

# Nurses' Knowledge and Practices Regarding Prevention of Cesarean Section Wound Infection: An Intervention Program

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## Abstract

**Aim:** Study the effect of educational program on nurses' knowledge and practices regarding prevention of caesarean section wound infection.

**Setting:** The study was conducted in Obstetrics and Gynecology Department at Farasan General Hospital.

**Design:** A Quasi-experimental study (pre and post-test) was utilized.

**Sampling:** Convenient sample included 50 nurses.

**Tools:** Two tools were used Self-administered questionnaire and Observational checklist.

**Results:** Majority of studied nurses had poor total knowledge score regarding prevention of caesarean section wound infection pre intervention. While most of the nurses studied had good total knowledge score regarding prevention of caesarean section wound infection post intervention. More than majority of nurses studied had unsatisfactory total practice pre intervention toward prevention of caesarean section wound infection, meanwhile majority of studied nurses had high satisfactory total practices post intervention. **Conclusion:** the intervention program had positive effect on nurses' knowledge and practices regarding prevention of caesarean section wound infection after application of program zcompared to before application.

**Recommendations:** Updating knowledge and practices of nurses through continuous in-service educational programs emphasizing the importance of the evidence-based nursing practices of prevention of caesarean section wound infection.

**Keywords:** Educational program, nurses' knowledge and practices, caesarean section wound infection.

## Introduction

The caesarean section is one of the most common obstetrical surgical procedures. The

international healthcare community has considered an appropriate proportion for CS to be between 10-15% of all deliveries<sup>1</sup>. Globally, the prevalence of CS is approximately 18.6%, ranging from 6 to

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27.2%. Caesarean section is considered the most important risk factor for postpartum maternal infection<sup>2</sup>. Post wound infection is one of the most common postoperative complications after cesarean section in both developed and developing countries. Surgical site infection surveillance system is a must to implement before, during and after cesarean section to get a controlled, accurate and standardized magnitude. Especially the abdominal wound complicating cesarean section should be decreased through strict preventative strategies.<sup>3</sup> The successful application of infection control measures, cesarean section wound infection prevention measures, and well-structured continuing education programs are considered as a substantial element that would improve nurses' knowledge.<sup>4</sup>

Nurses should collaborate with other health team members to control and prevent cesarean section wound infection occurrence. Nurses play a key role in wound management, and their theoretical understanding of basic wound management is expected to influence the quality of wound therapy fundamentally. Education of health care professionals can improve their knowledge level, thus promoting infection prevention guidelines implementation which directly contributes to health care associated infections reduction.<sup>5</sup>

### Significance of the Study

Caesarean wound infections have major consequences such as limiting the potential benefits of surgical interventions and increasing the economic burden on hospitals. Adding to the functional disability and emotional stress of the woman.<sup>6</sup> Post cesarean section (CS) infection is a momentous problem that affects 4.5% in Kingdom Saudia Arabia, and infection at the incisional site which occurs in around 6.6%-9% of post cesarean deliveries.<sup>8</sup>

### Aim of the Study

The aim of this research is to study the effect of intervention programme on nurses' knowledge and practices regarding prevention of caesarean section wound infection.

### Research Hypotheses

Nurses' knowledge and practices regarding prevention of caesarean section wound infection will be improved after application of educational program compared to pre application.

### Subjects and Method

A Quasi-experimental study (pre- and post-test) was followed. The study was conducted in Obstetrics and Gynecological Department at Farasan General Hospital. Convenient sample type. The total number includes (50) nurses.

### Tools of Data Collection

**Tool (I): Self-administered questionnaire.** It includes demographic characteristics of nurses studied. Knowledge assessment sheet adapted from.<sup>7,10,11,12</sup>

**Tool (II): Observational check list:** it includes general nurses 'practices about prevention of caesarean section wound infection. General practices regarding environmental cleaning.

### Ethical Consideration

- An official permission was granted from Committee for Research Ethics - Jazan University with reference number (REC-46/06/1319), date of decision 29 December 2024. The aim of the study was to explain to each nurse before applying the tools. An oral consent was obtained from each nurse to participate in the study, and each nurse can freely withdraw at any time. The data was collected and treated confidentially.

