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Effect of Designed Post-Operative Nursing Management Protocol on Nurses' Performance Regarding Care of Women Undergoing Cesarean Section

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Abstract:
Background: A cesarean section is associated with increased maternal risks, such as puerperal sepsis, hemorrhage, thromboembolism, despite the gross increase in cesarean section rate; there is still high perinatal mortality**. Aim & design:** Quasi-experimental study design was conducted aiming to evaluate the effectiveness of the designed post-operative nursing management protocol on nurses' performance regarding care of women undergoing cesarean section. **Sample:** 40 nurses were chosen as a convenience sample in this study, which was carried out at Postnatal Inpatient Department at Ain Shams University Maternity Hospital. **Tools:** the study utilizes three tools: A structured interview questionnaire, an observational checklist, and nurses' satisfaction questionnaire, in addition to developed supportive material (post-operative nursing management protocol). **Results:** The results showed statistically significant improvements in nurses' performance (knowledge and practice) at intervention -post compared with the pre-intervention level ($p<0.001$). In addition to 90% of nurses were satisfied with nursing management protocol. **Conclusion:** Findings of this study conclude that the post-operative nursing management protocol was effective in improving nurses' performance regarding care of women undergoing cesarean section and most of them were satisfied with it. **Recommendations:** applying continuous refreshment courses and follows up programs for nurses regarding post-operative care of cesarean section women.

Keywords: Cesarean section, Nurses' performance & Post-operative nursing management protocol.

Introduction
A cesarean section (C.S) is a major obstetric surgical procedure performed for the purpose of delivering a live fetus when vaginal delivery would put the mother and the fetus at risk due to complications of pregnancy, labour and delivery thereby saving lives of women and their newborns (**Begum, et al., 2017).** A cesarean section is a surgical procedure performed for the purpose of extracting a viable fetus through an incision in the abdominal wall and the uterus **(World Health Organization, WHO, 2018)**.

Cesarean section indications include failure of labor to progress, pelvic abnormalities, problems with the placenta, multiple gestation pregnancy, active herpes simplex, non-reassuring fetal heart rate, mal-presentation of the fetus, and any serious medical condition that requires emergency treatment (**Atuhaire., 2020)**.

Although a cesarean section is a lifesaving procedure, it is associated with a number of risks or problems in the postoperative period which may also be classified as maternal and fetal. Maternal risks include hemorrhage, postoperative adhesions, wound infection, incisional hernias, wound gaping, puerperal sepsis, organ injury, anesthesia complications, and complications may extend to future pregnancies such as uterine rupture, placenta accreta, placenta praevia, ectopic pregnancy, infertility, and hysterectomy **(Elsharkawy et al., 2019)**.

Fetal risks include respiratory distress syndrome, birth injuries, transient lung syndrome among others. These risks/problems are six times more likely to occur than in vaginal delivery and fifty times more if a cesarean is performed in an emergency than if it was elective **(Macones et al., 2019).**

These risks are higher in women with limited access to comprehensive obstetric care and require careful consideration in settings that lack the facilities and capacity to conduct surgery safely or to treat surgical complications. So, providing quality nursing care that refers to "doing the right thing, at the right time, in the right way, for the right patient and having the best possible results". It is one of the key challenges facing maternal and neonatal services as deprived care from quality during births **(Huang., 2015)**.

The nursing contribution is very important to detect abnormal findings or subtle signs and symptoms to the rescue and mobilization of the team process to provide proper immediate care for the post-cesarean section mother and the newborn and prevent any complications to be arises. So, it is vitally important that nurses have the knowledge and technical skills to determine when to be proactive and undertake specific observations and nursing actions when there

are indications to do so. The nurse's responsibility is to be competent and able to undertake further necessary education and training required to provide extended care **(Burke & Allen, 2020).**

Nursing management protocol has been shown to result in improvement of nurse's knowledge and practice and availability of skilled personnel to carry out effective interventions for post-operative care of cesarean section women which reflect Clinical benefits include shorter stays, fewer complications, and fewer readmissions, as well as cost savings and a reduction in "harmful" clinical variances found in certain high-volume clinical care processes and procedures, all of which will improve quality of care, patient safety, and health outcomes. **(Abdelhakm & Said., 2017).**

Nurses play a crucial role in the post-operative care of women undergoing C.S as provided competent care through multidisciplinary roles as a health care provider, health educator, counselor, administrator, and researcher. Nursing assessment and intervention are also directed to identifying and meeting the educational health needs to promote optimal individual adaptation and effective self-care **(Kenyon et al., 2016)**

Significance of the study

Cesarean section rate has increased in different parts of the world, both in developed countries and in developing countries. An estimated 18.5 million cesarean sections are carried out annually in the world, and 3.6% of the procedure is performed without any medical or surgical indications **(Diema et al., 2019).** In Egypt, CS rates are alarmingly high, accounting for 52% of all deliveries **(Elnakib et al., 2019)**

According to **WHO (2018),** a cesarean section can cause critical and sometimes chronic complications, disability, or death particularly in settings that lack the facilities and capacity to properly render care to mothers undergone this surgical procedure and treat surgical complications. Cesarean section causes many risks for the mother and fetus such as increased risk for loss of blood, exposure to infection, increase risk of tearing the female reproductive organs like urinary bladder, uterine blood vessels, risk of tearing the uterine incision, risk of maternal death post-cesarean labor from complications of anesthesia, puerperal infections, and deep vein thrombosis. Fetus deliver through cesarean labor is at considerably enlarged risks for respiratory complications and admission to the newborn Intensive care unit.

