

# Effect of Preoperative Vaginal Preparation with Povidone Iodine on Post Cesarean Endometritis among Women Undergoing Elective Caesarean Delivery

Shaimaa F. Saleh.<sup>1</sup>, Prof. Inass K. Ali<sup>2</sup>, Prof. Hamed E . Ellakwa<sup>3</sup>,  
Assistant Prof. Marwa A. Shahin<sup>4</sup>

<sup>1</sup>Teacher at the technical School of Nursing in menouf

<sup>2</sup>Professors of Maternal and Newborn Health Nursing, Faculty of Nursing, Menoufia University

<sup>3</sup> Professor of Obstetrics and gynecology Faculty of Medicine - Menoufia University

<sup>4</sup> Assistant Professor in Maternal and Newborn Health Nursing, Faculty of Nursing, Menoufia University

Corresponding email: [shaimaa\\_farahat85@yahoo.com](mailto:shaimaa_farahat85@yahoo.com).

---

**Abstract:** preoperative vaginal wash with povidone iodine reduced the vaginal bacteria up to 98% which can in turn reduce ascending bacteria from the vagina to the uterus end reduce post cesarean infection especially endometritis. The purpose of the study was to assess Effect of preoperative vaginal preparation with povidone iodine on post cesarean endometritis among women undergoing elective caesarean delivery **Methods:** A quasi-experimental design was utilized. **Sample:** A convenience sample of 162 pregnant women in the full term pregnancy. **Setting:** The study was carried out at Menoufia University Hospital at Shebin El-Kom and Menouf General Hospital at menouf. **Instruments:** An interviewing questionnaire, maternal assessment tool, cesarean examination tool, follow up assessment tool. **Results:** There was a statistically significant reduction in postoperative infection in the study group compared to the control group. **Conclusion:** preoperative vaginal cleansing with povidone iodine is effective in the reduction of post cesarean endometritis. **Recommendations:** Preoperative vaginal preparation with antiseptic solution should be incorporated as an essential part of routine preoperative care before cesarean delivery

**Keywords:** Preoperative, Vaginal Cleansing, Post Cesarean Infection.

---

## 1. INTRODUCTION

Cesarean delivery is currently one of the most common surgical procedures performed by obstetricians. Despite the WHO recommendation that CS rate should not exceed 10%-15% of all deliveries (WHO, 2015), the rate in USA reaches 32.9%, while in Egypt it reaches 51, 8 % of all deliveries (El Zanaty and association, 2015). In fact, cesarean delivery is the most significant risk factor for postpartum infection (Tikkanen et al., 2013). Postpartum infection has been shown to be eight-folds higher after surgical delivery than after normal delivery. The most common post CS maternal infectious morbidity involve any febrile morbidity resulting from a surgical site infection (SSI), endometritis or sepsis (Conroy et al., 2012).

Postpartum surgical site infection (SSI), wound infection and endometritis result in prolonged hospital stays and increased financial burden to the health care system. Surgical site infection complicate a significant number of patients who undergo cesarean delivery 2-7% will experience wound infections and 2-16% will develop endometritis. The most recognized risk factors for developing post caesarean infectious morbidity included repeated vaginal examinations, prolonged rupture of membranes, prolonged labor and failure to use prophylactic antibiotics. Other reported risk factors are nulliparity, younger age, and use of internal monitors in labor, intra partum bacterial vaginosis and presence of immuno-compromised state such as diabetes mellitus, anemia or obesity (Kawakita & Landy, 2017). Postpartum endometritis is an infection of the lining of the uterus. It is seen in 6–27% of postpartum patients, and is 10 times more likely after cesarean delivery when compared to vaginal delivery (Haas et al., 2018). Clinically, patients have fundal tenderness and fevers and are generally treated with intravenous antibiotics. These patients often have prolonged hospital stays and are at risk for developing more serious complications like bacteremia, sepsis and intra-abdominal abscesses. Additional known risk factors for development of endometritis include chorioamnionitis, and prolonged rupture of membranes (Smaill & Grivell, 2014; Haas et al., 2018)

Preoperative antibiotics and abdominal preparation with antiseptic solution have been adopted as the standard of care to mitigate the risk of developing postoperative infectious complications (Hadiati et al., 2014; Berríos-Torres et al., 2017). Preoperative vaginal washing with an antiseptic solution or an antimicrobial agent is a routine prophylactic nursing intervention that had been performed before many gynecological procedures to prevent post-procedure infection, but it is not a standard care before cesarean section (Abdallah, 2015).

Traditionally, povidone iodine (PVP-I) has been the most common antiseptic agent used for skin preparation (Huang, et al., 2018). Vaginal cleansing with povidone iodine is an additional intervention that has been shown to decrease post cesarean endometritis. A Cochrane review and a recent meta-analysis established that the subgroup of patients who benefit from vaginal cleansing are those who have labored or experienced rupture of membranes prior to cesarean, with a decrease in the rate of endometritis from 8.8% to 4.5% (Caissutti et al., 2017 ).

