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Practices of Pregnant Women Toward Prevention of Puerperal Sepsis

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ABSTRACT

Background: Puerperal sepsis is an important public health problem which is a leading cause of maternal mortality.

***Aim* of the study:** To evaluate the effect of the educational program about puerperal sepsis prevention on practices of pregnant women.

Study design: A quasi experimental design was used.

Setting: The study was conducted in in the outpatient antenatal clinic at Zagazig University Hospital.

Study subjects: A purposive sample of 150 pregnant women.

Tools of data collection: Two tools were used; tool I. A structured interview questionnaire, tool II. Pregnant women's practices assessment questionnaire.

Results: There was marked improvement in total women's practices regarding puerperal sepsis prevention post intervention and two weeks after delivery compared to pre intervention with highly statistically significant difference, (P< 0.001).

Conclusion*:* Applying the educational program significantly increased women practices regarding prevention of puerperal sepsis.

Recommendations*:* The obstetric nurse could play and implement their role as health educator, counselor, coordinator and supervisor and help post natal mothers to improve their knowledge and practice regarding puerperal sepsis prevention.

Keywords*:* Practices, Pregnant women, Puerperal sepsis prevention.

Introduction

Puerperal sepsis is defined as an infection of the genital tract that occurs at any time between the rupture of the membranes or labor and the first 42 days postpartum and includes two or more of the following symptoms: pelvic pains, fever (oral temperature 38.5°C or higher on any occasion), abnormal vaginal damage (for example, the presence of pus, an abnormal smell, or a foul odor of discharge), and a delay in the rate of uterus reduction less than two centimeter per day during the first week **(WHO, 2020).**

In Egypt, **Khashab et al (2020)** conducted a cross-sectional survey on women who gave birth at ElShatby University Maternity Hospital and at Dar Ismail Public Hospital, followed by a prospective survey of those women in both hospitals up to the 42nd day after their delivery. This study revealed that 8.0% of women suffered from puerperal sepsis and it is the third leading cause of direct maternal death after postpartum hemorrhage and hypertensive disorder.

Puerperal sepsis mainly occurs after discharge in the first 24 hours of parturition and within the first ten days following delivery when streptococci colonizing the genital tract or acquired nosocomial invade the endometrium, adjacent structures, lymphatic and bloodstream **(Gourlay et al., 2019).** It usually originates from organisms that constitute the normal vaginal flora. Due to presence of amniotic fluid, blood, and lochia; they increase the risk of infection by decreasing the vaginal acidity and providing an alkaline environment which encourage the growth of bacteria. Infections can also easily enter the female genital tract externally and ascend through the internal genital structures during the vaginal birth **(Bishaw et al., 2022).**

Risk factors that increase the incidence of puerperal sepsis include pre-existing maternal illnesses like (diabetes mellitus, severe anemia, obesity, bacterial vaginosis, and group B streptococcal infections), unhygienic home delivery, retained placenta, manual placental removal, retained products of conception, cesarean section, human immunodeficiency virus, low socioeconomic status, frequent vaginal examinations, prolonged labor, early rupture of membrane for more than 24 hours, meconium-stained amniotic fluid and perineal tears **(Abdel-fattah et al., 2022)**.

Most common presenting features of puerperal sepsis in an Indian study were fever, tachycardia, breathlessness, malodourous vaginal discharge, abdominal distention, scar infection, vaginal or rectal bleeding, peritonitis and septic shock **(Kumar & Yadav, 2020).** In another study, postpartum fever was the most common postpartum condition observed among women with puerperal sepsis, cesarean site infection, then episiotomy site and urinary tract infection **(Bishaw et al., 2023)**.

Complications of puerperal sepsis was demonstrated in the study of **Olutoye et al (2022)**, in which 38.6% of the women had no complications, while anemia was the commonest complication 56.8%, maternal mortality 16.5%, multiple organ dysfunction syndrome 20.3%, acute kidney injury 8.3% and psychosis 3.2%.

Pregnant women self care is defined as the ability to adapt and to self-manage to prevent complications as puerperal sepsis through maintaining personal and vaginal hygiene, avoid contact with people with contagious diseases, early start of gentle exercise after hospital discharge, inform the doctor if there is a foul-smelling vaginal discharge or severe pain in the abdomen, hospital delivery under complete aseptic precautions, good nutrition, avoid tension and nervousness, taking pain and anti-inflammatory medications under the supervision of a specialist **(Abdel-fattah, et al., 2022**).

Significance of the study:

Puerperal sepsis has a multi-dimensional impact, increasing early neonatal mortality as the mother is unable to care for the infant as a result of puerperal sepsis. Puerperal sepsis not only endangers the mother's health but also imposes financial strain on the family due to the associated treatment costs, including hospital stays and medications **(Fenny et al., 2021).** A pocket of studies conducted in Africa revealed the lowest magnitude of good reported self-care practice during the postpartum period, which ranges from 11.4% to 40.8% **(Nchimbi & Joho, 2022).** Prevention is always better than cure, so this study was conducted to evaluate the effect of the educational program about puerperal sepsis prevention on knowledge and practice of pregnant women.

AIM OF THE STUDY

The study aimed to evaluate the effect of the educational program about puerperal sepsis prevention on practices of pregnant women.

Study hypothesis:

Implementation of educational program would improve practices of pregnant women about prevention of puerperal sepsis.

SUBJECTS AND METHODS

Study design:

A quazi experimental design (pre & post test) one group was used to evaluate the effect of the educational program about puerperal sepsis prevention on practices of pregnant women.