Accurate nurses' practical skills are a key factor in avoiding and treating such complications and the quality of nursing care and education has a vital part in reducing complications of such operations and in assisting mothers to good self-care and rise mother satisfaction **(WHO,2018).**

Therefore, implementing a nursing management protocol guided by scientific evidence in daily clinical nursing practice can be helpful to guide the decision-making process and ensure the provision of quality and safe care that reflected upon decreasing maternal, perinatal, and neonatal mortality and morbidity associated with cesarean section. Because of this requirement, it is essential that nurses keep their skills and knowledge up to date. Based on this important issue researchers suggested this study to assess the effect of designed post-operative nursing management protocol on nurses' performance related to care of women undergoing cesarean section.

Aim of the study

The aim of this study was to assess the effect of designed post-operative nursing management protocol on nurses' performance regarding care of women undergoing cesarean section through the following objectives:

- Assessing the nurses' knowledge & practices regarding post-operative care of women undergoing cesarean section.
- Designing and implementing nursing management protocol regarding post-operative care of women undergoing cesarean section.
- Evaluating the effect of nursing management protocol on nurses' knowledge and practice.

Research Hypothesis:

Nurses who have been exposed to the post-operative nursing management protocol will demonstrate improved knowledge and practices regarding care of women undergoing cesarean section compared to their preintervention level.

Operational Definition:

Nursing management protocol: is considered to be a set of predetermined criteria that define appropriate nursing interventions that articulate or describe situations in which the nurse makes judgments relative to a course of action for effective management of common patient care problems **(Brown., 2014).**

Nurses' performance: is defined as the capacity demonstrated by an organization to acquire the needed nursing resources and knowledge for using them in a suitable manner to produce nursing services that effectively improve patients' conditions **(Dubois et al., 2013).**

Subjects and Methods:

Research Design:

A Quasi-experimental research design (pre/post-test) was used.

Setting

The study was conducted at (Postnatal Inpatient Unit at Ain Shams University Maternity Hospital.

Subjects

Sample Type: A convenient sample.

Sample Size: A total of 40 nurses working in the previously mentioned settings at the time of data collection were recruited for the study.

Tools of Data Collection:

Three tools were utilized for data collection.

A structured interviewing questionnaire:

It was developed in a simple, clear Arabic language by the researcher based on a related literature review **(El-Khawaga et al., 2019)) (AbuoShabana et al., 2015).** It consisted of 40 questions: covering two parts as the following.

Part 1: was to assess general characteristics of the study nurses as age, residence, qualification, years of experience, attendance of previous training courses regarding post-operative care of cesarean section (5 questions).

Part 2: concerned with nurses' knowledge regarding cesarean section and nursing intervention. It consisted of 35 multiple choice questions (MCQ) covering two main areas; cesarean section such as meaning, indications, complications, types, danger signs (10 MCQs), and post-operative nursing care of cesarean section such as position after surgery, relieving postoperative pain, Preventive measures for infection post CS, care of the newborn and health education about self-care for women undergoing cesarean section before discharge from the hospital (25 questions).

Scoring system

Each question scored as (2) for correct answer and score (1) for incorrect answer. The total score ranged from 0-70. Total knowledge scores were categorized as the following:

- Adequate knowledge ≥ 60% (42-70 score)
- Inadequate knowledge < 60% (0-42 score)

Nursing Practice Observation Checklist:

It was adapted from Royal College Of Obstetricians and Gynecologists **(RCOG, 2016)** and"WHO safe childbirth checklist **(WHO, 2015)** and modified by the researchers to evaluate post-operative nurses' practices regarding care of women undergoing cesarean section (pre/post-test). it consisted of 42 steps covering the following items; postoperative maternal assessment (14 steps), maternal comfort, pain management (8 steps), Maintain Fluid and electrolyte balance (5 steps), Bladder management (4 steps), Mobilization, diet (3 steps), hygienic measures, wound care and health education about self care measures after ceserean section(6 steps) , and baby care (4 steps).

Scoring system: Each step of the procedure assigned a score(2)if done, and a score(1)if not done or incorrectly done. The total score ranged between(0-84)

The total practice scores were classified as the following;

- Satisfactory practice (≤ 60% 50-84)
- Unsatisfactory Practice (>60% 0-49)

Nurses' satisfaction Questionnaire:

It was adapted from (**El-Molla., 2013)** and modified by the researcher to assess nurses' satisfaction regarding nursing management protocol. It consisted of 15 statements in the form of a three-point Likert scale as if the nursing management protocol was clearly defined, well organized, and covered the critical content necessary for nurse's practice. In addition to teaching methods if they were helpful, effective suitable to the way of learning and motivate nurses to learn. Furthermore, items regarding trainer if she was well prepared, knowledgeable, the talk was clear, the time allotted was sufficient and the nursing protocol objectives were met.

Scoring system

Each item was scored on a three points-Likert-scale ranging from 1 (not satisfied), 2 (moderate satisfied), and 3 (satisfied).

The total satisfaction score ranged from (1 to 45) and was graded as the following;

- Not satisfied < 60% (0-26).
- Moderate satisfied 60- 74 % (27- 33)
- Satisfied ≥ 75% (34-45)

Validity & reliability:

Tools were evaluated for feasibility and content validity by five experts from the Faculty of Nursing & Medicine, in the Maternity-Gynecological Nursing Department, and medical-surgical Department. Their comments were considered. The same experts revised the designed nursing management protocol that covered all items related to post-operative care of cesarean section women according to the current literature and all recommended modifications were done. Reliability was done by Cronbach's Alpha coefficient test which revealed r = 0.88 for the first tool, 0.92 for the second tool, and 0.87 for the third tool.