### **Significance of the study**

Surgical site infection (SSI) is one of the most common complications following cesarean section, and has an incidence of 3%–15% worldwide. It places physical and emotional burdens on the mother herself and a significant financial burden on the health care system. Moreover, SSI is associated with a maternal mortality rate of up to 3% (Zuarez-Easton et al., 2017). In some developing countries found the incidence of Cesarean section -Surgical site infection (CS-SSI) as follows: 12.5 % CS-SSI in Nigeria, 29.38% CS-SSI in Oman, and 9.6% CS-SSI in Egypt (Novelia et al 2017)

Based on reviewing literature, Haas et al., (2018) showed that preoperative vaginal cleansing with povidion iodine decreases the incidence of post-cesarean endometritis. Few available Egyptian reviews or researches were done to study the effect of vaginal cleansing with povidion iodine in reduce infection after cesarean section. It is considered a noninvasive nursing technique in the field of midwifery. This study is a trail to find a way to reduce post cesarean& postpartum infection by using the cheap antiseptic solution for vaginal cleaning before cesarean section. The aim of this intervention is to reduce the postoperative endometritis, reduction of postoperative morbidity that may lead to decrease the cost, economical burden and also decrease the effort of the health care providers. So the researcher tried to fill in such gap of knowledge by conducting this study.

### **Purpose of the Study:**

The study purposed to examine the Effect of preoperative vaginal preparation with povidone iodine on post cesarean endometritis among women undergoing elective caesarean delivery

### **Research Hypotheses:**

The women who will undergo vaginal preparation with povidone iodine before cesarean section will have less possibility of post cesarean endometritis than those who don't use it.

## 2. METHODS

### Research design:

A quasi-experimental design (case-control group) was used.

### Setting:

The study was carried out at the operative room of obstetrics and gynecologic department in Menoufia University hospital and Menouf general hospital. These settings were selected because of the highly flow rate of C.S, high levels of services were provided, and provision of postnatal services for women with various socioeconomic backgrounds. They have high turnover of puerperal women. Also, these settings were governmental hospitals. Mothers remain in hospital for at least 24hrs after C.S in University Hospital and from 2-4 days in Menouf General Hospital. The flow rate of women delivered C.S (primiparas and multiparas) ranged from 8-10 cases/day in University Hospital and from 4-6 cases/day in Menouf General Hospital. The flow rate of primipara ranges from 2-3 cases attending per day (emergency day.)

### Sampling:

Convenience sample of one hundred and sixty two pregnant women (72 pregnant women from Menoufia University hospital and 90 pregnant women from Menouf general hospital) who attended the both hospitals at Shebin -Elkoom and menouf city and fulfilled the inclusion criteria was enrolled in the current study. The selected women were then randomly assigned into two groups (study and control). Each of the 162 was asked to pick a piece of paper containing a number (1 and 2). Those who selected number 1 was assigned to study group, those who selected number 2 was assigned to control group. This technique was used to avoid sample contamination and bias.

**Sample size:** The sample size was calculated by using the following formula

$$N = \frac{Z^2 \times p \times q}{D^2}$$

The sample size was calculated for each group according to the following equation and the results of the pilot study. Where N = is the sample size, Z = is the standard normal deviate = 1.96 at confidence interval 95%, D = is the desired confidence interval (99% that the population proportion falls within 10% of the sample proportion). Based on the sample size measured, a total of 162 women (81 for each group) participated in the study.

### Instruments:

**Instrument I: A structured interview questionnaire:** It was developed based on the review of currently related literature. It consisted of three parts: the first part contained questions related to the socio-demographic characteristics, the second part contained data related past medical history, the third part contained data related to previous obstetric history: It includes gravidity, parity, and previous delivery complications.

### Instrument II: Maternal assessment tool

It was adopted from (Mohamed, 2014). It was used in this study mainly to collect preoperative data about finding of the general, abdominal, per vaginal examination and laboratory investigation

Part 1: This part is used to record the findings of physical examination

1-General examination: it is aimed to detect any signs of infection. It included; measurement of vital signs, evidence of tonsillitis and tender breast.

2-Abdominal examination to detect local signs of skin infection

3-Vaginal examination to detect signs of vaginal infection to exclude it from the study .

Part 2: This part used to record the findings of laboratory investigation

**Instrument III: A Present caesarian assessment tool:** for observation and evaluation of caesarian as (type of incision, using of urinary catheterization, using of abdominal drain) and Post cesarean examination includes measuring vital signs, level of uterine fundus, assessing incision condition (color, odor, edema) at the time of discharge

**Validity and reliability**

For validity purposes, the researchers conducted an extensive literature review and developed the questionnaire from the previously used instruments and reviewing pertinent studies. Instrument I was designed by the researchers and validated by three experts (two Professors in Maternal and Newborn Health Nursing and one expert has doctorate degree in Obstetric Medicine) for content accuracy and internal validity, while instruments II and III were adopted from the previous studies. The interview questionnaire underwent some modifications according to the panel of judgment regarding the clarity of sentences and appropriateness of content. Test-retest reliability was used to estimate reliability.

