

Post-cesaree wound infection and nursing care: a literature review

RESUMO | Objetivo: Averiguar mediante a literatura científica a associação entre a infecção de ferida pós-cesárea e os cuidados de enfermagem. Método: Trata-se de uma revisão integrativa. Realizou-se a busca por artigos; com delimitação nos últimos 5 anos; em português, inglês e espanhol; disponíveis na íntegra. Nas plataformas de dados: BDNF, DOAJ, LILACS, MEDLINE, SciELO, SCOPUS e Web of Science. Resultados: Os dados foram organizados e apresentados em figuras e tabelas. Dos 71 estudos encontrados, 1 estava disponível na BDNF, 2 na DOAJ, 1 na LILACS, 28 na MEDLINE, 2 na SciELO, 28 na SCOPUS e 9 na Web of Science. Contudo, após a leitura permaneceram apenas 6 estudos. Conclusão: Observou-se que a infecção de ferida pós-cesárea se relaciona aos cuidados pré, durante e pós-parto. Evidência-se a necessidade de capacitação da enfermagem e da implantação de protocolos de ação para padronizar e alinhar a assistência, fornecendo subsídios para a assistência puerperal da mulher.

Descritores: Cesárea; Infecção da Ferida Cirúrgica; Cuidados de Enfermagem.

ABSTRACT | Objective: To investigate through the scientific literature the association between post-cesarean wound infection and nursing care. Method: This is an integrative review. The search for articles was performed; with delimitation in the last 5 years; in Portuguese, English and Spanish; available in full. On the data platforms: BDNF, DOAJ, LILACS, MEDLINE, SciELO, SCOPUS and Web of Science. Results: The data were organized and presented in figures and tables. Of the 71 studies found, 1 was available in BDNF, 2 in DOAJ, 1 in LILACS, 28 in MEDLINE, 2 in SciELO, 28 in SCOPUS and 9 in the Web of Science. However, after reading, only 6 studies remained. Conclusion: It was observed that post-cesarean wound infection is related to pre, during and postpartum care. It is evidenced the need for nursing training and the implementation of action protocols to standardize and align care, providing subsidies for the women's puerperal care.

Keywords: Cesarean Section; Surgical Wound Infection; Nursing Care.

RESUMEN | Objetivo: Investigar a través de la literatura científica la asociación entre la infección de la herida post-cesárea y los cuidados de enfermería. Método: Esta es una revisión integradora. Se realizó la búsqueda de artículos; con delimitación en los últimos 5 años; en portugués, inglés y español; disponible en su totalidad. En las plataformas de datos: BDNF, DOAJ, LILACS, MEDLINE, SciELO, SCOPUS y Web of Science. Resultados: Los datos fueron organizados y presentados en figuras y tablas. De los 71 estudios encontrados, 1 estaba disponible en BDNF, 2 en DOAJ, 1 en LILACS, 28 en MEDLINE, 2 en SciELO, 28 en SCOPUS y 9 en la Web of Science. Sin embargo, después de la lectura, sólo quedaron 6 estudios. Conclusión: Se observó que la infección de la herida post-cesárea está relacionada con la atención pre, durante y posparto. Se evidencia la necesidad de capacitación en enfermería y la implementación de protocolos de acción para estandarizar y alinear la atención, brindando subsidios para el cuidado puerperal de las mujeres.

Palabras claves: Cesárea; Infección de la Herida Quirúrgica; Atención de Enfermería.

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INTRODUCTION

Cesarean section (CS) is a primary obstetric surgical procedure that seeks to promote the life of the mother and fetus. Since 1985, the international health community has recognized that the reference rate for CS is 10 to 15%. Although there is some debate in the literature about this rate, according to the latest

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World Health Organization (WHO) statement on CS rates, rates greater than 10% are not associated with a reduction in maternal/neonatal mortality rates. ⁽¹⁾

Every surgical procedure can be accompanied by several complications, including surgical site infection (SSI). In Brazil, SSIs occupy the third position, representing 14.66 nosocomial infections, and in countries with high poverty rates, they can affect up to one third of people undergoing surgery. Among these, they report that the number of CS has increased significantly, especially those without clinical indication. ⁽²⁾ This practice has become a worldwide problem due to its significant association with increased infection rates after CS, known as puerperal infection. ⁽³⁾

The WHO defines puerperal infection as any maternal infectious process, due to bacteria from the female genital and extragenital tract, which may occur at the time of rupture of the amniotic sac or during childbirth or even in the late postoperative period. It can be characterized by hyperthermia, pelvic pain, delayed uterine involution, transvaginal losses, with an abnormal appearance and odor, including infectious processes in the surgical wound. ⁽⁴⁾