Study setting:

This study was carried out at the outpatient antenatal clinic at Zagazig University Hospital. The antenatal clinic is located in second floor of the outpatient clinics building. The small room is for the assisting nurse, and the large room is adequately equipped for examinations. This unit is adjacent to the gynecological unit, and it works every day from 9 am to 1 pm except Friday.

Study Subjects:

Sample type:

A purposive sample was used from the above-mentioned setting.

Sample size:

The total number of pregnant women attending to outpatient clinic at Zagazig University Hospital through the study period of six months (n =150) who fulfill the following criteria

Inclusion criteria:

- Pregnant women at gestational age (30-35weeks).
- Free from any medical or obstetrics complication.

Exclusion criteria:

- Women who refused to participate in the study.

Tools of data collection*:*

Tool I: A structured interview questionnaire

This tool included two parts

Part 1: General characteristics of pregnant women:

Such as age, level of education, occupation, residence, marital status, age at marriage and family income.

Part 2: Obstetrical history

Which included gestational age at recruitment in the study, number of previous pregnancies, complications of previous pregnancy, type of previous pregnancy complications, number of previous deliveries, types of previous delivery, complications of previous delivery, types of previous delivery complications, complications of previous post-partum and types of previous postpartum complications.

Tool II: Pregnant women practices Assessment questionnaire for prevention of puerperal sepsis

It was adapted from **Tortorice (2023)** to assess pregnant women practices regarding prevention of puerperal sepsis. It was divided into two parts:

Part1. Pregnant women practices during pregnancy

It included (3) practices regarding attending of scheduled antenatal visits, (4) practices regarding nutrition during pregnancy, (3) practices regarding antenatal exercise, (1) practice regarding informing the doctor with pregnancy warning signs and (2) practices regarding planning for delivery.

Part2. Pregnant women practices during the postnatal period

It included (1) practice regarding attending scheduled postnatal visits, (1) practice regarding postnatal nutrition, (2) practices regarding postpartum rest and sleep, (2) practices regarding postnatal exercise, (2) practices regarding starting of sex after child birth, (9) practices regarding postpartum perineal care, (5) practices regarding speeding perineal healing after episiotomy, (10) practices regarding cesarean section wound care and (7) practices regarding breast care.

Practices Scoring System:

The items were judged according to three-point Likert scale continuum from never (1), sometimes (2), and always (3). The mean and standard deviation was calculated. As well as women' total practice score was classified as the following:

- Satisfactory level of practice when the total score was ≥ 60%.
- Unsatisfactory level of practice when the total score was < 60%.

Validity and reliability of the tools:

Once prepared, the tools were tested for content validity by three experts in the field of obstetrics and gynecological nursing. All recommended modifications in the tools were done. The reliability of tools was tested using Cronbach's Alpha test as following: Self care practice regarding prevention of puerperal sepsis (0.961).

Pilot study:

A pilot study was carried out before performing the main study in order to test the clarity of the tools and the feasibility of the study. The pilot sample involved about 10% (15) woman that fulfilled the set criteria. This pilot study was conducted in month before collection of data. The purpose of the pilot study was to ascertain the feasibility of the tools, and to detect any problems peculiars to the statement as sequence and clarity. It also helped to estimate the time needed for women to fill in the tools of the study.

Field work:

Upon securing all necessary official permission obtained from the responsible authorities at Zagazig University Hospitals, the researcher visited the previously mentioned study setting and met the pregnant women who were willing to participate in the study according to the eligibility criteria and explained the study objectives with assuring about the confidentiality of the data and taken their written acceptance as well as to gain their cooperation. After the women's finishing their checkup and follow up visits at the antenatal clinic. The researcher attended the study setting three days per week for data collection over a period of 6 months, starting from the first of December 2024 to the end of May 2025. The study was conducted through four phases: Preparatory, planning, implementation, and evaluation.

- **Preparatory phase:**

This phase was concerning to construction of the study tools. The researcher interviewed the pregnant women in the third trimester of pregnancy > 30 weeks gestation individually at the antenatal clinic with maintaining the privacy for orientation about the educational program rationale and to assess their knowledge and self-care practice by using pretest interviewing questionnaire and observational checklist. The time consumed for completing the

questionnaire and checklist was ranged from 20 to 30 minutes.

- **Planning and implementation phase:**

On the basis of identified women's needs which obtained from the pilot study, assessment phase and relevant review of literature. The researcher prepared the supportive material "educational booklet". It was prepared by the researcher in simple Arabic language and included pictures for more illustrations to simplify women's understanding. Its contents were validated by scientific committee and then planned to distribute to the pregnant women during the first educational session to be used as a guide to improve their self care practices regarding the prevention of puerperal sepsis.

The researcher sought to facilitate the way of teaching before applying the educational sessions. The pregnant women were classified into 6 groups each subgroup include 25 women. The educational program was implemented through 8 interactive sessions; time of each session 30- 45 minutes depending upon the women physical, mental readiness and other circumstances in the study setting. These sessions were conducted two times weekly (Monday & Wednesday) by the researcher where these days were specified for pregnant woman follow up from 9:00 am to 1 pm. The program total period was nearly one month for each group. Then it was repeated on another group of women until reaching the total sample size.

The content of the sessions were as following:

Session (1) definition of puerperal sepsis, symptoms. **Session (2**) mode of transmission of infection to the genital tract sites of infection. **Session (3)** risk factors of puerperal sepsis **Session (4)** the role of the health care team in prevention of puerperal sepsis during and after child birth. **Session (5) & (6)** self care practices during pregnancy to prevent puerperal sepsis. **Session (7) & (8)** self care practices during postpartum period to prevent puerperal sepsis.