### Validity and Reliability

The tools were thoroughly reviewed by three experts, two in Obstetrics & Woman's health nursing and one obstetrician for content validation. Reliability of the tools was performed to confirm their consistency by Cronbach's Alpha coefficient test which revealed that each of the two tools consisted of relatively homogenous items, which it was 0.83.

**Pilot study:** It was carried out on 10% of total sample (5 nurses) to evaluate reliability of study sample and clarity of the study tool.

### Field Work

- Data was collected from the beginning of September 2023 until the end of May 2024, covering nine months. The study was carried out for three days weekly from 9 Am to 12 Pm at Obstetrics and Gynecological Department at Farasan General Hospital. Data was collected through distribution of self - administered questionnaire. The average time required for completion of the questionnaire was about 20 to 30 minutes with each nurse. Then the researcher used the observational checklists to assess nurses' practice regarding prevention of caesarean section wound infection and general practices regarding environmental cleaning and skin of surgical site preparation procedure. Nurses were divided into (10) groups according to working circumstances and nurses' physical and mental readiness. Each group included (5) nurses. The overall sessions were 4 sessions for each group; the duration of each session ranged from 30-45 minutes. At the beginning of the first session the researcher gave the nurses the instructional guideline and introduced an orientation of the instructional guideline. Then

the researcher provided nurses with general knowledge about prevention of caesarean section wound infection. Then the researcher explained the knowledge about preoperative, intraoperative and postoperative measures to prevent caesarean section wound infection. The researcher demonstrates practical part of guideline covering contain procedure e.g. (skin of surgical site preparation and vaginal preparation). The last session, re-demonstration of the practical part. At the end of the session the researcher gave nurses the opportunity to ask questions and provided period of discussion. **Finally**, the researcher evaluates effect of the educational program (post-test) by using the same format of tools which were used before the implementation of the educational program (pre-test).

### Statistical Design

After data collection, each sheet was scored, and data were organized, categorized, results were presented in tables and were analyzed by using the statistical package for social sciences (SPSS) program, version (2024). Numerical qualitative data were expressed as frequencies and percentages. As well, means, standard deviation (SD), Chi-square and probability of errors (*p*-value) test were used to examine the relation between qualitative variables.

## Results

**Table 1. Distribution of demographic characteristics of the nurses studied (n=50).**

Personnel Characteristics	Frequency	%
<b>Age in years</b>		
20-<30	32	64.0
30-<40	5	10.0
≥40	13	26.0
<b>Mean ±SD</b>	31.98±8.74	

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<b>Educational level</b>		
Secondary nursing education	12	24.0
Technical nursing education	28	56.0
Bachelor's degree of Nursing	10	20.0
<b>Years of experience</b>		
< 5 years	30	60.0
5-10 years	2	4.0
≥10 years	18	36.0
<b>Mean ±SD</b>	6.68±4.53	
<b>Previous attendance of training programs</b>		
Yes	9	18.0
No	41	82.0

Table (1): clarifies that about two third (64.0%) of the studied nurses were in the age group of 20-30 years with a mean age of 31.98±8.74 years and more than half (56.0%) of the studied nurses were technical nursing education. Moreover, more than half (60.0%)

of studied nurse had < 5 years of experience with mean 6.68±4.53 years. Regarding previous training programs, more than three quarters (82.0%) of the nurses studied didn't attend any training programs about cesarean section wound infection.