SSIs after CS are the most common and 60% can be prevented with control measures and good practices. These actions are carried out within the hospital environment in three moments: Pre-delivery with preoperative bath and shaving 2 hours before delivery; Intraoperatively, administering antibiotic prophylaxis, keeping the operating room doors and windows closed during the surgical procedure, limiting the number of people in the operating room; and in the puerperium, considering the immediate postoperative period, completion of the safe surgery checklist, adequate care with the dressing and other preventive measures. ⁽⁵⁾

The responsibility for the prevention and control of SSIs in health services is the responsibility of all team members, whether multidisciplinary or interdisciplinary. In this context, it is important to highlight the role of the nursing team, as it represents

60% of the health professionals and is the category that directly assists patients. ⁽⁶⁾

Studies indicate that hand washing; use of personal protective equipment (PPE); Constant training every month with the team are simple daily preventive actions carried out by the nursing team that guarantee care aligned with quality, minimi-



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zing the risks and consequently the possible adverse events resulting from patient care. ⁽⁵⁾

In this sense, when designing interventions aimed at the real needs of puerperal women, nurses qualify the care provided as having a crucial contribution to preventing and reducing the rates of puerperal infection. Thus, it is a time of risk that requires

nursing care to avoid complications. Therefore, this review aims to investigate through the scientific literature the association between post-cesarean wound infection and nursing care.

METHOD

This is a bibliographic, descriptive study of the integrative review type, with a qualitative approach. From the following steps: (1) elaboration of the guiding question and objective of the study; (2) definition of inclusion and exclusion criteria for scientific productions; (3) search for scientific studies in databases and virtual libraries; (4) analysis and categorization of the productions found; (5) results and discussion of findings. ⁽⁷⁾

To survey the guiding question, the PICO strategy was used (P: population/patients; I: intervention; C: comparison/control; O: outcome). ⁽⁸⁾ Therefore, P – Puerperal women, I – Post-cesarean wound infection, C – Normal delivery; O – Nursing Care. Thus, the following guiding question was defined for the research: “What are the factors related to post-cesarean wound infection and nursing care?”

For the selection of articles, the following inclusion criteria were used: original article, available in full, published in the last 5 years (2016-2021) in Portuguese, English or Spanish, which responded to the objective of the study. Gray literature was excluded, as well as repeated publications of studies in more than one database and articles that did not answer the guiding question of the study and that allowed access through the Virtual Private Network (VPN) of the University of Pernambuco (UPE). The temporal delimitation in the last 5 years is justified in order to collect more recent articles.

Data collection took place during May and June 2022 in the following Databases: Nursing Database (BDENF); Directory of Open Access Journals (DOAJ); Latin American and Caribbean Literature in Health Sciences (LILACS); Medical Literature Analysis and Retrieval System Online

(MEDLINE); SCOPUS, and on the Web of Science, as well as in the virtual library: Scientific Electronic Library Online (SciELO).

Articles indexed from the Health Sciences Descriptors (DeCS) were searched: “Cesárea”, “Infecção da Ferida Cirúrgica”, “Cuidados de Enfermagem”. The respective terms from the Medical Subject Headings (MeSH) were used: “Caesarean Section”, “Surgical Wound Infection”, “Nursing Care”. And their synonyms: A (Abdominal Deliveries; Abdominal Delivery; C Section (OB); C-Section (OB); C-Sections (OB); Caesarean Section; Caesarean Sections; Caesarean Sections; Deliveries, Abdominal; Delivery, Abdominal; Postcesarean Section); B (Postoperative Injury Infection; Operative Site Infection; Surgical Wound Infection; Surgical Injury Infection; Surgical Site Infection; Operating Site Infection; Postoperative Wound Infection; Surgical Wound Infections; Infections in Surgical Wounds) and C (Nursing Care Management; Systematization of Nursing Care). The operationalization and the search strategy were based on the combination of the Boolean operator AND and OR, performing the search together and individually so that possible differences could be corrected (Chart 1).

The articles were selected based on the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) in order to assist in the development of articles.⁽⁹⁾ At first, duplicate studies were eliminated by reading titles and abstracts. Of these pre-selected, a full reading was carried out in order to verify those that meet the guiding question and the inclusion/exclusion criteria. The final sample was then constructed with studies relevant to the pre-established criteria (Figure 1).

