically significant difference in the mean score of clinical care pathway practice regarding different items of post-operative care related to; immediate post-operative assessment and care (in the recovery room, during the day of surgery), care from 24 until 72 hours following surgery, care from 72- until 10 days following surgery and instruction before discharge and follow -up home care post discharge were observed from pre to immediate and 1-month later post implementation of clinical pathway management program with p-value < 0.05.

Figure: (2) Total mean score of nurses' clinical care pathway practice regarding care of fracture neck of femur patients throughout all intervention periods of the study.

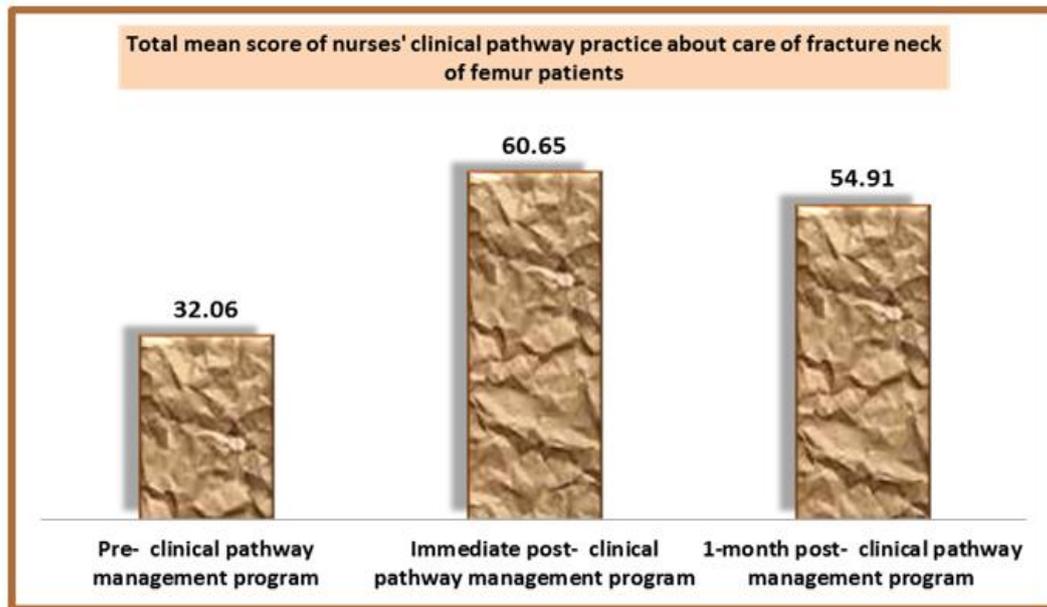


Figure (2): showed the total mean score of nurses' clinical pathway practice regarding care of fracture neck of the femur patients throughout all intervention periods of the study. The figure revealed that there was significant difference in the total mean score of practice which was observed from pre (32.06±3.326) to immediate (60.65±3.408) and (54.91±3.902) later post 1-month from implementation of clinical pathway management program.

Table (6) Total level of nurses' practice regarding designing the clinical pathway map throughout all intervention periods of the study

Variables	The studied nurses (N=43)				z P
	Immediate post implementation of clinical pathway program		1-month post implementation of clinical pathway program		
	N	%	N	%	
Satisfied clinical pathway designing (> 60%)	5	11.6	41	95.3	5.55 0.00*
Average clinical pathway designing (50% - 60%)	10	23.3	1	2.3	
Unsatisfied clinical pathway designing (< 50%)	28	65.1	1	2.3	

* Significant at P < 0.05

Table (6) showed the total level of nurses' practice regarding designing of the clinical pathway map throughout all intervention periods of the study. The table was revealed that there was a significant improvement of nurses' practice regarding designing of the clinical pathway map from (11.6% satisfied, 23.3% average and 65.1% unsatisfied) immediately to (95.3% satisfied, 2.3% average and 2.3% unsatisfied) after one month later from application of the clinical pathway management program at p < 0.05.

Figure (3) Mean score of nurses' practice regarding designing of the clinical pathway map throughout all intervention periods of the study