**Administrative Approvals:**

An official letter was taken from Dean, Faculty of nursing, Menoufia University and directed to Directors of the study settings. An official permission was obtained to carry out the study from the directors of the above mentioned settings. Also, the approval of the Ethical Committee of the Faculty of Nursing, Monoufia University was obtained.

**Ethical Consideration:**

An approval of the committee of the research committee in the faculty of nursing, Menoufia University was obtained on 12/7/2017. Approaches to ensuring ethics were considered in the study regarding confidentiality and informed consent. Confidentiality was achieved by the use of closed sheets with the names of the participants replaced by numbers. All participants were informed that the information they provided during the study would be kept confidential and used only for statistical purpose and after finishing the study, the findings would be presented as a group data with no personal participant's information remained.

**Pilot study**

A pilot study conducted to test the feasibility, applicability and understandability of the tools. It was conducted on 10% of the total sample (16 women) according to the selection criteria. All women participated in the pilot study excluded from the study sample because the researcher made some modifications of the instruments.

**Study field work:**

The current study was carried out on four phases:

**1) Preparatory phase:**

An extensive review related to the study area was done including electronic dissertations, available books, articles and periodicals. A review of literature to formulate knowledge base relevant to the study area was also done. A written permission from the institutional authority of the two hospitals was obtained before conducting the study. The researcher was constructed and prepared of the different data collection tools, measuring tape, in addition to seeking managerial arrangement to carry out the study.

**2) Interviewing phase:**

The researcher collected the data from the women of the two groups through an interview and assessment.

**3) Implementation phase (for study group):**

Upon arrival to operating room, all pregnant women were catheterized with Foley's catheter in sterile manner and vaginal cleaning was performed by the researcher after spinal anesthesia is given to the patient and before scrubbing of the abdomen by the nursing staff. The intervention group received vaginal cleaning, in addition to the standard abdominal preparation. Vaginal cleansing was done with 3 gauze pieces soaked with 10% povidone iodine in a sterilized bowl and the scrub was done from the vaginal apex to the introitus with attention to the anterior, posterior and lateral vaginal wall including all fornices. The cleansing agents were applied by the scrubbing nurse by rotating 360° in the vagina for 30 second. The cesarean delivery was then being performed. **For control group**, The women who were assigned to the control group received the standard abdominal scrub only. All women were receiving the standard antibiotic prophylaxis after the operation.

**4) Evaluation phase:**

All women received the routine post-operative care as (measuring vital signs, palpation of uterus , inspection of lochia) without other intervention before discharge from hospital, the women estimated for the time of stay in hospital before discharge, the hospital stay for the majority of women was 24 hours. If the time of stay in hospital more than 24 hours, the researcher examined the post cesarean adverse maternal infectious morbidities including fever and wound infection (color, odor of wound incision, presence of edema ) at the time of hospital discharge.

According to management strategy patients were discharged after 24 hours and were recommended to re-visit on day 7 after CS for the removal of stitches and that’s when our clinical evaluation of surgical wound was performed. On the discharge day all patients received detailed instructions regarding Surgical Site Infections (SSIs) and were informed about the need to report at hospital in case at least one of the following symptoms was observed (fever, suppurative secretion from the surgical site, redness, edema, warmth, pain or tenderness of the surgical site area) and take care which day this symptoms were observed. In cases of SSI suspicion, wound discharge specimens were collected and analyzed by using the gram stain and culture in the hospital laboratory. Antimicrobial susceptibility testing was carried out using a standardized panel. Some cases were readmitted to the hospital for initiation of intravenous antibiotic therapy and wound care.

**Statistical Analysis:**

**Data analysis**

The collected data were scored, tabulated and analyzed using (SPSS) version 22. Descriptive as well as nonparametric statistics were utilized to analyze the data pertinent to the study. The level of significance was set at  $p < 0.05$ . Chi square test, Independent sample t-test, Fischer exact test (FE), Mean and Mann-Whitney test (nonparametric test) were used to analyze the data

**3. RESULTS**

**Table (1): Socio-demographic Characteristic of the study Participants:**

variables	Cases (No=81)		Control (No=81)		Test of sig. p-value
	No	%	No	%	
<b>Age groups</b>					
- 20-24 years	29	35.8	29	35.8	$X^2 = 3.3$ $P = 0.35(>0.05)$
- 25-29 years	29	35.8	20	24.7	
- 30-34 years	21	21.9	28	34.6	
- 35-40 years	2	2.5	4	4.9	
<b>Marital status</b>					
- Married	77	95.1	80	98.8	<b>Fisher's Exact= 1.9</b> $P = 0.38(>0.05)$
- Divorced	4	4.9	1	1.2	
<b>Residence</b>					
- Rural	51	63	54	66.7	$X^2 = 0.24$ $P = 0.62(>0.05)$
- Urban	30	37	27	33.3	
<b>Level of education</b>					
- Illiterate	12	14.8	23	28.4	$X^2 = 7.2$ $P = 0.12(>0.05)$
- Read and write	29	31.9	20	24.9	
- Secondary	30	37	31	38.3	
- University	10	12.3	7	8.6	
<b>Occupation</b>					
- House wife	71	87.7	74	91.4	$X^2 = 0.59$ $P = 0.44 (>0.05)$
- Working	10	12.3	7	8.6	