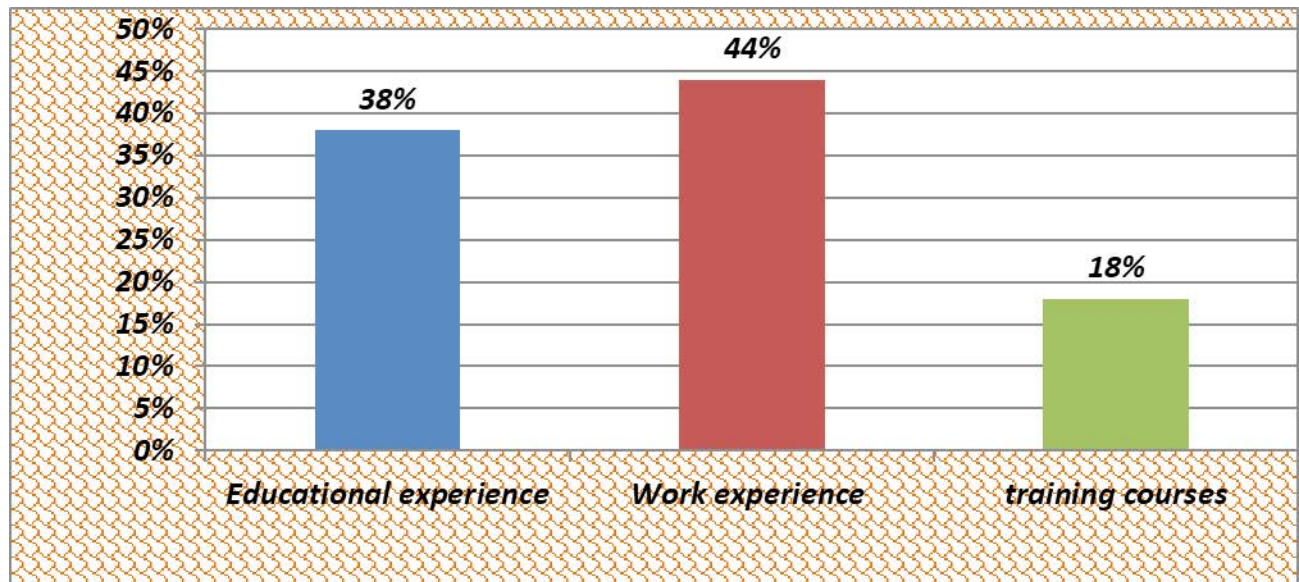
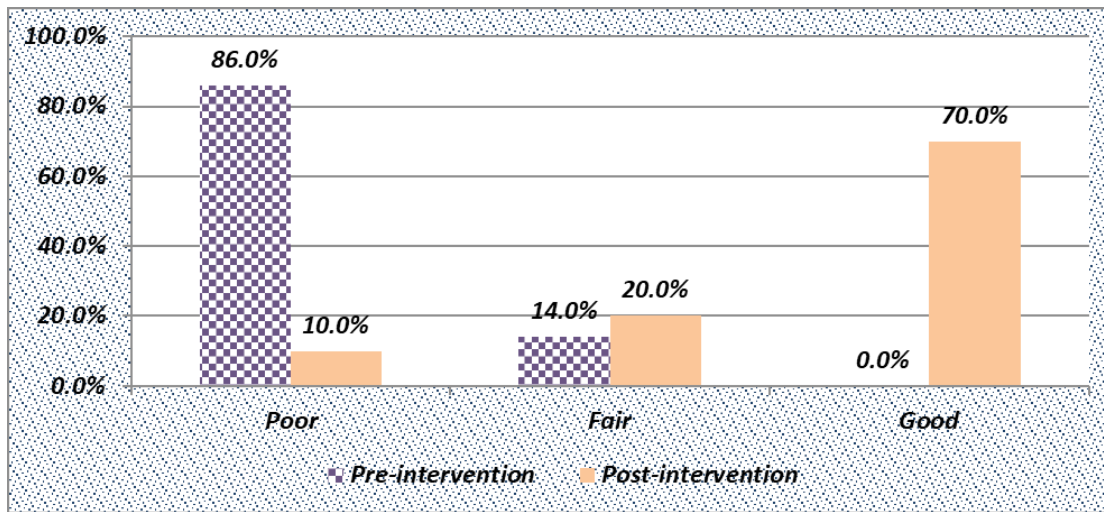


Figure 1: nurse’s sources of knowledge regarding prevention of cesarean section wound infection

Figure (1) shows that most of the nurses (44%) had sources of knowledge regarding caesarean section wound infection from work experience, (38%) of them had sources of knowledge regarding caesarean