Administrative design:

An official written approval letter clarifying the title, purpose, and setting of the study was obtained from the Dean of Faculty of Nursing of Ain Shams University and director of Ain Shams Maternity University Hospital.

Ethical considerations:

Ethical approval was obtained from the Scientific Research Ethical Committee of Faculty of Nursing at Ain Shams University before starting the study. Informed consent was obtained from participants after explaining the purposes of the study. No harmful

methodology was used with participants. Each participant had the right to withdraw from the study at any time. Human rights were granted. Data was confidential, and a coding system for data was used.

Pilot Study:

It was carried out in three weeks on 10 % of the sample (4 nurses) over one month (November 2020). The pilot study was conducted to assess the validity, clarity, comprehensiveness of the tools and to test the feasibility of the study process. The necessary modifications were done based on the pilot study findings such as (omission of some questions from the tool) in order to strengthen their contents or for more simplicity and clarity. Nurses included in the pilot study were not excluded from the total sample as no major modifications of study tools were done.

Fieldwork:

The study was implemented within eight months, from the beginning of December 2020 until the end of July 2021. The researchers visited the previously stated setting three days per week, during the morning shift (9.00 a.m. to 12.00 p.m.) and afternoon shift (3.00 pm – 5.00 pm). The fieldwork of the current study was done through four phases;

Assessment phase:

Firstly, the researchers introduced themselves to each participant and explained the study's purpose, duration, and activities, as well as taking oral consent to participate in the study. Nurses were interviewed individually using an interviewing questionnaire to assess nurses' general characteristics and their knowledge regarding cesarean section and post-operative care of it. Then the researchers assessed nurses' practices regarding post-operative care of cesarean section women by using the observational checklist during their work. The average time for the completion of the tools for each nurse was around 20-30 minutes.

Planning phase:

Setting the goals and objectives of the nursing management protocol:

a) General objective

At the end of nursing management protocol sessions, each nurse should be able to acquire essential knowledge and practices needed to provide competent post-operative care to cesarean section women.

b) Specific objectives

At the end of protocols sessions each nurse should be able to:

1. Define cesarean section.
2. List indications of cesarean section for the women.
3. Identify indications of cesarean section for the baby.
4. Determine types of cesarean section.
5. Clarify danger signs of cesarean section.
6. Discuss complications of cesarean section.
7. Recognize priorities of nursing care for post-cesarean section
8. Apply post-operative nursing care for women undergoing cesarean section

Preparing the content of the nursing management protocol:

The nursing management protocol developed by the researchers based on the results of the assessment phase, opinions of medical and nursing experts and reviewing of related literature **(WHO., 2015), (Katali.,2019), (AUCKland., 2015**). It was designed in Arabic language and with different illustrative pictures in order to facilitate the nurses' understanding of its contents. The content of post-operative nursing management protocol for cesarean section women is divided into two parts;

The theoretical part; included knowledge related to cesarean section as defintion, indications, types, complications, danger signs, post-operative nursing care , and health education of self-care measures for women undergoing cesarean section before discharge from the hospital including a healthy diet, wound care, daily living activities, postpartum exercises, breastfeeding, hygienic measures, sexual relation, follow up visit, and baby care.

The pratical part: included items related to post-operative care and procedures that should be provided by nurses for women undergoing cesarean section. included the following items: post-operative maternal assessment, maternal comfort and pain management, maintain Fluid and electrolyte balance, bladder management, mobilization and diet, hygienic measures; as wound care, breast care, perineal care, and infection control measures, in addition to baby care including assessment of the baby, and Maintain general hygiene.

Implementation phase

The management protocol was achieved in about four months. It was conducted in eight sessions (3 theory sessions and 5 practice sessions). An appropriate schedule for nurses was designed to implement the nursing protocol, the schedule includes; the date, place, topic, time, and duration of each session. The researchers divided the nurses into eight groups; each group includes five nurses, and the content was implemented separately for each group. The researchers took into consideration safety precautions against COVID19 infection followed by WHO guidelines **(World Health Organization., 2020)** as it was pandemic during the data collection period; for example, wearing masks, keeping a one-meter distance, hand washing, and using the antiseptic solution (alcohol 70%), also the researchers followed the rules and regulation of the hospital safety measure. At the beginning of the first session, an orientation session regarding contents of protocol, its

purpose, objectives, and its impact on nurses' performance.

The theoretical part: For theoretical contents, three teaching sessions were conducted, each session ranged from 20-30 minutes, for each group (5 nurses) to acquire the related information. The researcher continued to reinforce the gained information, answer any raised questions, and gave feedback. Communication channel was kept open between the researcher and the study group subjects

- **The practical part;** consisted of five sessions, each session ranged from 30-45 minutes, it included demonstrations and re-demonstration about procedures related to post-operative care of cesarean section women.
- At the beginning of each session, the researcher first summarizes the content of the previous session and the objectives of the new one, and considers using simple and clear language suitable for nurses. Various teaching methods used as small group discussions, lectures, brainstorming, simulation role-plays, demonstrations, re-demonstrations, Colored posters, and a Microsoft PowerPoint presentation were used as teaching aids. Each nurse has received a copy of the handout of the nursing protocol, in which all elements were explained in Arabic

Evaluation phase:

The effect of implementation of nursing management protocol on the nurses' performance was evaluated by comparing nurses' knowledge and practices before and after one month of intervention by using the same pre-intervention tools. In addition to assessing nurses' satisfaction related to designed nursing management protocol at post-intervention by using (tool III).