Table (1). Shows the socio-demographic characteristics of the study participants. As shown in the table, there was no statistically significant difference ( $p > 0.05$ ) between the study and control groups regarding the general characteristics of both groups.

Table (2): Obstetric History of the Current Pregnancy among the study Participants:

Variables	Cases (No=81)		Control (No=81)		Test of sig. p-value
	No	%	No	%	
<b>Number of gravidity</b>					
– Mean ± SD	3.1±1.2		2.9±1.2		Mann Whitney test= 1.5 P =0.13(>0.05)
– Min-Max	1-6		1-6		
<b>Number of abortion</b>					
– Mean ± SD	0.15±0.57		0.25±0.99		Mann Whitney test= 0.54 P =0.59 (>0.05)
– Min-Max	0-3		0-6		
<b>Number of parity</b>					
– Mean ± SD	1.9±1.1		1.6±1.1		Mann Whitney test= 1.7 P =0.08 (>0.05)
– Min-Max	0-4		0-4		
<b>Gestational age</b>					
– Mean ± SD	38±0.92		38.2±1.1		Mann Whitney test= 1.1 P =0.28 (>0.05)
– Min-Max	36-41		36-40		
<b>Indication of C.S.</b>					
– Elective repeat (previous)	68	84	59	72.8	$\chi^2 =$ <b>8.8</b> P = <b>0.19(&gt;0.05)</b>
– Cephaloplevic disproportion	5	6.1	2	2.5	
– Obstructed labor& Fetal death	2	2.5	7	8.7	
– Fetal malpresentations	4	4.9	6	7.4	
– Post date	2	2.5	4	4.9	
– Suspected macrosomia	0	0	3	3.7	
<b>History of antenatal genitourinary infection</b>					
– Yes	18	22.2	12	14.8	$\chi^2 =$ <b>1.5</b> P = <b>0.23(&gt;0.05)</b>
– No	63	77.8	69	85.2	

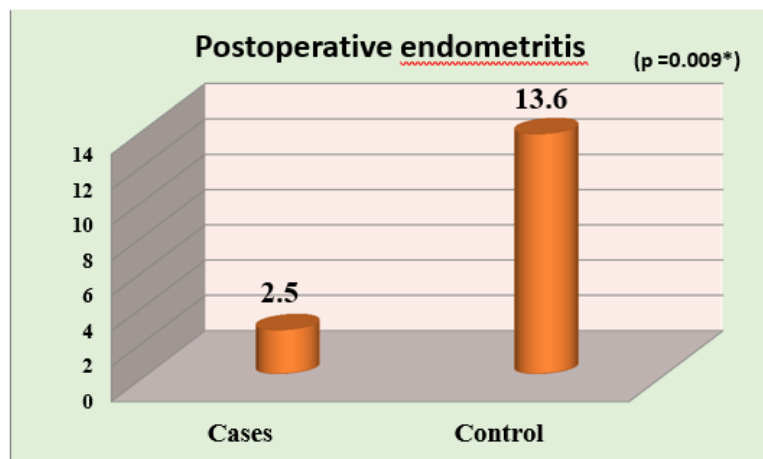
Table (2). Shows the obstetric history of the current pregnancy among the study participants. There was no statistically significant difference ( $p>0.05$ ) between the study and control groups. The mean gestational age at delivery was 38. (1.1) weeks. Also, the most common indication of CS is previous CS (84% and 72.8%) respectively of study and control groups. Regarding the history of antenatal genitourinary infection, the majority of them (77.8 and 85.2 respectively) did not have genitourinary infection during pregnancy.