After reading the articles, the selected articles were categorized and the knowledge acquired was classified into levels of evidence according to the GRADE system: High – There is strong confidence that the true effect is close to that estimated; Moderate – There is moderate confidence in the estimated

Chart 1 – Database search strategy. Recife, Pernambuco (PE), Brazil, 2022.

| Data bases | Search terms | Results | Selected |
|------------|---|---------|----------|
| BDEFN | ((Caesarean Section) OR (Abdominal Deliveries) OR (Abdominal Delivery) OR (C Section (OB)) OR (C-Section (OB)) OR (C-Sections (OB)) OR (Caesarean Section) OR (Caesarean Sections) OR (Caesarean Sections) OR (Deliveries, Abdominal) OR (Delivery, Abdominal) OR (Postcesarean Section)) AND ((Surgical Wound Infection) OR (Postoperative Injury Infection) OR (Operative Site Infection) OR (Surgical Wound Infection) OR (Surgical Injury Infection) OR (Surgical Site Infection) OR (Operating Site Infection) OR (Postoperative Wound Infection) OR (Surgical Wound Infections) OR (Infections in Surgical Wounds)) AND ((Nursing Care) OR (Nursing Care Management) OR (Systematization of Nursing Care))) | 1 | 1 |
| DOAJ | (Caesarean Section) AND (Surgical Wound Infection) AND (Nursing Care) | 2 | 1 |
| LILACS | ((Caesarean Section) OR (Abdominal Deliveries) OR (Abdominal Delivery) OR (C Section (OB)) OR (C-Section (OB)) OR (C-Sections (OB)) OR (Caesarean Section) OR (Caesarean Sections) OR (Caesarean Sections) OR (Deliveries, Abdominal) OR (Delivery, Abdominal) OR (Postcesarean Section)) AND ((Surgical Wound Infection) OR (Postoperative Injury Infection) OR (Operative Site Infection) OR (Surgical Wound Infection) OR (Surgical Injury Infection) OR (Surgical Site Infection) OR (Operating Site Infection) OR (Postoperative Wound Infection) OR (Surgical Wound Infections) OR (Infections in Surgical Wounds)) AND ((Nursing Care) OR (Nursing Care Management) OR (Systematization of Nursing Care))) | 1 | 0 |
| MEDLINE | ((Caesarean Section) OR (Abdominal Deliveries) OR (Abdominal Delivery) OR (C Section (OB)) OR (C-Section (OB)) OR (C-Sections (OB)) OR (Caesarean Section) OR (Caesarean Sections) OR (Caesarean Sections) OR (Deliveries, Abdominal) OR (Delivery, Abdominal) OR (Postcesarean Section)) AND ((Surgical Wound Infection) OR (Postoperative Injury Infection) OR (Operative Site Infection) OR (Surgical Wound Infection) OR (Surgical Injury Infection) OR (Surgical Site Infection) OR (Operating Site Infection) OR (Postoperative Wound Infection) OR (Surgical Wound Infections) OR (Infections in Surgical Wounds)) AND ((Nursing Care) OR (Nursing Care Management) OR (Systematization of Nursing Care))) | 28 | 2 |
| SciELO | ((Caesarean Section) OR (Abdominal Deliveries) OR (Abdominal Delivery) OR (C Section (OB)) OR (C-Section (OB)) OR (C-Sections (OB)) OR (Caesarean Section) OR (Caesarean Sections) OR (Caesarean Sections) OR (Deliveries, Abdominal) OR (Delivery, Abdominal) OR (Postcesarean Section)) AND ((Surgical Wound Infection) OR (Postoperative Injury Infection) OR (Operative Site Infection) OR (Surgical Wound Infection) OR (Surgical Injury Infection) OR (Surgical Site Infection) OR (Operating Site Infection) OR (Postoperative Wound Infection) OR (Surgical Wound Infections) OR (Infections in Surgical Wounds)) AND ((Nursing Care) OR (Nursing Care Management) OR (Systematization of Nursing Care))) | 2 | 0 |

effect; Low – Confidence in the effect is limited; and Very Low – Confidence in the effect estimate is very limited. There is an important degree of uncertainty in the findings. ⁽¹⁰⁾

A summary of the information in the corpus was constructed using an instrument: identification of the original article; authorship of the article; year of publication; country; methodological characteristics of the study; and study sample. Allowing to obtain general conclusions due to the gathering of several studies, through the process of systematic analysis and synthesis of the researched literature. When well elaborated, it can represent the current state of the researched literature. In addition, it highlights the knowledge gaps that need to be filled with new studies.