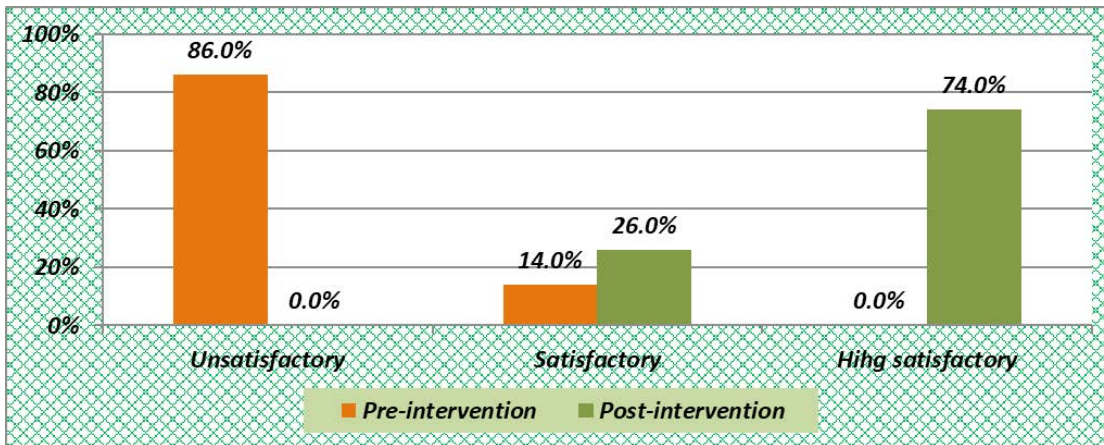
section wound infection from educational experience, while (18%) of them had knowledge from training courses.



**Figure 2: percentage distribution of total knowledge score of the nurses studied regarding prevention of caesarean section wound infection.**

Figure (2) shows that (86.0%) had poor knowledge regarding prevention of caesarean section wound infection before implementation of educational

program. (70.0%) had good knowledge after implementation of educational program



**Figure 3: percentage distribution of total practice scores regarding prevention of caesarean section wound infection.**

Figure (3) shows that (86.0%) had unsatisfactory total practice pre intervention toward prevention of caesarean section wound infection, (74.0%) had highly satisfactory total practices post intervention.

**Table 2. Correlation between studied nurses' total knowledge and practices score at post-intervention (N=50).**

Total knowledge	Post-intervention		
	r	P value	
Total practice	0.476	<0.001**	

Table (2): this table illustrates that there was a highly positive statistically significant correlation between studied nurses' total knowledge & total practices score post intervention ( $p < 0.001^{**}$ ).

**Table 3. Relationship between demographic characteristics and total nurses' knowledge regarding prevention of caesarean section wound infection (n=50).**

Nurses' knowledge & Demographic Characteristics	Good N= 8		Average N= 21		Poor N= 21		Total	$\chi^2$	P value
	No	%	No	%	No	%			
<b>Age</b>								11.942	>0.05
20-<30	6	21.4	7	25.0	10	53.6	23		
30-<40	1	20.0	5	80.0	0	0.00	6		
≥40	1	3.8	9	34.6	11	61.6	21		
<b>Educational level</b>								13.973	<0.05*
Secondary nursing education	2	10.5	7	36.8	9	52.7	19		
Technical nursing education	2	5.6	2	11.1	9	83.3	18		
Bachelor's degree of Nursing	4	22.2	12	55.6	3	22.2	18		
<b>Years of experience</b>								1.558	<0.05*
< 5 years	0	0.00	1	50.0	1	50.0	2		
5-10 years	6	15.0	12	30.0	12	55.0	30		
≥10 years	2	11.2	8	44.4	8	44.4	18		
<b>Previous attendance of training programs</b>								1.536	>0.05
Yes	7	14.6	15	31.3	16	54.1	38		
No	1	8.3	6	50.0	5	41.7	12		

\*= statistically significant at  $\leq 0.05$

Table (3): this table shows that there was statistically significant relationship between the level of education and years of experiences of the

studied nurses and their total knowledge regarding prevention of caesarean section wound infection.

**Table (4): Relationship between demographic characteristics and total nurse's practices regarding prevention of caesarean section wound infection (n=50).**

Total nurse's practices & Demographic Characteristics	Satisfactory N= 17		Unsatisfactory N= 33		Total N= 50	$\chi^2$	P value
	No	%	No	%			

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Age						1.893	<0.05*
20-<30	6	21.4	12	78.6	18		
30-<40	2	40.0	4	60.0	6		
≥40	9	34.6	17	65.4	26		
Educational level						22.517	<0.001**
Secondary nursing education	0	0.00	18	100.0	19		
Technical nursing education	5	27.8	10	72.2	18		
Bachelor's degree of Nursing	12	66.7	5	33.3	18		
Years of experience						1.955	>0.05
< 5 years	11	28.2	23	71.8	34		
5-10 years	4	44.4	5	55.6	9		
≥10 years	2	16.7	5	83.3	7		
Previous attendance of training programs						0.185	>0.05
Yes	13	27.1	25	72.1	38		
No	4	33.3	8	66.7	12		

\*\* = highly statistically significant at  $\leq 0.001$  \* = statistically significant at  $\leq 0.05$

**Table (4):** this table shows that there was statistically significant relationship between the age and their total practices regarding prevention of caesarean section wound infection. There was high statistically significant relationship between the level of education and their total practices regarding prevention of caesarean section wound infection.