Table (3): Preoperative Assessment of the study Participants:

Variables	Cases (No=81)		Control (No=81)		Test of sig. p-value
	No	%	No	%	
<b>Preoperative examination</b>					
<b>Vaginal examination</b>					
– Yes	22	27.2	27	33.3	$\chi^2 =$ <b>0.73</b> P = <b>0.39(&gt;0.05)</b>
– No	59	72.8	54	66.7	
<b>If yes</b>					
<b>Cervical dilatation at time of cesarean</b>					
– Yes	15	68.2	18	66.6	$\chi^2 =$ <b>0.34</b> P = <b>0.69(&gt;0.05)</b>
– No	7	31.5	9	33.3	

Membrane ruptured at time of cesarean						
—	Yes	35	43.2	35	43.2	$\chi^2 = --$ $P = --$
—	No	46	56.8	46	56.8	
<b>If yes</b>						
Length of time after Membrane rupture (70)						
—	<6 hrs	21	60	12	34.3	$\chi^2 = 6.4$ $P = 0.09(>0.05)$
—	6-10 hrs	8	22.9	10	28.6	
—	10-18 hrs	4	11.4	5	14.3	
—	>18 hrs	2	5.7	8	22.8	

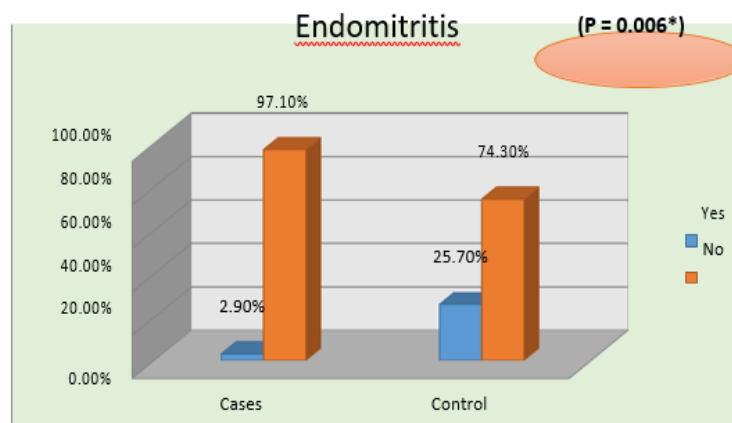
**Table (3).** Shows the preoperative assessment of the study participants. There was no significant difference ( $p > 0.05$ ) between the study and control groups in preoperative assessment regarding all variables ( $p > 0.05$ ). Almost half of study participants had rupture membrane (43.2%) at time of cesarean section.



\*significant difference

**Figure (1): Comparison of Postoperative Endometritis among the study Participants**

Figure (1). Shows the postoperative endometritis among the study participants. This figure shows there was statistically significant reduction in postoperative endometritis in the study group compared to the control group. ( $p = 0.009^*$ )



**Figure (2): Postoperative Endometritis among the study Participants with Rupture Membrane**

Figure (2). Shows the Postoperative endometritis among the study participants with rupture membrane. This figure shows that there was significant reduction ( $P = 0.006^*$ ) in the incidence of post caesarean endometritis in study participants compared with control group participants with ruptured membranes (2.9 vs. 25.7%) respectively

#### 4. DISCUSSION

The findings of the current study revealed that the research hypothesis was supported. The findings are discussed in the following sequence: 1- findings related to “socio-demographic characteristics” 2-findings related to Obstetric History of the Current Pregnancy 3- findings related to Preoperative Assessment of the study Participants 4- Findings related to Postoperative endometritis 5- Findings related to Postoperative endometritis among the study participants with rupture membrane.

The majority of the study participants' ages ranged between twenty to thirty five years old because that age is mid fertility years in which women are more likely to become pregnant. These findings are supported by Tewfik, (2015) who studied “Preoperative vaginal preparation using povidone iodine versus chlorhexidine solutions in prevention of endometritis in elective cesarean section”. Tewfik reported similar sample age group (20 – 35) years old.

Regarding education, the current finding highlighted that the majority of women in the sample were secondary educated. This may be due to that the majority of the study participants lived in rural areas which low education levels are common. The findings of this study are in consistent with Mohamed et al., (2014) who investigated “Vaginal cleaning before cesarean delivery to reduce post cesarean section &postpartum infection”. They revealed that the majority of study participants had diploma and they were similar in the education level. This is also ascertained by Barat, (2016) who investigated the “Impact of preoperative vaginal preparation with povidone iodine on post cesarean infection”. He reported that the majority of study participants had high school (secondary) education.

As for gravidity and parity, the results of the current study showed that the majority of the study participants were multigravida and multipara because null parity was reported to be independently associated with increased risk of post cesarean endometritis more than multiparity. The researcher encouraged multipara women to be engaged in preoperative vaginal preparation to have better post- partum outcome. This is supported by Hass et al., (2010) who investigated “Vaginal cleansing before cesarean delivery to reduce postoperative infectious morbidity”. They analyzed the factors that are associated with the composite infectious morbidity outcome. They also reported that lower gravidity and parity (indicative of not having an elective repeat cesarean) were all associated with developing post cesarean infectious morbidity

The findings of this study disagreed with Khedr & Fadel, (2016) who selected nulliparous women as study group and did not find any association between the study participants regarding post cesarean infectious morbidity in a study entitled “Effect of prophylactic preoperative nursing interventions on prevention of endometritis among women undergoing elective caesarean delivery.