Each session started with a summary of the previous session and the objectives of the new one. Teaching methods were selected to suit teaching in small groups in a form of group discussion, demonstration and re-demonstration. Additionally, during the educational sessions suitable teaching methods were used as power point presentation, videos films, pictures, lab models.

Evaluation Phase:

Pregnant women practices were evaluated after two weeks of delivery by telephone calls or What's app or when she came back for postnatal visits.

Administrative design:

An official permission was granted by submission of an official letter from the faculty of nursing to the responsible authorities of the study setting to obtain their permission for data collection**.** Nursing and medical staff responsible for caring of women were approached to gain their cooperation.

Ethical considerations:

Ethical approval was obtained from the scientific and ethics committee of the faculty of nursing, Zagazig University. The ethical code was (M.D ZU-NUR/147/9/3/2024). All ethical issues were taken into consideration during all phases of the study. Women were also assured that the information obtained during the study was confidential and used for the research purpose only.

Statistical Analysis:

The collected data were organized, coded, entered using Microsoft Excel software. Data were then imported into Statistical Package for the Social Sciences (SPSS version 20.0) software for analysis. According to the type of data quantitative represent as number and percentage, quantitative continues group represent by mean ± SD, the

following tests were used to test differences for significance; difference and association of qualitative variable by Chi square test (X^2). Differences between quantitative independent groups by paired t. P value was set at <0.05 for significant results & <0.001 for high significant result.

Table (1) shows that, 72.0% of the studied women were aged between 20-<30 years, the Mean SD of their age was 25.93± 4.11 years. As regard to education level, 42.0% of them had secondary education. Also, 80.0% of them were housewives. Moreover, 58.0% of them live at urban areas. Furthermore, 98.0% of them were married. Also, 56% of them didn't have sufficient family income.

Table (2) displays that, the mean SD of gestational age was 32.16± 0.71 weeks. Also, 20.0% of the studied women had one previous pregnancy. Moreover, 33.0% of women had previous pregnancy complications, 15.0% of them had anemia. Furthermore, 13.3% of the studied women had one previous delivery. Also, 18.0 % of women given birth by cesarean section, 13.0% of them had complications of previous delivery, 10.0% of women had prolonged labor. Also, 11.0 % of women who had previously given birth had post-partum complications, 7.0 % of women had urinary tract infection.

Table (3): demonstrates that, there is a marked improvement in all self-care practices items regarding scheduled antenatal visits two weeks after delivery compared to pre intervention with a highly significant difference at (P= < 0.001). As evidence, (14.7%) of the studied pregnant women attend scheduled antenatal visits pre implementation of educational program. While changed to (92.0%) after two weeks of delivery. Regarding nutrition during pregnancy, there is a marked improvement in all self-care practices items at two weeks after delivery compared to pre intervention with a highly significant difference at (P= < 0.001). As evidence, (16.0% and 16.7%, respectively) of the studied pregnant women eat 3 main meals and 3 small meals and take vitamins contain basic nutrients pre implementation of educational program. While changed to (79.4% and 80.0%, respectively) two weeks after delivery.

Table (4) presents that, there is a marked improvement in all self-care practices during pregnancy two weeks after delivery compared to pre intervention with a highly significant difference at (P= < 0.001). As evidence, (16.0% and 14.0%, respectively) of the studied pregnant women do light exercise and get enough sleep to reduce fatigue pre implementation of educational program. While changed to (78.0% and 78.0%, respectively) two weeks after delivery. Regarding pregnancy warning signs and planning for delivery, there is a marked improvement in all self-care practices items two weeks after delivery compared to pre intervention with a highly significant difference at (P= < 0.001). As evidence, (14.0% and 6.7%, respectively) of them inform the doctor of pregnancy warning signs and avoid shaving before labor pre implementation of educational program. While changed to (75.3% and 69.3%, respectively) two weeks after delivery.

Table (5) shows that, there is a marked improvement in all Self-care practices items during postpartum period, regarding attend scheduled postnatal visits two weeks after delivery compared to pre intervention with a highly significant difference at (P= < 0.001). As evidence, (16.7%) of the studied pregnant women reported they they always attend scheduled postnatal visits and changed to (78.6%) two weeks after delivery. Regarding postpartum rest and sleep, there is a marked improvement in all self-care practices items two weeks after delivery compared to pre intervention with a highly significant difference at (P= < 0.001). As evidence, (2.0%) of the studied pregnant women seek help from husband, family and friends pre implementation of educational program. While changed to (87.4%) two weeks after delivery. Regarding postnatal exercise, there is a marked improvement in all self-care practices items two weeks after delivery compared to pre intervention with a highly significant difference at (P= < 0.001). As evidence, (20.0%) of the studied pregnant women avoid some exercises for the first 6 weeks pre implementation of educational program. While changed to (78.7%) two weeks after delivery. As regards sex after birth, there is a marked improvement in all self-care practices items regarding start of sex after childbirth two weeks after delivery compared to pre intervention with a highly significant difference at (P= < 0.001). As evidence,

(14.7.0%) of the studied pregnant women start of sex about six weeks after delivery pre implementation of educational program. While changed to (74.7%) two weeks after delivery.