Aiming at a better understanding and visualization of the main findings, the data were organized by presenting them in figures and tables, exposed in a descriptive way.

RESULTS

The selected studies are arranged in order to show their titles, authors, years of publication, levels of evidence, objectives and results. After reading the selected articles, the studies were categorized, classifying the knowledge produced on the topic, in levels of evidence, mostly Moderate - There is moderate confidence in the estimated effect. The main findings arranged in the objectives and conclusions are directly associated with post-cesarean wound infection and nursing care (Table 1).

DISCUSSION

Risk factors for post-cesarean wound infection

Over the years, women have developed fear of vaginal delivery and even tokophobia, which is an excessive dislike or fear of vaginal delivery. This is for cultural reasons, such as the ease of

| | | | |
|----------------|---|-----------|----------|
| SCOPUS | ((((Cesarean Section) OR (Abdominal Deliveries) OR (Abdominal Delivery) OR (Caesarean Section) OR (Caesarean Sections) OR (Cesarean Sections) OR (Deliveries, Abdominal) OR (Delivery, Abdominal) OR (Postcesarean Section)) AND ((Surgical Wound Infection) OR (Postoperative Injury Infection) OR (Operative Site Infection) OR (Surgical Wound Infection) OR (Surgical Injury Infection) OR (Surgical Site Infection) OR (Operating Site Infection) OR (Postoperative Wound Infection) OR (Surgical Wound Infections) OR (Infections in Surgical Wounds)) AND ((Nursing Care) OR (Nursing Care Management) OR (Systematization of Nursing Care))) | 28 | 1 |
| Web of Science | ((((Cesarean Section) OR (Abdominal Deliveries) OR (Abdominal Delivery) OR (C Section (OB)) OR (C-Section (OB)) OR (C-Sections (OB)) OR (Caesarean Section) OR (Caesarean Sections) OR (Cesarean Sections) OR (Deliveries, Abdominal) OR (Delivery, Abdominal) OR (Postcesarean Section)) AND ((Surgical Wound Infection) OR (Postoperative Injury Infection) OR (Operative Site Infection) OR (Surgical Wound Infection) OR (Surgical Injury Infection) OR (Surgical Site Infection) OR (Operating Site Infection) OR (Postoperative Wound Infection) OR (Surgical Wound Infections) OR (Infections in Surgical Wounds)) AND ((Nursing Care) OR (Nursing Care Management) OR (Systematization of Nursing Care))) | 9 | 2 |
| Total | | 71 | 6 |

Source: Research data, 2022.

Figure 1 – Flowchart of the selection process of primary studies adapted from PRISMA. Recife, Pernambuco (PE), Brazil, 2022.