As for gestational age, the results of the current study showed that all women included in the study were in the third trimester (38 weeks gestation) as one of the main inclusion criteria of the participants. This is in accordance with Kiani et al., (2018) who investigated “Vaginal cleaning before cesarean section and post- operative infectious morbidity &postpartum infection”. They reported that the demographics of women undergoing cesarean section including the gestational age at delivery was similar in the two study groups confirming appropriate selection and randomization methods. The mean gestational age was 38 weeks in both the groups.

On the contrary, these findings were not in accordance with those of Memon, (2011) who investigated the “Effect of preoperative vaginal cleansing with an antiseptic solution to reduce post caesarean infectious morbidity” and selected pregnant women at 36 weeks gestation. The researcher's point of view was that delivery before 37 completed weeks of gestation has traditionally been defined as preterm which has greater maternal and neonatal risks. That is why the researcher conducted this study on women at 38 weeks to avoid any complications.

Regarding the indication for cesarean section, the present findings revealed that the main indication was elective repeated cesarean section (CS), as one of the main inclusion criteria. This study finding is supported by Mohamed et al., (2014) who investigated the “effect of vaginal cleansing before cesarean delivery to reduce post cesarean section &postpartum infection”. They revealed that the majority of participants had previous one cesarean. On the same line Ahmed et al., (2017) who investigated “Vaginal cleansing prior to caesarian section: To do or not to do”. They stated that the most



common indication for cesarean section was previous cesarean delivery (69% and 63% in the intervention and control groups, respectively). On the other hand, this finding is in contradiction with Kiani et al, (2018) who investigated “Vaginal cleansing prior to cesarean section and post-operative infectious morbidity” and selected pregnant women with emergency cesarean delivery

This study specifically excluded emergency cesarean deliveries, principally because of the lack of informed consent discussions, and the non-adequate time allowed to prepare the patients. This might be increase the risk of postpartum infection. The researcher's point of view is supported by Farret et al., (2015) who investigated "Risk factors for surgical site infection following cesarean section in a Brazilian women's hospital: a case-control study." They reported that the patients who had an emergency cesarean had a 3.3-fold greater risk of surgical site infection (SSI) when compared with the elective cesarean. Moreover Krieger et al., (2017) stated that risk of SSI increased following emergency cesarean delivery, which may be the result of suboptimal operative site preparation and insufficient prophylactic antibiotic treatment in this urgent situation.

Regarding the preoperative assessment, the study and control groups were similar with respect to that assessment that may increase the risk of postpartum endometritis, including the number of vaginal exams, cervical dilatation, the incidence of ruptured membranes and the time since membrane rupture

This study finding is in agreement with the finding of the study conducted by Yildirim et al., (2012) who investigated “Does vaginal preparation with povidone–iodine prior to caesarean delivery reduce the risk of endometritis? A randomized controlled trial”. They stated that both groups were similar with respect to the number of digital examinations, length of labor after admission, status of membranes on admission, duration since membrane rupture, and meconium fluid characteristics. In the same line Felder et al., (2018) who investigated the “Implementation of vaginal cleansing prior to cesarean delivery to decrease endometritis rates” They stated that there was no statistical difference between patients for the majority of Preoperative assessment

Various risk factors for developing post caesarean endometritis have been recognized which include vaginal examination, cervical dilatation at the time of caesarean section, rupture of membranes, and length of surgery. The present study findings revealed that the rupture of membrane before cesarean section is significantly associated with postoperative infectious morbidity. This finding was supported by Asad et al., (2017) who investigated “Vaginal cleansing prior to cesarean section and post-operative infectious morbidity”. They revealed that Women with longer duration of rupture of membranes are at a greater risk of postoperative infectious morbidity rather than those who did not have.

These findings are in agreement with, Memon, (2011), Kiani et al., (2018) who reported that there was significant association between the longer duration of rupture of membranes and postoperative infectious morbidity. On the contrary; these findings were not in accordance with Felder et al., (2018) who reported that the subgroup analysis showed no difference in postoperative infectious morbidity for those who experienced the rupture of membranes compared to those who had intact membranes

Regarding endometritis, the present study finding revealed that there was a statistically significant reduction in the incidence of post cesarean endometritis. It also showed that vaginal preparation with povidone–iodine solution immediately prior to caesarean delivery was beneficial only for women with ruptured membranes.

The present study findings were consistent with Haas, Contreras &Enders, (2018) who investigated “Vaginal preparation with antiseptic solution before cesarean section for preventing postoperative infections”. They stated that vaginal preparation with povidone–iodine solution immediately prior to caesarean delivery significantly reduces the risk of post-operative endometritis in women with ruptured membranes. For women with intact membranes, the rate of postoperative endometritis was not significantly reduced in the vaginal preparation group. In the same line, Caissutti, (2017) investigated “vaginal cleansing before cesarean delivery”. He reported that there was a statistically significant reduction in the rate of endometritis for women receiving vaginal cleansing mainly with ruptured membranes.