Limitations of the study:

- Interviewing nurses and implementing sessions were sometimes postponed because many nurses were busy with care of women during data collection,
- Insufficient equipment, especially disposable items.

Statistical analysis:

Data were collected, coded, tabulated, and analyzed, using the SPSS version 20 computer application for statistical analysis. Descriptive statistics was used to calculate percentages and frequencies for qualitative variables, mean and standard deviations for quantitative variables. The statistical tests such as chi-square test (X2) were used to estimate the statistically significant differences and r-test was used for correlation co-efficient. The internal consistency (reliability) of the tools used in this study was measured by determining Cronbach's alpha coefficient test. The significance of the results was considered as follows: when P> 0.05, it is no statistically significant difference; while P< 0.05, it is a statistically significant difference; and P<0.001, it is considered a highly statistically significant difference.

Result:

Table (1): Frequency and percentage distribution of the studied sample according to their general characteristics (n=40).

Items	No	%
Age (Year)		
< 20 years	8	20
20<30	11	27.5
30 <40	17	42.5
≥40	4	10
Mean+ SD **36.3±8.2**		
Residence		
Rural	9	22.5
Urban	31	77.5
Educational level		
Secondary nursing education	26	65
Technical nursing education	3	7.5
Bachelor of nursing	11	27.5
Years of Experience		
<5	9	22.5
5-<10	16	40
>10	15	37.5
Attending training courses regarding post-operative care of cesarean section women.		
Yes	6	15
No	34	85

Table (2): Comparison of studied sample' knowledge regarding Cesearean section at pre and post intervention: (n=40).

Item	Pre intervention		Post intervention		X^2	P-value
	No	%	No	%		
Concept						
Correct	10	25	35	87.5	**16.15**	**0.001****
Incorrect	30	75	5	12.5		
Indications						
Correct	7	17.5	34	85	**18.98**	**0.002****
Incorrect	33	82.5	6	15		
Types						
Correct	11	27.5	36	90	**16.93**	**0.001****
Incorrect	29	72.5	4	10		
Danger signs post-cesarean section						
Correct	14	30	34	85	**17.02**	**0.001****
Incorrect	26	70	6	15		
Complications						
Correct	11	27.5	35	87.5	**16.96**	**0.001****
Incorrect	29	72.5	5	12.5		
Nursing care post CS						
Correct	13	32.5	34	85	**17.16**	**0.002****
Incorrect	27	67.5	6	15		
Total Knowledge Score						
Adequate	11	27.5	35	87.5	**16.96**	**0.001****
Inadequate	29	72.5	5	12.5		

Table (3): Comparison between the studied sample' practices regarding post-operative assessment of caesarean section women at pre and post-intervention: (n=40).

Items	Pre-intervention				Post-intervention				X^2	P-value
	Done		Not done		Done		Not done			
	N	%	N	%	N	%	N	%		
Post-operative maternal assessment										
Assesses & maintains a patent clear airway.	14	35	26	65	34	85	6	15	14.51	0.001**
Assess level of consciousness.	19	47.5	21	52.5	36	90	4	10	14.68	0.001**
Monitoring vital signs every15 min in the first 2 hours-then/1hour for 6 hours then every 6 hours.	17	42.5	23	57.5	37	92.5	3	7.5	14.71	0.001**
Monitor SaO2via pulse oximeter and provide oxygen if the patient needed	13	32.5	27	67.5	36	90	4	10	14.48	0.001**
Complete head-to-toe physical assessment.	12	30	28	70	33	82.5	7	17.5	14.47	0.001**
Check redivac/s and record the amount and type of drainage	14	35	26	65	34	85	6	15	14.53	0.001**
Empty and record drainage at least every 4 hours and as needed.	11	27.5	29	72.5	33	82.5	7	17.5	13.92	0.001**
Palpate uterine fundus /15 min for 1 hour then/30 min for 2 hours then/4 hrs.	13	32.5	27	67.5	37	92.5	3	7.5	14.39	0.001**
Assess amount and character of lochia	15	37.5	25	62.5	37	92.5	3	7.5	14.28	0.001**
Assess lower extremities for presence of edema, redness pain	8	20	32	80	35	87.5	5	12.5	15.03	0.001**
Assessing wound site for infection, bleeding, redness, and discharge	12	30	28	70	36	90	4	10	14.46	0.001**
Assess iv site for appearance & patency initially and /2 hours	14	35	26	65	34	85	6	15	14.53	0.001**
Measure, record & report fluid intake and output.	18	45	22	55	37	92.5	3	7.5	14.61	0.001**
Assess woman's postoperative pain score	16	40	24	40	33	82.5	7	17.5	14.52	0.001**

Table (4): Comparison between the studied sample' practice regarding post-operative care of caesarean section women at pre and post-intervention (n=40).