Table (6) displays that, Regarding postpartum perineal care, there is a marked improvement in all self-care practices items two weeks after delivery compared to pre intervention with a highly significant difference at (P= < 0.001). As evidence, (24.0% and 4.0%, respectively) of the studied pregnant women squeeze peri bottle over perineum from the front to the back and use anesthetic sprays after perineal care pre implementation of educational program. While changed to (81.3% and 78.7%, respectively) two weeks after delivery. Also, (16.0%) of the studied pregnant women start perineal care at the front pre implementation of educational program. While changed to (78.7%) two weeks after delivery.

Table (7) displays that, there is a marked improvement in all self-care practices items regarding perineal healing after episiotomy two weeks after delivery compared to pre intervention with a highly significant difference at (P= < 0.001). As evidence, (12.0% and 16.0%, respectively) of the studied pregnant women squeeze buttocks together before sitting and try not to strain with bowel movements pre implementation of educational program. While changed to (80.6% and 78.6%, respectively) two weeks after delivery.

Table (8) displays that, there is a marked improvement in all self-care practices items regarding cesarean section wound care two weeks after delivery compared to pre intervention with a highly significant difference at (P= < 0.001). As evidence, (12.0% and 8.0%, respectively) of the studied pregnant women remove dressing and the stitches or after 5-7 days and eat a healthy diet and drink plenty of fluids pre implementation of educational program. While changed to (77.3% and 78.7%, respectively) two weeks after delivery. Also, (14.0% and 9.3%, respectively) of the studied pregnant women support wound during coughing and inform doctor about any symptoms of wound infection pre implementation of educational program. While changed to (78.0% and 78.7%, respectively) two weeks after delivery.

Table (9): displays that, there is a marked improvement in all self-care practices items regarding breast care two weeks after delivery compared to pre intervention with a highly significant difference at (P= < 0.001). As evidence, (18.7% and 24.0%, respectively) of the studied pregnant women take a brief hot shower before breast feeding and breastfeed in a quiet, relaxed place and supportive position pre implementation of educational program. While changed to (82.0% and 81.3%, respectively) two weeks after delivery. Also, (11.3% and 11.3%, respectively) of the studied pregnant women gently roll the nipple and express breast milk or use of pump to drain the breasts, after the baby nurses pre implementation of educational program. While changed to (82.0% and 76.0%, respectively) two weeks after delivery.

Table (10) shows that, there is a marked improvement in total women' self-care practices regarding puerperal sepsis two weeks after delivery with a highly statistically significant difference at (P= < 0.001) between pre, post implementation of educational program and two weeks after delivery. As evidence, only 30.0% of the studied pregnant women have satisfactory level of total self-care practices regarding puerperal sepsis pre implementation of educational program. While changed to 77.3% two weeks after delivery.

Figure (1): shows that, there is a marked improvement in total women' self-care practices regarding puerperal sepsis two weeks after delivery with a highly statistically significant difference at (P= < 0.001) between pre and two weeks after delivery. As evidence, only 30.0% of the studied pregnant women have satisfactory level of total self-care practices regarding puerperal sepsis pre implementation of educational program. While changed to 77.3% two weeks after delivery.

DISCUSSION

The infection of the vaginal tract during postpartum period for at least the first six weeks after delivery, is defined as puerperal sepsis, which stated as a major public health issue and the leading cause of women deaths,

particularly in underdeveloped countries. Endogenous infections can occur depending on the existence of devitalized tissues in the vagina and cervix, while exogenous infections result from the introduction of outside agents such as helpers, relatives, or non-sterile objects. The endometrium is the primary site of infection; from there, it can move through the parametrium to the ovaries and fallopian tubes before entering the circulation causing septicemia **(Okwudili, et al., 2020).**

Therefore, the aim of this study was to evaluate the effect of the educational program about puerperal sepsis prevention on knowledge and practices of pregnant women. The findings of the current study were discussed under main six sections which included socio-demographic characteristics**,** obstetric history, women knowledge regarding prevention of puerperal sepsis, women self care practices regarding prevention of puerperal sepsis then relation and correlation between the studied variables.

The present study showed that, the majority of the studied women were aged between 20-<30 years, the mean ± SD of their age was 25.93± 4.11 years. As regard to education level, almost three fourth of them had secondary and university education. Also, the majority were housewives. Moreover, more than half of them live at urban areas. Furthermore, nearly all of them were married. Also, more than half didn't have sufficient family income.

In the same line, **Gamel et al. (2020)** studied "Impact of Puerperal Sepsis Self-Care Nursing Guideline on Women's Knowledge and Practices" at the postpartum unit of Fayoum general and university hospitals in Egypt and revealed that less than one third of the studied women aged 20-30 years, the highest percentage of them were secondary and university educated. The majority were housewives and urban residents and the majority of them were married between age 20- 30 years after completing their graduation. From the point of view of the researcher, these similarities may be attributed to the same community circumstances and culture.

Moreover, the same Socio-demographic characteristics were reported in a prospective cohort study of **Bishaw et al. (2023)** regarding "Incidence and predictors of puerperal sepsis among postpartum women at Debre Markos comprehensive specialized hospital, northwest Ethiopia"; the highest proportion of women participated in the study were between 20- 29 years, secondary/university and diploma educated, housewives with insufficient monthly salary and the most of them were married.

Pertaining obstetric history of the studied women, the present study displays that the mean gestational age at recruitment in the study was 32.16± 0.71 weeks. Also, one fifth of the studied women had one previous pregnancy. Moreover, almost one third of women had previous pregnancy complications, less than one fifth of them had anemia. Furthermore, less than one fifth of the studied women had one previous delivery, given birth by cesarean section, had complications of previous delivery, previous post-partum complications and a lower percentage of women had urinary tract infection.