In accordance with these results Sanchez-Ramos et al., (2019) who investigated “Antiseptic formulations for vaginal preparation prior to cesarean: a systematic review and network meta-analysis” They reported that patients undergoing cesarean, vaginal irrigation with povidone-iodine had the highest probability of reducing the risk of endometritis

## International Journal of Novel Research in Healthcare and Nursing

Vol. 7, Issue 3, pp: (61-72), Month: September - December 2020, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

Moreover, Yildirim et al., (2012), stated that vaginal preparation with povidone–iodine solution immediately prior to caesarean delivery reduced the risk of post-operative endometritis. Interestingly, when women with ruptured membranes were not included in the analysis, no significant differences were noted.

Also Memon et al., (2011) reported that the incidence of post caesarean endometritis was significantly reduced in the intervention group, when compared with the control group particularly in patients who with ruptured membranes. On the contrary these findings were not in accordance with those of Felder et al., (2018) who reported that the implementation of vaginal cleansing prior to cesarean delivery in women with ruptured membranes, has led to a clinical, although not statistical, decrease in postoperative endometritis. The researcher’s point of view is that these differences in reported postoperative endometritis rates could be attributed to the technique and materials used for the vaginal preparation itself, time and distribution of povidone–iodine within the vagina, or the amount of antiseptic used for the preparation might affect infectious outcomes

### 5. CONCLUSION

According to the findings of the present study, it can be concluded that there was a statistically significant difference after using of povidone–iodine before cesarean section on the reduction postoperative endometritis more than those who use routine care. This supported the study hypothesis. Based on the present findings; the study hypothesis was accepted.

### 6. RECOMMENDATIONS

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

Preoperative vaginal preparation with antiseptic solution should be incorporated as an essential part of routine preoperative care before cesarean delivery.

#### Suggestions for future studies:-

- Replication of the study to further settings using a larger sample is needed to confirm the present observations.
- Designing subsequent studies to compare between the different antiseptics to find the most effective antiseptic for reducing post-operative infection.
- Study the effect of wound irrigation with povidon iodine prior to skin closure at caesarean section on preventingsurgical site infection

### REFERENCES

- [1] Abdallah, A. A. (2015): Evaluation of the risk of postcesarean endometritis with preoperative vaginal preparation with povidone–iodine: A randomized controlled study. Middle East Fertility Society Journal.; 20(4)
- [2] Ahmed, M. R., Aref; N. K.; Sayed Ahmed, W. A., & Arain, F. R. (2017). Chlorhexidine vaginal wipes prior to elective cesarean section: does it reduce infectious morbidity? A randomized trial. The Journal of Maternal-Fetal & Neonatal Medicine, 30(12), 1484-1487.
- [3] Asad, S., Batoool Mazhar, S., Khalid Butt, N., & Habiba, U. (2017) Vaginal cleansing and emergency caesarean section. BJOG: An International Journal of Obstetrics and Gynaecology, 124, 45.
- [4] Barat, S., Bouzari, Z., Ghanbarpour, A., & Zabihi, Z. (2016). Impact of preoperative vaginal preparation with povidone iodine on post cesarean infection. Caspian Journal of Reproductive Medicine, 2(1), 1-7
- [5] Berríos-Torres, S. I., Umscheid, C. A., Bratzler, D. W., Leas, B., Stone, E. C., Kelz, R. R., ... & Dellinger, E. P. (2017). Centers for disease control and prevention guideline for the prevention of surgical site infection, 2017. JAMA surgery, 152(8), 784-791.
- [6] Caissutti, C., Saccone, G., Zullo, F., Quist-Nelson, J., Felder, L., Ciardulli, A., & Berghella, V. (2017). Vaginal cleansing before cesarean delivery: a systematic review and meta- analysis. Obstetrics & Gynecology, 130(3), 527-538