Items	Pre-Intervention				Post Intervention				X2	p-value
	Done		Not done		Done		Not done			
	N	%	N	%	N	%	N	%		
Maternal comfort &Pain management										
Position the woman in semi-recumbent position in the initial post-operative period	7	17.5	33	82.5	36	90	4	10	17.75	0.002**
Assist woman in positioning & feeding	13	32.5	27	67.5	35	87.5	5	12.5	12.36	0.001**
Instruct woman to put pillow on the abdomen when coughing	8	20	32	80	37	92.5	3	7.5	12.28	0.001**
initiate deep breathing exercises frequently every 2hours, coughing and leg exercises	6	15	34	85	34	85	6	15	17.92	0.002**
Encourage woman to wear loose comfortable clothes	11	27.5	29	72.5	35	87.5	5	12.5	12.34	0.001**
Apply non pharmacological pain relieve measures	9	22.5	31	77.5	33	82.5	7	17.5	12.19	0.001**
Maintain safety measures.	18	45	22	55	35	87.5	5	12.5	14.61	0.001**
Provide prescribes medication on time	22	55	18	45	33	82.5	7	17.5	18.78	0.002**
Maintain Fluid and electrolyte balance										
Administer the IV regime as prescribe and document on the fluid balance record	21	52.5	19	47.5	37	92.5	3	7.5	18.03	0.002**
Assess IV site for signs of inflammation to avoid extravasations	12	30	28	70	35	87.5	5	12.5	12.04	0.001**
Measure and record all intake	13	32.5	27	67.5	36	90	4	10	12.31	0.001**
Bladder Management										
Assess bladder distension upon admission & with each fundal assess	7	17.5	33	82.5	33	82.5	7	17.5	17.86	0.002**
Verify foley catheter is patent and keep the urinary bag below the level of the patient to avoid urine back flow	17	42.5	23	57.5	37	92.5	3	7.5	13.98	0.001**
Measure intake and out put	16	40	24	60	35	87.5	5	12.5	13.74	0.001**
Record initial micturition following removal of indwelling catheter (normally 12 hours post delivery)	7	17.5	33	82.5	37	92.5	3	7.5	17.67	0.002**
Mobilization/Diet										
Encourage early mobilization (within 6 – 12 hours)	12	30	28	70	36	90	4	10	12.39	0.001**
Encourage oral fluids intake after doctor permission	15	37.5	25	62.5	37	92.5	3	7.5	13.87	0.001**
Provide soft diet when flatus or bowel movement……..	18	45	22	55	34	85	6	15	14.61	0.001**
Hygienic measures & health education										
Assessment of woman's general hygiene	12	30	28	70	38	95	2	5	16.54	0.001**
Perineal care	5	12.5	35	87.5	32	80	8	20	17.67	0.002**
Breast care	6	15	34	85	35	87.5	5	12.5	17.82	0.002**
Wound care	11	27.5	29	72.5	36	90	4	10	16.63	0.001**
Health education about self-care measures after cesarean section	6	15	34	85	33	82.5	7	17.5	17.54	0.002**
Apply infection control measures	13	32.5	27	67.5	34	85	6	15	12.86	0.001**
Care of baby										
Assessment of the baby	10	25	30	75	35	87.5	5	12.5	16.38	0.001**
Maintain general hygiene of the baby	14	35	26	65	33	82.5	7	17.5	16.52	0.001**
Encourage skin to skin contact	9	22.5	31	77.5	38	95	2	5	16.08	0.001**
Offer support to start breast feeding	11	27.5	29	72.5	36	90	4	10	16.63	0.001**

Table (5): Comparison of studied sample total practices score regarding post-operative care of cesarean section women at pre and post-intervention: (n=40).

Total Practices Score	Pre intervention		Post intrvntion		X^2	P-value
	N	%	N	%		
Satisfactory	12	30	34	85	16.48	0.001**
Unsatisfactory	28	70	6	15		

Table (6): Frequency and Percentage distribution of studied sample' satisfaction regarding the nursing management protocol (n=40)

Items	Satisfied		Moderate Satisfied		unsatisfied	
	N	%	N	%	N	%
1.Objectives of the nursing management protocol were clearly defined.	36	90	3	7.5	1	2.5
2.Participation was encouraged.	34	85	4	10	2	5
3.Nursing management protocol covered the critical content necessary for nurses' practices.	38	95	1	2.5	1	2.5
4.The content was organized.	35	87.5	2	5	3	7.5
5.The teaching methods used were helpful and effective	36	90	2	5	2	5
6.The teaching materials used in this protocol were motivating nurses to learn.	36	90	2	5	2	5
7.Nursing management protocol was understood.	35	87.5	3	7.5	2	5
8.The method of teaching was suitable to the way of learning	33	82.5	6	15	1	2.5
9.The protocol provide nurses with a variety of learning materials and activities	37	92.5	1	2.5	2	5
10. The trainer was well prepared.	36	90	4	10	0	0
11. The trainer was knowledgeable.	37	92.5	3	7.5	0	0
12. The trainer talk was clear.	38	95	2	5	0	0
13. The training objectives were met.	38	95	2	5	0	0
14. The time allotted was sufficient.	37	92.5	3	7.5	0	0
15. The training facilities were suitable.	33	82.5	6	15	1	2.5
16. Total Satisfaction score	36	90	3	7.5	1	2.5