Similarly, **Abd Elmoniem et al. (2023)** study about "Effect of utilizing care bundle on prevention of puerperal sepsis among post-natal women" at the outpatient clinic of obstetrics & gynecology department and postnatal room (recovery room) at Benha University Hospital, Egypt showed the same results. More than half of women in the study group were primigrvida, one fourth of previous deliveries were by CS. Also, the same percentage of prolonged labor and postpartum complications.

In partial agreement with the current study, "Effectiveness of Puerperal Sepsis Self- Care Guideline on Women's Health during Pueriperium" was a study carried out at BeniSuef general hospital in Egypt by **Masoud & Saber (2020)** and stated the same percentages of gravidity, parity, previous pregnancy complications but hypertension in previous pregnancies was the commonest complication. It also reported the same percentage of previous delivery complications but with higher percentage of obstructed labor, the same percentages of previous postpartum complications, but primary postpartum hemorrhage was the commonest complication.

The present study focused on self care practices during pregnancy for prevention of puerperal sepsis which included items as attend scheduled antenatal visits, nutrition during pregnancy (eat 3 main meals and 3 small meals, taking vitamins contain basic nutrients, avoid mercury-containing foods, drink enough water at least 10 glasses per day), do light exercise, get enough sleep to reduce fatigue, practice stress relief, inform the doctor of pregnancy warning signs, plan for hospital delivery under complete aseptic precautions and avoid shaving before labor. A higher percentage of women in the pretest sometimes or never perform these practices which significantly improved to always perform after two weeks of delivery.

The same changes between done practices pre, post and follow up after instructional guidelines were showed by **Abdel-fattah et al. (2022)** regarding nutrition items (maintain a healthy hemoglobin level, by eating rich iron food in liver and honey, ensure a balanced diet that help to improve body immunity, take plenty of fluids and juices), get immediate medical care for any pregnancy complications and prepare for hospital delivery.

The present study clarified self care practices during postpartum period for prevention of puerperal sepsis. These practices included attend scheduled postnatal visits, postnatal nutrition, postpartum rest/sleep, postnatal exercise, sex after child birth, perineal care, perineal healing, cesarean section wound care and breast care. In the pretest, the majority of women sometimes or never do these practices after two weeks of delivery the majority of women always do these practices with significant difference between pretest test and after two weeks. **Abd-Elsatar et al. (2023)** confirmed these results and showed that the women self care practices regarding nutrition, physical activity, genital hygiene, wound care, breast care, rest and sleep were satisfactory in almost one third of women in pre intervention which were significantly increased in the majority of women post intervention and follow up phases.

Cesarean section wound care was an important subscale of women self care practices in the present study which included remove dressing and the stitches or after 5-7 days, clean and dry wound carefully every day once dressing is off, wear cotton high waist pants and loose clothes, wash hands before and after touching wound or dressing, showering is preferable to bathing, do not rub soap or shower gels on wound, pat the wound dry with a clean towel, eat a healthy diet and drink plenty of fluids, support wound during coughing and inform doctor about any symptoms of wound infection. The majority of women after two weeks of delivery significantly reported always doing these practices.

the study group of women undergone enhanced recovery pathway was instructed about incision care as following: Showering is recommended, water is allowed to gently flow over the incision while gently washing the area, If the mother had stitches or staples, these were removed during the first doctor appointment and scrape the surface or apply pressure to it is avoided. The women in the study group had significant level of good knowledge than the control group. These were the result of the study "Impact of enhanced recovery pathway application outcomes on nurses and women undergoing cesarean section" at the obstetrics and gynecology units of University Hospital and Shebin El-Kom Teaching Hospital, Egypt carried out by **Ismail et al. (2021)** and going in the same line with the present study findings.

Towards women self care practices regarding sex after child birth, before nursing guidelines lower percentage of women always start sex after six weeks of delivery and always choose comfortable intercourse positions which was significantly increased to the majority of women two weeks after delivery. Going in the same line with the present study, **Gamel et al. (2020)** stated that after nursing guidelines the majority of women were committed to avoid practicing sexual activities during the first 40 days after birth.

As regards women self care practices regarding items of post partum perineal care. In the present study these items included wash hands before and after each perineal care, change the soiled pad frequently, dry with dry tissue from front to back, use anesthetic sprays after perineal care, and perform perineal care after elimination. All

these items pre implementation of educational program were significantly increased post program and after two weeks of delivery.

In agreement with the present study findings, **Gamel et al. (2020)** stated that after puerperal sepsis self-care nursing guideline, the majority of women were always committed to the need to wash hands before and after perineal care, clean genital and perineal area several times daily with an antiseptic solution in right direction before changing dressing, drying the perineum well with a clean and dry towel, change the underwear and pad regularly and observe the perineum in case of episiotomy for having any symptoms of the presence of infection such as bloody secretions, bad odor or color or delay of wound healing and should go to the doctor immediately. From the point of view of the researcher, these similarities might be attributed to the similarity in tools and items of data collection in the two studies.

Self-care practices regarding breast care in the present study included take a brief hot shower before breast feeding, breastfeed in a quiet, relaxed place and supportive position, use of moist heat on breasts before breast feeding, gently roll the nipple before breast feeding, hold baby skin-to-skin frequently, feed the neonate at least 15 to 20 minutes each breast, express breast milk after the baby nurses. The present study educational program succeeded in significant improvement of these practices after two weeks of delivery compared to the pretest.