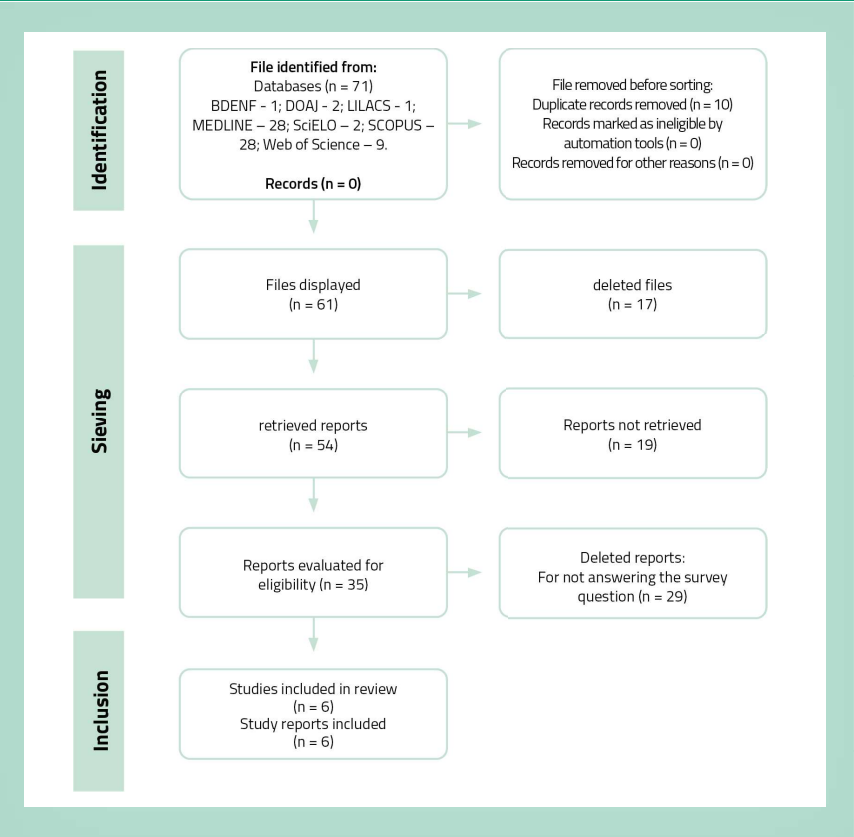


Table 1 – Synthesis of the main findings on post-cesarean wound infection and nursing care. Recife, Pernambuco (PE), 2022.

| N | Title/Database | Authors (Year) | Country | Level of Evidence | Objective | Results |
|---|---|--|-------------|-------------------|--|---|
| 1 | Identification of post-cesarean surgical site infection: nursing consultation / BDEF | Cunha, Marcia Regina et al., (2018) ⁽¹¹⁾ | Brazil | Moderated | To describe the profile of women in relation to their living conditions, health and socio-demographic profile, correlating with the presence of signs and symptoms suggestive of post-cesarean surgical site infection, identify information to be considered in the postpartum consultation performed by the nurse and propose a roadmap for the systematization of care. | In view of the results of the study, the systematization of the puerperal consultation is essential. The script is an instrument that can potentially improve the quality of care and the recording of information. |
| 2 | The risk factors and care measures of surgical site infection after cesarean section in China: a retrospective analysis. / MEDLINE | Li, L., Cui, H (2021) ⁽¹²⁾ | China | Moderated | To assess the pathogenic characteristics and risk factors of surgical site infection after cesarean section to provide insights into the management of cesarean section patients. | Age, BMI, time of surgery, blood loss, and urinary catheter use were associated with a higher risk of surgical site infection after cesarean section. Clinical preventions and interventions are necessary for this population to reduce the occurrence of surgical site infection. |
| 3 | Randomized Controlled Trial Evaluating Dialkylcarbamoyl Chloride Impregnated Dressings for the Prevention of Surgical Site Infections in Adult Women Undergoing Cesarean Section. / MEDLINE | Stanirowski, Paweł Jan et al., (2016) ⁽¹³⁾ | Europe | Moderated | To evaluate the effectiveness and cost-effectiveness of dressings impregnated with Dialkylcarbamoyl chloride (DACC) in preventing SSI in women undergoing cesarean section. | The use of DACC-coated dressing decreased SSI rates among patients after cesarean section and proved its cost-effectiveness. |
| 4 | Symptoms of Discomfort and Problems Associated with Mode of Delivery During the Puerperium: An Observational Study. / DOAJ | Martínez-Galiano, J. M. et al., (2019) ⁽¹⁴⁾ | Switzerland | Moderated | To investigate the association between mode of delivery and self-reported postpartum symptoms of maternal discomfort and problems during the puerperium. | Women who had cesarean or instrumental delivery had a higher incidence of infection and psychological changes than those who had normal delivery. |
| 5 | A Practice Improvement Project to Reduce Cesarean Surgical Site Infection Rates. / SCOPUS | Holland, Cindra et al., (2016) ⁽¹⁵⁾ | USA | Moderated | Address the increasing rate of cesarean surgical site infections. | Our interdisciplinary approach to integrating best practice strategies has resulted in reduced infection rates and improved patient satisfaction scores. |
| 6 | Risk factors for cesarean surgical site infections at a Thai-Myanmar border hospital. / Web of Science | Assawapalanggool, Srisuda et al., (2016) ⁽¹⁶⁾ | Thailand | Moderated | Examine risk factors for SSI after cesarean section | Their risk factors reflected the delay in adequate perinatal maternal care that resulted in late cesarean delivery. Early prenatal care may help to reduce SSIs by cesarean section in this population. |

Source: Research data, 2022.

sterilizing women by tubal ligation, or the medical feasibility of performing a cesarean, as multiple surgeries can be performed in a day. In addition, the issue of fear, pain and time of delivery, as well as the effort to preserve body aesthetics, are taken into account when

choosing a cesarean section.^(17,18)

Martínez-Galiano et al.⁽¹⁴⁾ in their study, they observed that women who had cesarean or instrumental delivery had a higher incidence of infection and psychological changes than women who had normal delivery.