**International Journal of Novel Research in Healthcare and Nursing**

 Vol. 7, Issue 3, pp: (61-72), Month: September - December 2020, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [7] Conroy, K., Koenig, A. F., Yu, Y. H., Courtney, A., Lee, H. J., & Norwitz, E. R. (2012). Infectious morbidity after cesarean delivery: 10 strategies to reduce risk. *Reviews in Obstetrics and Gynecology*, 5(2), 69..
- [8] El Zanaty and association (2015), Demographic and Health Survey: Egypt, Ministry of health and population. The DHS program.
- [9] Farret, T. C. F., Dallé, J., Monteiro, V. D. S., Riche, C. V. W., & Antonello, V. S. (2015). Risk factors for surgical site infection following cesarean section in a Brazilian Women's Hospital: a case-control study. *Brazilian Journal of Infectious Diseases*, 19(2), 113-117.
- [10] Felder, L., Paternostro, A., Quist-Nelson, J., Baxter, J., & Berghella(2018) Implementation of vaginal cleansing prior to cesarean delivery to decrease endometritis rates. *The Journal of Maternal-Fetal & Neonatal Medicine*, 1-6
- [11] Haas, D. M., Pazouki, F., Smith, R. R., Fry, A. M., Podzielinski, I., Al-Darei, S. M., & Golichowski, A. M. (2010). Vaginal cleansing before cesarean delivery to reduce postoperative infectious morbidity: a randomized, controlled trial. *American journal of obstetrics and gynecology*, 202(3), 310.
- [12] Haas, D. M., Morgan, S., Contreras, K., & Enders, S. (2018). Vaginal preparation with antiseptic solution before cesarean section for preventing postoperative infections. *Cochrane Database of Systematic Reviews*, (7).
- [13] Hadiati, D. R., Hakimi, M., Nurdiati, D. S., & Ota, E. (2014). Skin preparation for preventing infection following caesarean section. *Cochrane Database of Systematic Reviews*, (9).
- [14] Huang, H., Li, G., Wang, H., & He, M. (2018). Optimal skin antiseptic agents for prevention of surgical site infection in cesarean section: a meta-analysis with trial sequential analysis. *The Journal of Maternal-Fetal & Neonatal Medicine*, 31(24), 3267-3274.
- [15] Kawakita, T., & Landy, H. J. (2017). Surgical site infections after cesarean delivery: epidemiology, prevention and treatment. *Maternal health, neonatology and perinatology*, 3(1), 12.
- [16] Khedr, N. F. H., & Fadel, E. A. (2016). Effect of prophylactic preoperative nursing interventions on prevention of endometritis among women undergoing elective caesarean delivery. *Journal of Nursing Education and Practice*, 6(12).142
- [17] Kiani, S. A., Zafar, M., Yasmin, S., & Mazhar, S. B. (2018). Vaginal Cleansing Prior to Cesarean Section and Post-Operative Infectious Morbidity. *Journal of the Society of Obstetrics and Gynaecologists of Pakistan*, 8(2), 95-99
- [18] Krieger, Y., Walfisch, A., & Sheiner, E. (2017). Surgical site infection following cesarean deliveries: trends and risk factors. *The Journal of Maternal-Fetal & Neonatal Medicine*, 30(1), 8-12.
- [19] Memon, S., Qazi, R. A., Bibi, S., & Parveen, N. (2011). Effect of preoperative vaginal cleansing with an antiseptic solution to reduce post caesarean infectious morbidity. *JPMA-Journal of the Pakistan Medical Association*, 61(12), 1179
- [20] Mohamed, H., Hassan, S., & Hemida, R. (2015). Vaginal preparation with antiseptic solution before cesarean section for reducing post partum morbidity. *OSR-JNHS*, 4, 75-80
- [21] Mohamed, N.EL, Mohamed, H.I, Abd Allah, I.M, Elbahi, M.A. (2014) Vaginal cleaning before cesarean delivery to reduce post cesarean section & postpartum infection, *Egyptian Journal of Nursing (EJN)*35: 49
- [22] Novelia, S., Sia, W. S., & Songwathana, P. (2017). Surgical Site Infection among Women Post Cesarean Section: An Integrative Review. *Nurse Media Journal of Nursing*, 7(1), 46- 55
- [23] Sanchez-Ramos, L., Mitta, M., Roeckner, J., & Kaunitz, A. (2019) Antiseptic formulations for vaginal preparation prior to cesarean: a systematic review and network meta- analysis. *American Journal of Obstetrics and Gynecology*, 220(1)
- [24] Smaill, F. M., & Grivell, R. M. (2014). Antibiotic prophylaxis versus no prophylaxis for preventing infection after cesarean section. *Cochrane Database of Systematic Reviews*, (10)

**International Journal of Novel Research in Healthcare and Nursing**

Vol. 7, Issue 3, pp: (61-72), Month: September - December 2020, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [25] Tewfik, H., Ibrahim, A., Hanafi, S., Fahmy, A., Khaled, M. A., & Abdelazim, I. A. (2015). Preoperative vaginal preparation using povidone iodine versus chlorhexidine solutions in prevention of endometritis in elective cesarean section. *Int J Curr Microbiol App Sci*, 4(8), 486-92.
- [26] Tikkanen, S., Button, A., Zamba, G., & Hardy-Fairbanks, A. J. (2013). Effect of chlorhexidine skin prep and subcuticular skin closure on post-operative infectious morbidity and wound complications following cesarean section. *Proceedings in Obstetrics and Gynecology*, 3(2), 1-10.
- [27] Yildirim, G., Güngördük, K., Asicioğlu, O., Basaran, T., Temizkan, O., Davas, İ., & Gulkilik, A. (2012). Does vaginal preparation with povidone-iodine prior to caesarean delivery reduce the risk of endometritis? A randomized controlled trial. *The Journal of Maternal-Fetal & Neonatal Medicine*, 25(11), 2316- 2321.
- [28] Suarez-Easton, S., Zafran, N., Garmi, G., & Salim, R. (2017) Postcesarean wound infection: prevalence, impact, prevention, and management challenges. *International journal of women's health*, 9, 81