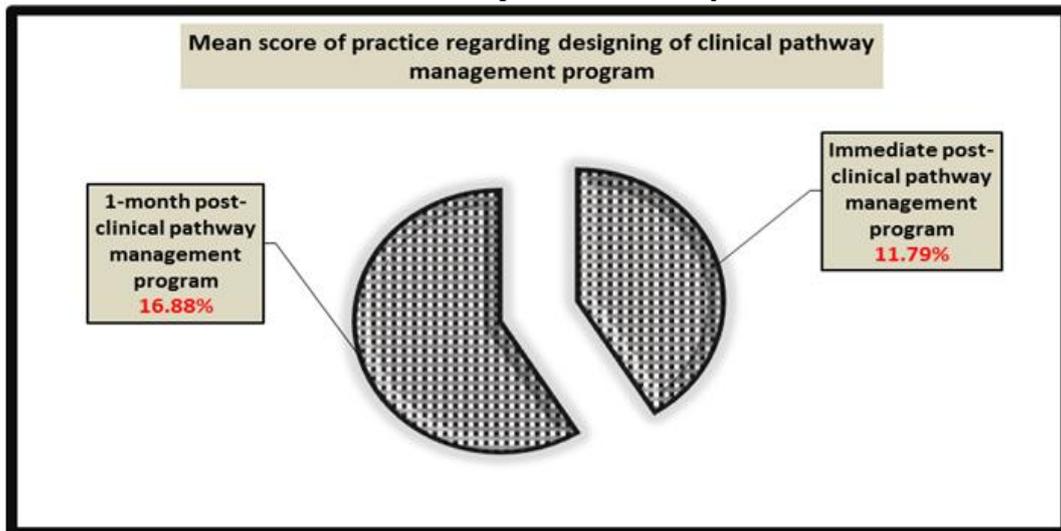


Figure (3): showed the mean score of nurses' practice regarding designing of clinical pathway map throughout all intervention periods of the study. The figure revealed that there was significant difference in the mean score of practice which was observed from immediate (11.79±2.774) to (16.88±1.867) later post one month from the implementation of clinical pathway program.

Table (7): Correlation between total score of knowledge and total score of the clinical pathway practice of the studied nurses throughout all intervention periods of the study

Variables	Pre- total score of clinical pathway practices	Immediate total score of clinical pathway practices	Post- total score of clinical pathway practices
	r P	r P	r p
Pre-total score of knowledge	0.564 0.000*	-0.550 0.000*	-0.374 0.000*
Immediate - total score of knowledge	-0.456 0.002**	0.629 0.000*	0.553 0.000*
Post - total score of knowledge	-0.080 0.611	0.298 0.052	0.484 0.001**

**Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table (7): showed the correlation between total score of knowledge and total score of the clinical pathway practice of the nurses throughout all intervention periods of the study. The table showed that there were significant positive correlations among pre-total score of nurses' knowledge and pre, immediate and after one month post- implementation of the study. Total score of nurses' clinical pathway practices at P= 0.000, 0.000 and 0.000 respectively. Also there were a significant positive correlation between immediate-total score of nurses' knowledge and pre, immediate and 1-month later post- total score of nurses' clinical pathway practices at P=.002, 0.000 and 0.000 respectively. The table also show that there was asignificant positive correlation among post- total score of nurses' knowledge and 1-month later post- total score of nurses' clinical pathway practices at P=.001.

Table (8) Relations between the sociodemographic characteristics of the studied nurses and their level of knowledge throughout all intervention periods of the study

Variables	Total level of knowledge Pre clinical pathway program				Total level of knowledge immediate post clinical pathway program		Total level of knowledge post-1- month of clinical pathway program		χ^2 P
	Poor		Fair		Good		Good		
	N	%	N	%	N	%	N	%	
Age									
▪ 20 < 25 years	11	25.6	0	-	11	25.6	11	25.6	1.422 0.491
▪ 25 > 40 years	14	32.6	0	2.3	14	32.6	14	32.6	
▪ ≥ 40 years	17	39.5	1		18	41.8	18	41.8	
Level of education									
▪ Baccalaureate degree	15	34.9	0	-	15	34.9	15	34.9	0.548 0.459
▪ Deplome	27	62.8	1	2.3	28	65.1	28	65.1	
Years of experiences for care of patients undergoing fracture neck of femur									
▪ ≤ one year	12	27.9	0	-	12	27.9	12	27.9	0.669 0.716
▪ > 1-5years	5	11.7	0	-	5	11.7	5	11.7	
▪ >5 years	25	58.1	1	2.3	26	60.4	26	60.4	

Table (8): showed the relations between the sociodemographic data of the nurses and their level of knowledge throughout all intervention periods of the study. Regarding age, the table showed that majority (39.5%) of nurses with age ≥ 40 years had poor level of knowledge pre implementation of clinical pathway during care of fracture neck of femur patients, while majority (41.8%) of them with age ≥ 40 years had good level of knowledge immediate and 1- month later post implementation of clinical pathway. Regarding level of education the table showed that majority (62.8%) of nurses who are deplome had poor level of knowledge pre implementation of clinical pathway program, while (65.1%) of them had good level of knowledge immediate and one month later post implementation of clinical pathway. Also Years of experiences the table revealed that more than half (58.1%) of nurses who had years of experience >5 years had had poor level of knowledge pre implementation of clinical pathway, while majority of them (60.4%) them had good level of knowledge immediate and one month later post implementation of clinical pathway program.