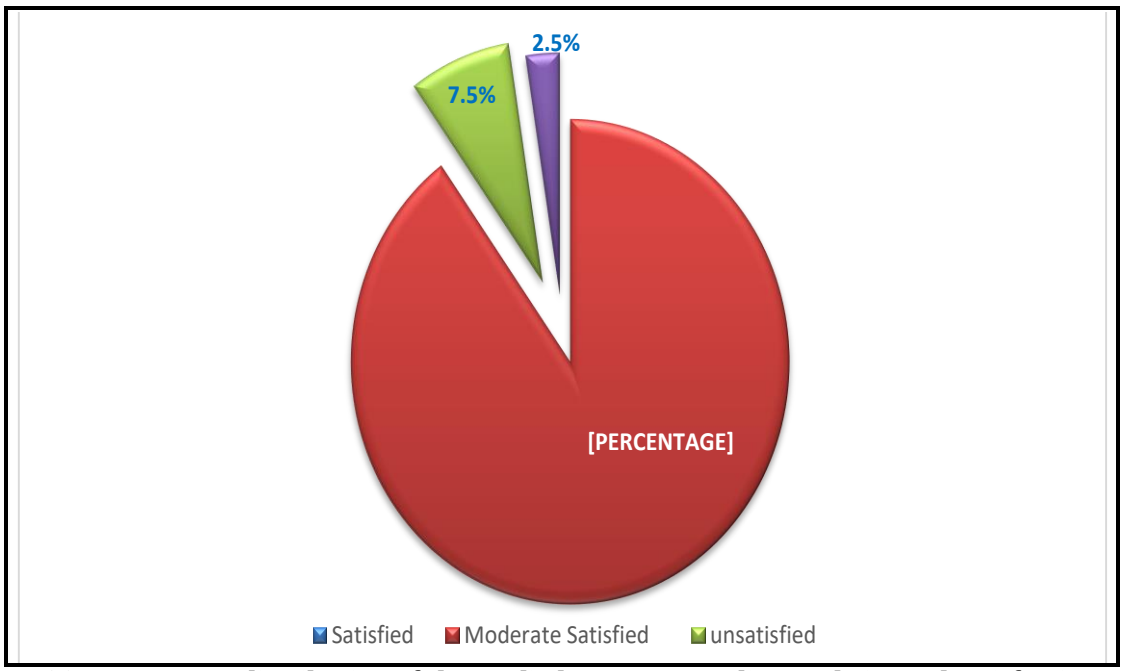

Figure (2): Percentage distribution of the studied nurses according to their total satisfaction score regarding nursing management protocol: (n=40)

Table (7): Correlation between studied sample total knowledge score and their total practices score: (n=40)

Item	Total practice score	
	r	P-value
Total knowledge score	0.82	0.001**

Table (1): Shows that (42.5%) of studied sample their age ranged from 30-40 years with the mean age 36.3±8.2, (77.5%) of them were from urban areas, (65%) of studied sample had secondary nursing education, (40%) of them their years of experience ranged between 5-10 years, and (85%) didn't attend training courses regarding post-operative care of cesarean section women.

Table (2): Reveals that (82.5%) of studied sample had incorrect knowledge regarding indications of cesarean section that improved to 85% correct at post-intervention, However (72.5) %of studied sample had incorrect knowledge about types and complications of cesearean section at pre-intervention, , which improved to (90%& 87%.) respectively at post-intervention. Meanwhile, (67.5%) of studied sample had incorrect knowledge about nursing care of cesarean section pre-intervention, which improved to (85%) post-intervention. There was a highly statistically significant improvement in all aspect of knowledge regarding cesarean section among studied sample at post-intervention compared to pre-intervention ($P < 0.001$).

Table (2): Proves that there was a highly statistically significant improvement in the total knowledge score of studied sample regarding cesarean section atpost-interventionn compared to pre-intervention. As (27.5%) of studied sample had adequate knowledge at pre-intervention reached 87.5% at post-intervention.

Table (3): Illustrates a highly statistically significant improvement of studied sample' practices related to all aspects of post-operative maternal assessment at post-intervention compared to pre-intervention ($p < 0.001$). The most improvement observed in monitoring vital signs, palpating uterine fundus, assessing amount and character of lochia, measuring and recording fluid intake and output which represented 92.5% at post-intervention compared to (42.5%& 32.5% & 37.5%& 45%) respectively at pre-intervention.

Table (4): Shows a highly statistically significant improvement of studied sample' practices related to all aspects of post-operative care of cesarean section women as maternal comfort, bladder management, mobilization, diet, hygienic measures, and care of the baby at post-intervention compared to pre-intervention ($p < 0.001$).

Table (5): Presents a highly statistically significant improvement in the total practice score of the studied sample towards post-operative care of cesarean section women at post-intervention compared to pre-intervention ($p < 0.001$).

Table (6): Reveals that (95%) of the studied sample satisfied with nursing management protocol covered the critical content necessary for nurses' practices and the training objectives were met, (92.5%) of them were satisfied with the protocol to provide nurses with a variety of learning materials and activities, the time allotted was sufficient, and The trainer was knowledgeable.

Figure (2): Shows that (90%) of studied sample were satisfied with nursing management protocol while 7.5% were moderate satisfied, and (only 2.5%) were not satisfied.

Table (7): Demonstrates that there was a statistically significant relationship between the studied sample's total knowledge score and their total practices score at post-intervention ($p \leq 0.001$).

Discussion

Cesarean section is a surgical procedure that can effectively prevent maternal and newborn mortality when used for medically indicated reasons. Cesarean section may be associated with short- and long-term risks that can extend many years beyond the current delivery and affect the health of the woman, the child, and future pregnancies **(Atuhaire., 2020)**.