### Discussion

The results of the present study showed that two third of the studied nurses were in the age group of 20< 30years with a mean age of  $31.98 \pm 8.74$  years. This result similar to **Musa**,<sup>12</sup> who assess nurses' knowledge and performance regarding infection control in labor room in Omdurman Military Hospital, Khartoum State, Sudan, revealed that most of respondent nurses (60%) were below 30 years.

The result of the current study revealed that more than half of studied nurse had < 5 years of

experience with mean  $6.68 \pm 4.53$  years. This finding, according to **Dhakar et al.**,<sup>13</sup> who studied the nurses' knowledge regarding aseptic technique in the operation theatre of selected hospitals of Bharatpur, concluded that most of the respondents had working experience of five years and below.

The result of the current study showed that more than half of the nurses studied were in technical nursing education, this result in accordance with **Arafat et al.**,<sup>14</sup> who assessed the effect of evidence-based guidelines on nurse's performance in respect to nosocomial infection at medical-surgical and obstetrician departments. Additionally, the result of the present study illustrated that more than three quarters of the nurses studied didn't attend any training programs about caesarean section infection. This result is similar with **Novelia et al.**,<sup>10</sup> who identify the level of nurses' knowledge and practices regarding the prevention of Caesarean

Section Surgical Site Infection who found that most of the nurses studied had not trained in an infectious control training program.

The present study revealed that more than half of studied nurses had incorrect answer about definition of caesarean wound infection, this result in the same line with *Balodimou et al.*,<sup>15</sup> who investigated nurses' knowledge regarding the prevention of surgical site infection, who stated that, the majority of respondents did not chose the correct definition of the time of occurrence of surgical site infection.

The result of the present study illustrates that majority of nurses studied had incorrect answers. This result is similar to *Sadia et al.*,<sup>8</sup> who studied the knowledge and practices of nurses towards surgical site infection prevention in two public hospitals of Lahore, Pakistan, who found that majority of the participants give wrong answer about the best time of hair removal.

Result of the present study showed that majority of them had complete correct answer. This result consistent with *Zucco et al.*,<sup>16</sup> who assess the level of knowledge, the attitudes and the adherence to evidence-based recommendations for surgical site infection prevention, found that more than two thirds (73%) of the participants knew that the appropriate time for shower or bath with an antiseptic agent is the day of the operation or the day before.

The present study revealed that half of the nurses studied had Incomplete Correct answer, these results came in the same line with *Labeau et al.*,<sup>17</sup> who assessed intensive care nurses' knowledge of evidence-based strategies for the prevention of SSI, who found that more than half of the sample wrongly classified SSIs in superficial incisional SSI, deep incisional SSI.

The present study showed that more than quarter of studied nurses had complete correct answer about signs of cesarean wound infection, These finding of present study disagreement with *Suliman S,N*,<sup>18</sup> who assess the nurses knowledge about pre and post-operative care in pediatric surgery, found that, majority of nurses had good knowledge about prevention of wound infection such as observe any

sign of infection early and wound is monitored with every dressing change for signs of infection to prevent any complication.

The present study showed that majority of studied nurses had poor knowledge, this result contrast with *Labrague et al.*,<sup>19</sup> who found that nurses have "Excellent Knowledge" on the concepts/principles of sterile technique and applied it to a "Great Extent". Significant relationship was found between knowledge and extent of practice of sterile technique.

The result of the present study revealed that majority of studied nurses had poor total knowledge score regarding prevention of caesarean section wound infection pre intervention. This result supported by *Novelia et al.*,<sup>10</sup> who identified the level of nurses' knowledge and practices regarding the prevention of Cesarean Section Surgical Site Infection, found that nurses had low levels of knowledge regarding the prevention of CS-SSI in Indonesia.