III. Discussion:-

Fracture neck of femur is common and severe injuries that are associated with high mortality and morbidity rate. The incidence of these fractures is expected to be double in the next 20th years and triple by 2050⁽⁵⁹⁾. Management of these fractures poses a challenge to surgeon and all health team. So clinical care pathways protocols and checklists offer a best way to assure coordination, efficiency, quality and safety during care of patients⁽⁶⁰⁾. Therefore this study was conducted to determine the effect of implementing clinical pathway management program of patients undergoing fracture neck of femur surgery on nurses' knowledge, practice and its' designing.

Concerning to socio-demographic characteristics of the nurses, the study findings revealed that majorities of the nurses were in the age group (≥40 and 25) years old, and all of them were female. Regarding educational level, the result showed that nearly two thirds of nurses were deplome degree and nearly three quarter of them were nurses and also two thirds of them had > 5 years of experience. Also results revealed that the majority of the nurses had no previous training about clinical pathway. These results were in the same line with **Shrief and Hamed (2018)**⁽⁶¹⁾ who reported that in their study greater than half of studied nurses their ages ranged from 20 to 30 years, high percentage of them were female. On the other hand this result were disagreed regarding majority of nurses had a bachelor degree, and their years of experience ranged from half to one years.

Also these results were disagreed with **Hussein et al., (2018)**⁽⁶²⁾ who reported that less than half of the orthopedic nurses' age ranged from 25 to < 30 years old. But were in the same line regarding that more than half of them have secondary nursing school diploma and the majority of them were having experience ≥ 10. Also **Said et al., (2017)**⁽⁶³⁾ reported that in their study about integrated clinical pathway that the mean age of nurses' ages was 32 ± 2.7 years, the highest percentage of them were female and majority of them having diplome nursing degree and had years of experiences ranged from 1 to < 10 years. The results of highest percentage of

nurses were female may due to the study of nursing at Egypt was exclusive for females students only till few years ago, thus the nursing staff in Egypt was mostly female.

Regarding to nurses' knowledge about fracture neck of the femur, the study results revealed that there were statistically significant improvements in nurses' mean score of knowledge regarding; fracture neck of femur, pre-operative assessment & preparation and immediate & late post-operative care that were observed throughout all intervention period of the study. This results were in the same line with **Fakler et al., (2016)**⁽⁶⁴⁾ who reported that nursing staff must inform fracture neck femur patients about surgery and discharge guidance with professional knowledge, which can increase the patient's trust and this can be achieved through educational guidelines for nurses. This also agrees with **Hojatallah et al., (2012)**⁽⁶⁵⁾ Who emphasized that training and educational program significantly improved levels of nurses' knowledge and practice regarding care of the orthopedic surgery patients.

Regarding to nurses' knowledge about the clinical pathway, the study results revealed that there were statistically a significant improvements in nurses' mean score of knowledge regarding; the clinical pathway program for fractured neck of the femur patients, also there were statistically significant difference in the total mean score of knowledge from pre to immediate and after one month later post implementation of clinical pathway program. This result was in the same line with **Roberts et al., (2005)**⁽⁶⁶⁾ who reported that in their study senior nurse who are responsible for new graduate and staff orientation programs need to ensure that sufficient information is provided about using of clinical pathways to cover learning experiences for these staff.

In the same line **Antioch et al. (2001)**⁽⁶⁷⁾ reported that the implementation process of the clinical pathway program for staff nurses and consultation is essential to the successful use of the clinical pathways in practice during care of patients. In addition to **Johnson et al., (2000)**⁽⁶⁸⁾ who clarified that education was the vital link in ensuring the success of the pathway for patients with fracture neck of femur. Where training went well with most staff of nurses, the pathway was generally well used and appreciated. Moreover **Sanad (2012)**⁽⁶⁹⁾ indicated that not only scientific knowledge but also experience could affect the overall quality performance of clinical pathway strategies during care of patients. This lack of clinical pathway knowledge might be due to lack of continuous education for these nurses, in addition to lack of their motivation to updating their knowledge.

Regarding to nurses' clinical pathway practice about fracture neck of the femur the study results revealed that there were statistically significant improvements in nurses' mean score of clinical pathway practice regarding; immediate pre-operative assessment and preparation within 4 hours from admission to emergency unit and immediate post-operative assessment and care (in the recovery room), care from 24 to 72 hours following surgery, care from 72- until 10 days following surgery and instruction before discharge and follow -up of home care post discharge, also there was significant difference in the total mean score of practice were observed from pre to immediate and 1-month later post implementation of clinical pathway management program.