Nursing management protocols are strategies geared towards reducing maternal deaths. The core protocols include the availability of skilled personnel to carry out effective interventions for women undergoing C.S. so, nursing management protocol is very important for nurses to update their clinical and theoretical knowledge, technical skills, as well as increase self-confidence and possess the necessary judgment, skills to cope with stressful and emergency conditions (**Said, Mohamed, & Draz 2019)**. This study aimed to investigate the effect of designed post-operative nursing management protocol on nurses' performance regarding care of women undergoing cesarean section

Regarding the general characteristics of the studied sample, the current study findings reveal; that more than one third of the studied nurses' age ranged between 30-40 years old with the mean age 36.3±8.2, slightly more than two third of them had secondary education, slightly more than one third of them their

years of experience ranged between 5- 10 years, and the majority of them didn't attend training courses regarding post-operative care of cesarean section women. These findings assured that nurses need more specific courses, guidelines, and protocols to improve their knowledge, skills, and achieve optimum outcomes.

The findings of the current study are contradictory with **El-Khawaga, et al. (2019)**, who study aimed to assess the effect of implementing a teaching program about Immediate Postpartum Care on Nurses' Knowledge and Practice which revealed that half of the studied nurses were in the age group of 20-30 years old. Conversely, **Torres et al. (2018),** who studied "Evaluation of a quality improvement intervention for labour and birth care" found that most nurses were in the age group of 26-30 years. The discrepancy among different study results may be attributed to methodological variations related to sampling and data collection.

In accordance, **Hashem (2015),** who conducted a study in Egypt to assess the quality of immediate postpartum nursing care provided to women after cesarean section in Tanta city mentioned that, almost all the studied nurses didn't attend any in-service training program about the quality of immediate postpartum nursing care. This can be explained in the light of the belief that lacks of hospital financial resources, shortage of nursing staff, and work overload are considered a barrier for nurses to leave work and attend a training course.

Concerning nurses' knowledge about cesarean section and post-operative care of it, the present study findings showed that slightly less than three quarters of studied sample had inadequate total knowledge score regarding cesarean section and its management before implementing nursing management protocol. This might be due to the majority of nurses had not received training courses related to post-operative care of cesarean section women.

This result matched **Novelia et al. (2017),** who studied " Nurses' Knowledge and Practice Regarding the Prevention of Cesarean Section Surgical Site Infection in Indonesia" and found that the nurses had inadequate knowledge regarding cesarean section care. This assured that nurses were in need of a continuous educational program to review, refresh, and be up to date on their knowledge and skills.

Disagreement to these study findings, **Abuo Shabana et al. (2016),** conducted a descriptive study to explore nurses' practical skills post-cesarean section. They reported that the majority of nurses had correct knowledge about care provided post-cesarean section. These differences may be due to the majority of their studied sample having received training courses regarding nursing care post-CS and infection prevention.

However, after implementing the nursing management protocol, nurses' total knowledge scores in all aspects of cesarean section, such as concept, indication, types, complications, and nursing care post-CS, improved significantly. The positive influence of the nursing management protocol and the well-organized learning sessions could account for these findings. Also, Nurses were very interested and satisfied during the learning sessions because the study's topic was considered relevant and sensitive to their work in such a critical unit.

Supporting these study findings, **Hussien et al. (2021),** who carried out a quasi-experimental (pre-post-test) to investigate the impact of enhanced recovery pathway application outcomes on nurses and women undergoing Cesarean Section on 50 maternity nurses and found that nurses' knowledge of all aspects of the cesarean section had improved. and enhanced recovery pathway post-intervention. In the same line, **Kadhim & Ali (2020),** who investigated the effectiveness of education programs in knowledge and practices for nurse-midwife regarding personal hygiene, and wound, self-care for primipara women with a cesarean section at a maternity hospital in holy karbala and reported that there was a marked improvement in nurses' knowledge as most nurses had a high level of knowledge in all tested areas post implementing the program. This finding indicated the positive effect of different educational strategies on nurses' knowledge and reflected that nurses could learn and improve their knowledge.

Similar findings were presented by **Elsharkawy et al. (2019)**, Who conducted a study to evaluate the effect of an educational module on their knowledge and practices regarding prevention of cesarean section surgical site infection on 44 nurses working at obstetrics and gynecology department at Shebien Elkoom teaching hospital, Menoufia governorate, Egypt. They demonstrated a similar success of the planned teaching in improving nurses' knowledge level. these findings are also in agreement with **Kareem & Hamza (2018),** who carried out a quasi-experimental design to assess the effectiveness of an educational program on nurse's knowledge regarding pre and post-operative nursing management in Iraq and found that there was a good development with highly significant differences in study group between pre and post-test in all items of knowledge related to pre and post-operative nursing management.

As regard to post-operative assessment of cesarean section women, the current study represented a highly statistically significant improvement of studied nurses' practices related to all aspects of post-operative maternal assessment at post-intervention

compared to pre-intervention, the most improvement observed in monitoring vital signs, assess the fundal level, lochia characteristics, measurement, recording intake, and output. This finding might be due to nurses' active participation in hands-on training, commitment, interest in the subject, and excellent communication between nurses and researchers, which helped acquire proper practice regarding post-operative care of cesarean section women.

These results correspond to **Farahat et al. (2018),** who investigate the effect of Clinical Audit on the Quality of postoperative nursing care provided to women undergoing Cesarean Section at Woman's Health Hospital, Assuit University; and reported that there was a significant improvement in nurses practices related to monitoring vital signs, palpating fundus and surgical site care after implementing educational strategy. In accordance with **Elsharkawy et al. (2019),** study findings proved a significant improvement of all nurses' practices post educational sessions regarding post-operative physical assessment of cesarean section women.