This result was in accordance with Brazilian study performed by **Oliveira et al., (2021)** entitled "prenatal clinical demonstration for the management of breast engorgement prevention" found that most of mothers had satisfactory practice level after education and stated that health education with the use of clinical demonstration is effective in the management of breast engorgement, in the appropriate technique of breastfeeding, and protective behaviors against breastfeeding. Similarly, a study conducted by **Mohammed & Shehata, (2021)** about "Effectiveness of Instructional Module on Breast Problems among Post Cesarean Section Mothers" at the postnatal inpatient maternity unit at Ain shams university maternity hospital in Egypt reported that majority of mothers had adequate practice post intervention and affirmed that the instructional module has improved the mothers' self-care practice and has a positive effect on alleviating breast problems among the studied mothers.

As for total level of self-care practices regarding puerperal sepsis prevention at pretest and two weeks after delivery, in the current study, the total mean score of women practice in the pretest was significantly increased after two weeks of delivery. In other words, less than one third of women in the pretest had satisfactory level of practice compared to the majority of them after two weeks of delivery.

Going in the same line with the study pretest, a descriptive study titled "Knowledge and Practices of Postnatal Mothers Regarding Prevention of Puerperal Sepsis" was performed at postnatal department of Minia University Hospital for obstetric and pediatric in Egypt by **Hassan et al. (2021)** and illustrated that the majority of the studied sample had poor practice about prevention of puerperal sepsis. Moreover, significant improvement in total satisfactory self care practices of women regarding prevention of puerperal sepsis from almost one third of women in pre intervention to the majority of women post intervention and follow up phases was reported by **Abdel-fattah et al. (2022) and Abd-Elsatar et al. (2023)** which coincided well with the present study findings.

CONCLUSION

Based on the present study findings, it can be concluded that the research hypothesis was achieved. Applying the educational program significantly improved women's self care practices during pregnancy and postpartum regarding prevention of puerperal sepsis.

RECOMMENDATIONS

In the light of the present study findings, it can be recommended that:

- The obstetric nurse could play and implement their role as health educator, counselor, coordinator and supervisor and help post natal mothers to improve their knowledge and practice regarding puerperal sepsis prevention.
- Future research should be conducted as "Health education packages for the postnatal mothers to improve their knowledge and right practices related to child birth and postpartum complications".

Table (1): Number and percentage distribution of the studied pregnant women according to their socio-demographic characteristics (n=150).

Socio-demographic characteristics	No.	%
Age (Years)		
<20	9	6.0
20-<30	**108**	**72.0**
≥30	33	22.0
Mean ± SD 25.93± 4.11		
Educational level		
Illiterate	6	4.0
Basic education	27	18.0
Secondary education	**63**	**42.0**
University education	54	36.0
Occupation		
Housewife	**120**	**80.0**
Working	30	20.0
Residence		
Urban	**87**	**58.0**
Rural	**63**	42.0
Marital status		
Married	**147**	**98.0**
Widow	3	2.0
Age at marriage		
<20	18	12.0
20-<30	**118**	**78.7**

≥30	14	9.3
Family income		
Sufficient	66	44.0
Not sufficient	**84**	**56.0**

Table (2): Number and percentage distribution of the studied pregnant women according to their obstetric history (n=150).

Obstetric history	**No.**	**%**
Gestational age at recruitment in the study (Weeks)		
30-31	41	27.3
32-33	**81**	**54.0**
34-35	28	18.7
Mean ± SD 32.16± 0.71		
Number of previous pregnancies		
None	111	74.0
One	**30**	**20.0**
Two	3	2.0
Three or more	6	4.0
Complications of previous pregnancy (n= 39)		
Yes	**33**	**33.0**
No	6	6.0
Type of previous pregnancy complications (n=33)		
Hypertension	3	3.0
Anemia	**15**	**15.0**
Gestational diabetes	9	9.0
Antepartum hemorrhage	6	6.0
Number of previous deliveries		
None	121	80.7
One	**20**	**13.3**
Two	9	6.0
Types of previous delivery (n=29)		

Vaginal	11	11.0
C.S	**18**	**18.0**
Complications of previous delivery (n=29)		
Yes	**13**	**13.0**
No	16	16.0
Types of previous delivery complications (n=13)		
Prolonged labor	**10**	**10.0**
Shoulder dystocia	3	3.0
Complications of previous post-partum (n=29)		
Yes	**11**	**11.0**
No	18	18.0
Types of previous postpartum complications (n=11)		
Postpartum hemorrhage	2	2.0
Urinary tract infection	**7**	**7.0**
Failure of lactation	4	4.0

(*) Mutual response more than 100% (women have more than one answers).

Table (3) Comparison between the studied pregnant women regarding to their self-care practices regarding scheduled antenatal visits and nutrition during pregnancy at pre, post intervention and after two weeks of delivery (n=150).

	Pre-intervention						**After two weeks**						**X^2**	**P- value**
	Always		Sometimes		Never		Always		Sometimes		Never			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Attend Scheduled antenatal visits	22	14.7	107	71.3	21	14.0	137	91.4	11	7.3	2	1.3	264.47	0.000**
Nutrition during pregnancy														
Eat 3 main meals and 3 small meals	24	16.0	78	52.0	48	32.0	119	79.4	26	17.3	5	3.3	180.43	0.000**
Taking vitamins	25	16.7	47	31.3	78	52.0	120	80.0	25	16.7	5	3.3	206.45	0.000**
Avoid mercury-containing foods	21	14.0	93	62.0	26	24.0	91	60.7	54	36.0	5	3.3	111.02	0.000**

Drink enough water	21	14.0	96	64.0	33	22.0	107	71.3	41	27.3	2	1.3	155.29	0.000**

Table (4) Comparison between the studied pregnant women regarding to their other self-care practices during pregnancy at pre and after two weeks of delivery (n=150).