This result was in the same line with **Mahmoud and Abd-El Sadik (2013)**⁽⁷⁰⁾ who reported that nurses have a key role in all aspects of clinical pathway practice because they begin and end the chain of staff involved in care of patients. Moreover **Tantawi et al., (2015)**⁽³¹⁾ who reported that the performance of the clinical pathway by nurses was monitored during care of patients. Overall, only about one-third of the nurses were applied the pathway correctly. The lack of application of the pathway steps for reasons beyond the responsibility of the nurse were not counted as incorrect application. In addition to **Refai (2010)**⁽⁷¹⁾ who found that in his study a clear improvement in practice scores among nurses immediately post nursing clinical pathway implementation than pre-nursing clinical pathway implementation.

In the same line **Barbieri et al., (2009)**⁽³⁰⁾ mentioned that the clinical pathway program is very helpful for the nurse because it helps the nurse to assess the patient's progress toward a timely discharge and detect any variances from the normal. Moreover **Scheiber-Case (2015)**⁽²⁹⁾ mentioned that the orthopedic surgical team design the clinical pathway steps that include; preoperative care, pain management, mobility, diet advancement, and bowel management in the postoperative phase so education is needed for staff nursing prior to the implementation of the pathway for these patients. Lack of nurses' clinical pathway practice may be due to the workload and shortage of staff could have a role, but do not justify this poor level of performance.

Regarding mean score and total level of nurses' practice regarding designing of clinical pathway map for fracture neck femur patients. The study results revealed that there was statistical significant improvement of nurses' practice regarding designing of clinical pathway map was observed from immediate to post 1-month from implementation of clinical pathway strategies. This findings were in the same line with **Abd El-Hay et al., (2018)**⁽⁷²⁾ who stated that the score of the study group regarding the pathway map rubric was improved from the first to the last teaching guidelines. In addition to **Zhou et al., (2017)**⁽⁷³⁾ who reported that clinical pathway teaching and training courses for nurses provide effective and highly efficient teaching and training pattern for nurses in clinical designing of clinical pathway practice. Also **Nirmala and Shakuntala (2011)**⁽⁷⁴⁾ said that in

their study, the comparison of pretest and post test rubric scores were showed significant difference in all the aspects except for the hierarchy.

Regarding correlations between total score of knowledge and total score of clinical pathway practice of the studied nurses. The current study results revealed that there were statistical significant positive correlations among nurses' total knowledge and total clinical pathway practice pre to immediate and one month post implementation of clinical pathway management program. These findings were in the same line with **Said et al., (2017)⁽⁶³⁾** who reported that regarding the correlation between clinical pathway nurses' knowledge and practice pre and post intervention, all studied nurses' knowledge were improved after intervention of integrated clinical pathway which lead to improvement of practice. Also **Jabbour et al., (2013)⁽²⁴⁾** reported that knowledge is a key factor in the performance of clinical pathway. The implication of nursing education offers nurses a chance to best practice of the clinical pathway during orthopedic surgery. In addition to **Tantawi et al., (2015)⁽³¹⁾** who indicated that none of the nurses had adequate performance of any of the tasks of the clinical pathway. It is most certainly due to lack of knowledge regarding these tasks.

Regarding to relation between the sociodemographic characteristics of the studied nurses and their levels of knowledge. The study results revealed that there were no relation between sociodemographic characteristics of the studied nurses and their level of knowledge pre to immediate and 1- month post implementation of clinical pathway program. This finding was in the same line with **Mahmoud and Abd-ElSadik (2013)⁽⁷⁰⁾** who reported that regarding to the relation between nurses' performance and their socio-demographic data, the current study showed that there was no significant differences. These findings also agree with **Abo-Alizm (2003)⁽⁷⁵⁾** who revealed in his study that there is no significant statistical relationships between the gender, occupation and experiences and clinical pathway knowledge of nurses.

IV. Conclusion

In the light of the current study, it can be concluded that: the implementation of the clinical pathway management program during care of patients undergoing the fractured neck of the femur had a positive effect on the improvement of nurses' knowledge and practice. Also there were significant improvements in designing of clinical pathway map for the fractured neck of the femur patients immediately and post one month from implementation of clinical pathway program.

V. Recommendations:

In the light of the study findings, the following recommendations are proposed.

- The developed clinical pathway must be implemented in all the units of orthopedic care settings.
- The nurse educators can be trained about how to use and teach clinical pathway for new nurses to plan care for clinical areas fracture neck of femur patients.
- Further studies and research about clinical pathway management program are needed in the area of orthopedic care settings.
- Organize training workshops and courses for students and interns nurses about implementation of clinical pathway according to patient's diagnosis in different settings.
- Distribute booklets and posters to all nurses to enhance their level of under-standing and practice regarding clinical pathway management program.

Limitations of this study:

The limitations of this study were lack of familiarity of many nurses with action research, nurses' resistance due to increased workload and responsibility in the clinical field, and time-consuming nature of the study.

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