This finding is confirmed by **Mohemmed et al. (2020),** who studied "Effect of Designed Educational Program on Midwives Knowledge and Practice Regarding Post Natal Sepsis Management in Governmental Hospitals" and stated that, the implementation of an educational intervention significantly improved nurses' practical skills related to physical assessment and management.

In relation to post-operative care of cesarean section pre and post-intervention, the current study findings revealed that a highly statistically significant improvement of studied nurses practices related to all items of post-operative care of cesarean section women as maternal comfort, bladder management, mobilization, diet, hygienic measures, and care of the baby at post-intervention compared to pre-intervention. This improvement may be attributed to continuous education and frequent demonstration throughout the implementation of management protocol and providing better teaching and learning methods and materials that enabled learning and better communication.

These current study findings supported by **Hussien et al. (2021),** who displayed that there was a statistically significant difference regarding the maternity nurses' practice of cesarean section care at pre and post clinical enhanced recovery pathway application where, the majority of the nurses were adequately done all items of CS care (pre, intra, and post-operative) after its application. Consistent with **Farahat et al. (2018),** who stated that the majority of studied nurses had good practice levels regarding overall cesarean section care post-implementation of the program.

This result is contradicting with **Mukonka et al. (2018),** who conducted a descriptive cross-sectional survey to understand the Midwives' perspective on the care of postpartum mothers who had a cesarean section at the University Teaching Hospital-Women and Newborn in Lusaka District and documented that all the midwives had the high score in performing all the immediate post-operative care on the postpartum mothers who had a cesarean section while the score was much lower during the subsequent postoperative period. This may be explained by the activities in the subsequent postoperative period are those which mothers would perform for themselves if they were in good condition to do so but given their current situation they could not and therefore relied on the health care providers as they had just undergone major abdominal surgery.

Regarding nurses' total practice level at pre and post-implementation of management protocol, the current study findings revealed that less than three quarter of the studied sample had unsatisfactory total scores at pre-intervention; this might be due to most nurses had unsatisfactory knowledge of pre-intervention and lack of in-service training programs. However, post-intervention there was a highly statistically significant improvement in the total practice level and all the practice elements regarding post-operative assessment and post-operative care of cesarean section women.

This result was matched with **Kadhim & Ali. (2020)** who evaluated overall practices among nurse-midwives regarding self-care for primipara women with cesarean section. This indicates that all nurse-midwives are showing poor practices during the pre-test time, while all of them had good practice levels during the post-test 1 time and the majority during the post-test 2 times after the implementation of an educational program. This highlights the need for providing importance to conduct periodically in-services training programs and protocol for maternity nurses about postoperative of women undergoing C.S to improve their knowledge and practices.

Also, the study in accordance with **El-Khawaga et al., (2019),** revealed a significant improvement of performance post-program among the studied nurses regarding the immediate postpartum care and the immediate newborn care compared to pre-program.

The current study findings were congruent with **Mahmoud et al. (2021),** who revealed that slightly less than two thirds of the studied nurses had unsatisfactory performance scores pre-implementation of an educational program, while immediately and one month post educational program implementation the performance score level was significantly improved. This assured that availability

and implementation of protocol enhanced maternity staff nurses' total level of knowledge and practice.

Regarding the nurses' satisfaction with the designed post-operative nursing management protocol regarding cesarean section, the current study findings revealed that the majority of studied sample was satisfied with all items of nursing management protocol and the most satisfaction documented in protocol was coverage of the critical content necessary for nurses' practices, meeting the training objectives, provision nurses with a variety of learning materials and activities, the time allotted was sufficient, and the trainer was knowledgeable. in the same line **El-Khawaga et al.(2019),** who evaluated the effect of clinical guidelines on baccalaureate nursing students' satisfaction and documented that the students' nurses were very satisfied with it.

The present study demonstrated a statistically significant relationship between total knowledge score and total practices score at post-intervention. This result may be explained because knowledge is a significant positive predictor of the practice, and they explained together approximately all the nurses' development. In accordance with **Elsharkawy et al. (2019),** who showed a strong positive correlation between knowledge and practice scores were generated.

To sum up, nursing competence must be assessed regularly and according to nationally recognized frameworks. On other hand, the present study emphasizes continuous courses and training of maternity nurses for caring of c.s women as well as by new methods for training. Using nursing management protocol in clinical training can prevent errors & confusion in the clinical field by sharing standards in clinical training. Nurses will be able to manage time & careful planning to have a more effective clinical field, referring to management protocol.

Conclusion

Based on the findings of the current study, it can be concluded that the results support the research hypotheses in which implementing of postoperative nursing management protocol was highly significantly improved nurses' knowledge and practice regarding care of women undergoing cesarean section. In addition, the majority of studied nurses were satisfied with the nursing management protocol. Also, there was a highly statistically significant association between nurses' total knowledge and practices.

Recommendations

In the light of the findings of the study, the following recommendations were suggested:

- In-service training programs are needed for nurses regarding post-operative care of cesarean section women to improve, update, and refresh their knowledge and practices.
- Applying post-operative nursing management protocol for nurses regarding the care of women undergoing cesarean in all available health services.
- Replication of the research on a greater statistical sample drawn from various Egyptian regions and long-term follow-up is recommended to obtain more generalizable results
- Further studies are needed to investigate the effect of postoperative nursing management protocol on minimizing complications among post-cesarean section women

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