	Pre-intervention						**After two weeks**						**X^2**	**P- value**
	Always		Sometimes		Never		Always		Sometimes		Never			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Do light exercise	24	16.0	75	50.0	51	34.0	117	78.0	29	19.3	4	2.7	177.16	0.000**
Get enough sleep	21	14.0	87	58.0	42	28.0	117	78.0	31	20.7	2	1.3	193.43	0.000**
Practice stress relief	23	15.3	40	26.7	87	58.0	112	74.7	33	22.0	5	3.3	200.7	0.000**
Inform pregnancy warning signs	21	14.0	87	58.0	42	28.0	113	75.3	28	18.7	9	6.0	161.75	0.000**
Plan for hospital delivery	4	2.7	68	45.3	78	52.0	95	63.3	47	31.3	8	5.3	197.44	0.000**
Avoid shaving before labor	10	6.7	122	81.3	18	12.0	104	69.3	34	22.7	12	8.0	164.34	0.000**

Table (5) Comparison between the studied pregnant women regarding to their self-care practices during postnatal period at pre and after two weeks of delivery (n=150).

	Pre-intervention						**After two weeks**						**X^2**	**P- value**
	Always		**Sometimes**		**Never**		**Always**		**Sometimes**		**Never**			
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**		
Attend postnatal visits	25	16.7	83	55.3	42	28.0	118	78.6	31	20.7	1	0.7	184.17	0.000**
Postnatal nutrition														
Eat a healthy foods	30	20.0	33	22.0	87	58.0	78	52.0	66	44.0	6	4.0	180.97	0.000**
Postpartum rest and sleep														
Sleep when baby sleeps	33	22.0	78	52.0	39	26.0	127	84.7	17	11.3	6	4.0	179.26	0.000**
Seek help from husband, family	**3**	**2.0**	117	78.0	30	20.0	131	87.4	14	9.3	5	3.3	307.23	0.000**
Postnatal exercise														

Gentle exercise	33	22.0	75	50.0	42	28.0	114	76.0	33	22.0	3	2..0	141.17	0.000**
Avoid heavy exercises in the first 6 weeks	**30**	**20.0**	21	14.0	99	66.0	118	78.7	31	20.7	1	0.7	255.14	0.000**
Sex after childbirth														
Start sex after six weeks of delivery	22	14.7	36	24.0	92	61.3	112	74.7	34	22.7	4	2.7	224.64	0.000**
comfortable intercourse positions	18	12.0	108	72.0	24	16.0	89	59.3	58	38.7	3	2.0	104.18	0.000**

Table (6) Comparison between the studied pregnant women regarding to their self-care practices of postpartum perineal care at pre and after two weeks of delivery (n=150).

	Pre-intervention						**After two weeks**						**X^2**	**P- value**
	Always		**Sometimes**		**Never**		**Always**		**Sometimes**		**Never**			
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**		
Wash hands before and after perineal care	36	24.0	81	54.0	33	22.0	108	72.0	37	24.7	5	3.3	109.32	0.000**
Change pad frequently	0	0.0	102	68.0	48	32.0	116	77.4	29	19.3	5	3.3	255.30	0.000**
Squeeze Peri bottle over perineum	36	24.0	30	20.0	84	56.0	122	81.3	23	15.4	5	3.3	193.02	0.000**
Dry with dry tissue	21	14.0	99	66.0	30	20.0	114	76.0	30	20.0	6	4.0	162.78	0.000**
Use anesthetic sprays	6	4.0	63	42.0	81	54.0	118	78.7	26	17.3	6	4.0	256.57	0.000**
Perineal care after elimination	5	3.3	48	32.0	97	64.7	115	76.7	30	20.0	5	3.3	273.91	0.000**

Table (7) Comparison between the studied pregnant women regarding to their self-care practices of perineal healing after episiotomy at pre, post intervention and after two weeks of delivery **(n=150).**

	Pre-intervention						**After two weeks**						**X^2**	**P- value**
	Always		**Sometimes**		**Never**		**Always**		**Sometimes**		**Never**			
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**		

Expose the perineum to air while resting	30	20.0	33	22.0	87	58.0	105	70.0	36	24.0	9	6.0	175.43	0.000**
Squeeze buttocks before sitting	18	12.0	99	66.0	33	22.0	121	80.6	25	16.7	4	2.7	205.34	0.000**
Sit slightly on the side	13	8.7	104	69.3	33	22.0	113	75.3	33	22.0	4	2.7	190.49	0.000**
Try not to strain with bowel movements	24	16.0	45	30.0	81	54.0	118	78.6	31	20.7	1	0.7	230.97	0.000**
Apply an ice pack to the perineum	16	10.7	101	67.3	33	2.2.0	117	78.0	30	20.0	3	2.0	199.46	0.000**

Table (8) Comparison between the studied pregnant women regarding to their self-care practices of cesarean section wound care at pre and after two weeks of delivery (n=150).