Most of the nurses studied had unsatisfactory total practice pre intervention toward prevention of caesarean section wound infection, most of them had high satisfactory total practices post intervention. This result similar with *Farotimi et al.*,<sup>20</sup> who examined the effect of a training program on attitude and practice of infection control among nurses in two tertiary hospitals in Ogun State, Nigeria, found that there were a Significant difference was observed between mean practice score ( $P = 0.001$ ), between self-reported and observed practices ( $P = 0.000$ ),

The result of the present study pointed out that most of studied nurses studied unsatisfactory practices pre intervention self-report practice about general practices regarding prevention of cesarean section wound infection. These results are similar to a study performed by *Dhakai et al.*,<sup>13</sup> who identify nurses' practices and their barriers and facilitators for surgical site infection prevention, and propose direction for improving nurses' practices for such prevention.

The present study showed that. These results were in the same line with *Khudhair, A.S*,<sup>23</sup> who assesses nurse's practice concerning postoperative wound

care, who revealed that nurses' practices were deficit in the most items of post-operative wound care for patients in surgical units.

The present study showed that more than half of studied nurses had unsatisfactory done practices about hand wash before wearing surgical gloves pre intervention and half of them had satisfactory done practices about hand wash post intervention ( $p < 0.001^{**}$ ), this result is supported by *Phan et al.*,<sup>25</sup> who determined hand hygiene compliance following an educational program in an obstetric & gynecological hospital in Vietnam and found that the hand hygiene compliance rates prior to the intervention were low and hand hygiene compliance increased significantly after intervention ( $p < 0.0001$ ) in the delivery suite and surgical ward.

The present study revealed that more than quarter of studied nurse had satisfactory practice (pre intervention), the result in contrast with *Alabdulrazaq et al.*,<sup>24</sup> who evaluating knowledge and practice of healthcare professionals towards prevention of surgical site infection, and measuring the incidence of SSI, found that the practice of washing the hands before and after changing the dressing during wound cleaning.

The present study revealed that less than half of studied nurse had satisfactory practice as self-reported (pre intervention) toward educate women on wound care before discharge from the hospital. the result in the same line with *Ding et al.*,<sup>26</sup> who described surgical nurses' postoperative wound care practices and the extent to observed surgical wound practices aligned with evidence-based guideline recommendations, stated that more than half of surgical nurses ( $n=37$ , 61.7%) did not educate patients on post-discharge wound management.

The present study showed that the most of studied nurses had reported unsatisfactory done practices regarding environmental cleaning as self-reported at pre intervention, this finding is in agreement with *El-Sayed et al.*,<sup>27</sup> who assessed nurses' knowledge and practice for prevention of infection in burn unit at a University Hospital, revealed that very low percentages among practices of environmental cleaning and pointed out that the nurse is responsible

for providing a clean and safe environment for patients closely the burn wound.

These findings of the present study showed that there was appositive statistical correlation between total knowledge and total practices scores before and after phases of instructional guideline implementation ( $p < 0.001^{**}$ ). This result is supported by *Mohammed, S.A.*,<sup>28</sup> who evaluate effects of implementing nursing guidelines on nurses' knowledge and patient's safety regarding nosocomial infection control measures in burn unit. A study of convenience sample (35 nurses and 40 patients) from Burn Department (BD) at Public Fayoum.

### Conclusion

Based on the results of the present study, concluded that an educational program has positive effect on nurses' knowledge and practices regarding prevention of caesarean section wound infection, there was a highly statistically significant difference in relation to total nurses' knowledge regarding prevention of caesarean section wound infection pre intervention and post intervention phases of educational program implementation. There was a highly statistically significant difference in relation to total nurses' practices regarding prevention of caesarean section wound infection pre intervention and post intervention phases of educational program implementation. There was a highly positive statistically significant correlation between studied nurses' total knowledge & total practices score post intervention and the study hypothesis was supported.

### Recommendations

- Updating knowledge and practices of nurses through continuous in-service educational programs emphasizing the importance of the evidence-based nursing practices of prevention of caesarean wound infection

### Further Researches

- Evaluating the effect of educational program on women regarding prevention of caesarean section wound infection.

- Enhancing quality of care in maternity departments and capabilities to prevent prevention of caesarean section wound infection

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