A survey found that anemia, arterial hypertension, puerperal infection from previous cesarean section and smoking are predisposing factors for SSI after cesarean section, with a higher incidence of urinary tract infections and obesity. However, it identified risk factors with

underreporting, reflecting the professionals' failure to record additional information in the notes, in addition to reporting a deficit in the examination of the user's history and their current condition. (19)

Yet, Araujo et al.⁽¹⁹⁾ observed in their study that in relation to the number of pregnancies, 64.2% of the 53 medical records with SSI after cesarean section were primiparous, contained information on risk factors such as urinary tract infection (9.4%), arterial hypertension (3.8%), smoking (3.8%) and obesity (3.8%). Regarding the integrity of the pouch, we found a greater number of patients with an intact pouch (58.5%).

Also, Li and Cui⁽¹²⁾ observed that factors such as age, BMI, duration of surgery, blood loss, and use of urinary catheters were associated with an increased risk of postoperative wound infection after cesarean section. Prevention and clinical interventions are necessary for this group of patients to reduce the occurrence of postoperative wound infections.

Corroborating, Fonseca et al.⁽¹⁸⁾ observed from the data collection that comparing the years 2015 and 2017, there was an increase in the incidence of wound infections, which can be explained by the change in the search form and in the reports of infections, mainly due to the nurse's care and the reduction of medication prescriptions in the puerperium. Reinforcing the relevance of constant surveillance and the central role of nurses.⁽¹⁸⁾

In the study by Antonello et al.,⁽²⁰⁾ their data suggest that the emergence of the COVID-19 epidemic had a positive impact on compliance with safety and infection control measures in patients undergoing cesarean section. Such a significant reduction leads us to believe that previous adherence by healthcare professionals was far from ideal, despite ongoing educational efforts. We believe that this reduction may be similar to that achieved by the introduction of hand

washing proposed by Semmelweis in the 19th century.

Nursing care

Cunha et al.,⁽¹¹⁾ observed, in view of the results of his study, that the systematization of postpartum consultation hours is essential. The roadmap is a tool that can potentially improve the quality of care and the collection of information.

Corroborating, Holland et al.,⁽¹⁵⁾ evidenced in their study that an interdisciplinary approach to integrating best practice strategies resulted in reduced infection rates and better patient satisfaction scores.

Assawapalanggool et al.,⁽¹⁶⁾ state that the risk factors highlighted in their study reflected a delay in providing adequate maternal perinatal care, resulting in a late cesarean section. Early prenatal care can help reduce C-section SSIs in this population.

Emphasizing the importance of the professional nurse in preventing this type of infection, being relevant to the professional category and helping to strengthen the work process at all stages and especially in risk management. The nurse is responsible for risk management, notifying adverse events and mainly responsible for the prevention and reduction of infections in the hospital environment.⁽²¹⁾

Bearing in mind that at the time of the postpartum consultation, the nurse must be competent and vigilant in the early identification of risks, signs and symptoms of possible surgical site infection after a cesarean section or episiorrhaphy and a careful evaluation of the physician's history, physical examination general and specific events favoring the development of an infection classified as puerperal infection.⁽²²⁾

In Brazil, the national health care-related infection prevention program determined that the rate of surgical site infections in cesarean sections (SSI-CS) was one of the program's national indicators. Since 2014, the notification of

SSI-CSs by health services has become mandatory.⁽²³⁾

When using the crosses to carry out the search, a small sample was obtained, although the search response was substantial, but few articles met the objective of the study. However, it was possible to highlight the factors related to post-cesarean wound infection and nursing care. Since this is the professional who provides direct assistance to postpartum women. Also, the included studies have limitations such as: single center, different comparison systems, small sample size and lack of randomization.

This study can promote the importance of performing nursing care, especially for postpartum women who need all the guidance on the care needed for the post-cesarean wound. Given this scenario, there is a need for constant monitoring of cesarean sections, trying to avoid performing unnecessary surgeries, for reasons not provided for in the current recommendation guidelines.

CONCLUSION

This study made it possible to observe how the factors associated with post-cesarean wound infection are related to pre, during and postpartum care. There is evidence of the need for greater training of the nursing team and the implementation of standard action protocols to standardize and align care, providing subsidies for women's puerperal care.

Therefore, analyzing nursing in the prevention of puerperal infections brings the benefit of pointing out the importance of the nursing professional in the prevention of this type of infection and it is relevant for the professional category to promote the strengthening of its role at all stages, as well as risk management. Emphasizing its responsibility in reporting adverse events and especially in preventing and reducing infections in the hospital environment. 🐦

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