	Pre-intervention						**After two weeks**						**X^2**	**P- value**
	Always		**Sometimes**		**Never**		**Always**		**Sometimes**		**Never**			
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**		
Remove stitches after 5-7 days	18	12.0	96	64.0	36	24.0	116	77.3	34	22.7	0	0.0	206.8	0.000**
Clean and dry wound every day	21	14.0	82	54.7	47	31.3	111	74.0	34	22.7	5	3.3	165.6	0.000**
Wear high-waisted pants	25	16.7	83	55.3	42	28.0	114	76.0	35	23.3	1	0.7	174.6	0.000**
Wash hands before and after touching wound	11	7.3	85	56.7	54	36.0	117	78.0	23	15.3	10	6.7	205.1	0.000**
Showering is preferable	16	10.7	98	65.3	36	24.0	115	76.8	31	20.7	4	2.7	185.4	0.000**
Do not rub soap on wound	21	14.0	54	36.0	75	50.0	96	64.0	47	31.3	7	4.7	167.8	0.000**
Dry wound with clean towel	3	2.0	108	72.0	39	26.0	117	78.0	29	19.3	4	2.7	229.0	0.000**
Eat a healthy diet and drink plenty of fluids	12	8.0	105	70.0	33	22.0	118	78.7	26	17.3	6	4.0	204.7	0.000**

Support wound during coughing	21	14.0	90	60.0	39	26.0	117	78.0	26	17.3	7	4.7	174.7	0.000**
Inform symptoms of wound infection	14	9.3	97	64.7	39	26.0	118	78.7	29	19.3	3	2.0	207.3	0.000**

Table (9): Comparison between the studied pregnant women regarding to their self-care practices regarding breast care at pre and after two weeks of delivery (n=150).

	Pre-intervention						**After two weeks**						**X^2**	**P- value**
	Always		**Sometimes**		**Never**		**Always**		**Sometimes**		**Never**			
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**		
Hot shower before feeding	28	18.7	37	24.7	85	56.7	123	82.0	26	17.3	1	0.7	235.12	0.000**
Breastfeed in a quiet place	36	24.0	75	50.0	39	26.0	122	81.3	21	14.0	7	4.7	147.47	0.000**
Moist heat on breasts before feeding	25	16.7	71	47.3	54	36.0	109	72.6	37	24.7	4	2.7	158.11	0.000**
Gently roll the nipple before feeding	17	11.3	96	64.0	37	24.7	123	82.0	16	10.7	11	7.3	209.61	0.000**
Hold baby skin-to-skin	19	12.7	75	50.0	56	37.3	97	64.7	49	32.7	4	2.7	153.78	0.000**
Feed at least 15 to 20 minutes each breast	18	12.0	99	66.0	33	22.0	105	70.0	40	26.7	5	3.3	142.28	0.000**
Express milk after nursing.	17	11.3	85	56.7	48	32.0	114	76.0	29	19.3	7	4.7	182.64	0.000**

Table (10) Comparison between the studied pregnant women regarding to total self-care practices regarding puerperal sepsis prevention at pre and after two weeks of delivery (n=150).

Self-care practices subscales	**Pre-intervention**				**After Two weeks**				**X^2**	**P- value**
	Satisfactory		**Unsatisfactory**		**Satisfactory**		**Unsatisfactory**			
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**		

During pregnancy	47	31.3	103	68.7	124	82.7	26	17.3	122.57	0.000**
Postnatal period	25	16.7	125	83.3	114	78.0	36	24.0	146.66	0.000**
Breast care	39	26.0	111	74.0	130	86.7	20	13.3	169.91	0.000**
Total self-care practices score	45	30.0	105	70.0	116	77.3	34	22.7	101.22	0.000**
Mean ± SD	45.52±20.56				98.48±23.04				Fr=247.61	0.000**

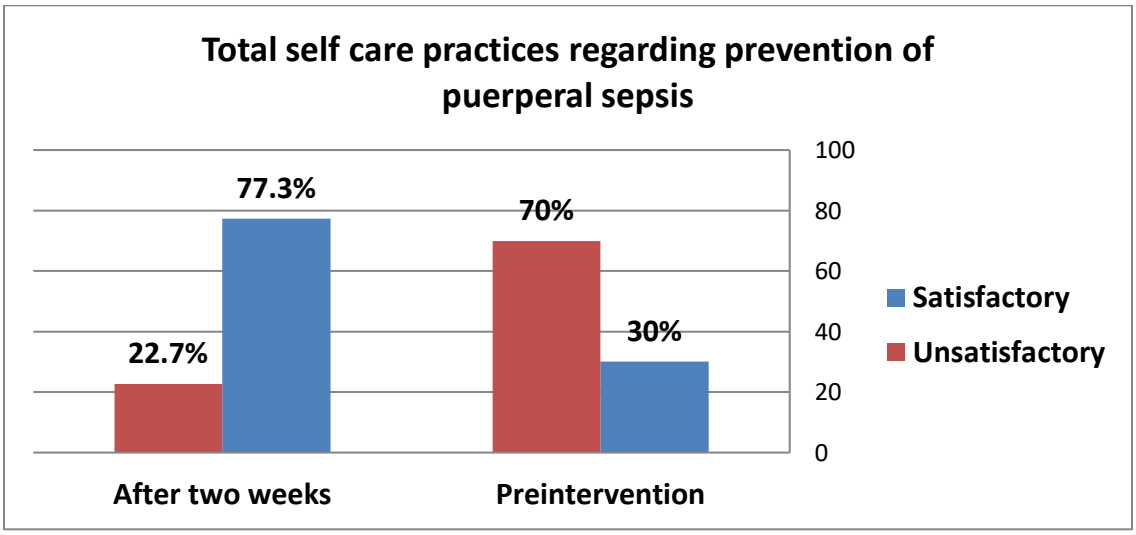

Figure (1): Percentage distribution of total women's practices regarding prevention of puerperal sepsis at pre, post intervention and after two weeks of delivery (n=150).

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