Effect of Health Instructions on Pregnant Women's Knowledge Regarding Puerperal Sepsis

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Abstract

Background: Puerperal sepsis is one of the major contributors to maternal mortality globally. **Aim of the study**: was to assess pregnant women's knowledge regarding puerperal sepsis and assess the effect of health instructions on pregnant women's knowledge. **Research design:** Quasi experimental (pre – posttest) research design was used. **Sample**: Were 100 pregnant women, (study group, control group) each group included 50 women. **Setting:** It was conducted at Antenatal Clinics at Sohag University Hospital, East Child Care and Al Shaheed Medical Center in Sohag City. **Tools:** structured interviewing questionnaire was used for data collection and health instructions booklet about puerperal sepsis. **Results**: It was observed that after applying the health instructions using booklet that there was a highly statistically significant difference between the pre and posttest in the study group regarding of total knowledge score of puerperal sepsis, 66% of women had good knowledge posttest in comparison with (20%) of women had good knowledge pretest, P-value is (0.001). **Conclusion**: Appropriate health education packages on puerperal sepsis during ANC, labor and delivery by health care providers to improve the knowledge of mothers. **Recommendation**: It is important to counsel mothers regarding puerperal sepsis and providing continuing educational program during antenatal and postnatal period regarding self-care practice to ensure best prevention of puerperal sepsis.

Key words: **Health Instructions, Knowledge, Puerperal Sepsis, Pregnant Women.**

Introduction

Postnatal period which also known as puerperium is a crucial time in the life of any woman that requires a special care starting from pregnancy and continuous during delivery and after delivery to prove safe motherhood and healthy living. Puerperal sepsis is graded as Grade I: confined to the uterus (endometritis), Grade II: confined to the pelvis (cellulitis, abscess, or thrombophlebitis), and Grade III: peritonitis or endotoxic shock. **(Jeenwal et al., 2019)**

Puerperal sepsis is a genital tract infection that can strike at any point between the rupture of the membranes or labor and the 42nd postpartum day. Puerperal sepsis is diagnostic if the woman has at least two of the following clinical features: Pelvic pain, Fever (oral $T^{o} \geq 38.5\ C^{0}$), abnormal vaginal discharge, foul odor vaginal discharge, and delay in the involution of the uterus within six weeks of giving birth. It is transmitted to women during or soon after child birth, miscarriage or unsafe abortion. **(Atlaw & Seyoum, 2019)**

Even if maternal mortality is somewhat reducing globally, the majority of maternal deaths occur at the time of giving birth. Puerperal sepsis is avoidable leading cause of maternal morbidity and mortality. After postpartum bleeding, unsafe abortion, and pregnancy-induced hypertension, puerperal sepsis is the fourth greatest cause of maternal mortality. **(Demisse et al 2019)**

Puerperal sepsis causes 11% of all global maternal deaths and is a significant contributing factor of maternal deaths.1 It is also the third leading cause of direct maternal mortality in developing nations.2 It has been estimated that 30million patients are affected by puerperal sepsis and nearly 6million among them die.3 Low- and middle income countries are disproportionately affected by puerperal sepsis particularly among vulnerable populations such as those with HIV/AIDS infection. One in 10 maternal deaths worldwide are attributed to sepsis. **(Bonet et al 2018)**

Puerperal sepsis is not only associated with severe acute morbidity but also lead to long-term complications like chronic pelvic pain and tubal infertility. Neonatal morbidity and mortality are also directly associated with peripartum infections which are responsible for around one million neonatal deaths worldwide. **(Greer et al., 2019)**

Puerperal sepsis can be caused by low socioeconomic status, unbooked status, protracted rupture of the foetal membranes, anaemia in pregnancy, retained products of conception, chorioamnionitis, manual removal of the placenta, episiotomy/genital tract trauma, and dangerous birth practices such as home delivery, using unsterile gloves and instruments during delivery, not washing hands and retained parts of placenta inside the uterus. **(Melkie & Dagnew, 2021)**

Puerperal sepsis can cause early complications to mother such as infertility, renal failure, and infection spread throughout the body, resulting in septicaemia, septic shock, pelvic abscess, and multiple organ failure. **(Lafon et al., 2021)**

As known the prevention is always better than cure, following aseptic techniques during delivery with a removal of any retained parts of placenta, using a prescribed antibiotics for cesarean delivery and for the case of prolonged rupture of membranes, providing an instruction regarding perineal hygiene and comfort measures, giving information's concerning to the successful and frequent breastfeeding, following the standards of care and intervention which prevent life-threatening complication and providing timely and high-quality post-delivery care are essential for prevention or minimizing the development of puerperal sepsis. **(Elsayed et al., 2023)**

During the postpartum period, women experience physiological changes, which can have negative impacts on their quality of life. Women's knowledge regarding postpartum complications and care can help them successfully pass of this critical period. Firmly, the maternity nurses guide and assist women throughout their pregnancy and puerperal period. As she has crucial role in the quality of antenatal, perinatal and postnatal care improvement, which provides the woman with advice, instructions, education, counseling, support and appropriate referral in order to improve their outcomes and reduce the incidence of potentially life threatening complications of postpartum period such as puerperal sepsis. **(Ari et al., 2019)**

Effective education provides the childbearing women with sufficient knowledge, practices and self-care strategies that meet their health needs , promote wellness, prevent illness, regain health , prevent hospitalization and to seek assistance if necessary. As a part of postpartum care, the mother will need a variety of healthy instructions regarding perineal care, comfort measures , prevention of infection such as puerperal sepsis. **(Subha, 2019)**

Nurses also play a critical role in the health of mothers and newborns. They are with women from the beginning of their pregnancy to the end. So, nursing education based on scientific principles should be used, emphasising the need of practice and knowledge sharing between staff nurses and mothers. **(Medina et al., 2021)**

Significance of the study

Puerperal sepsis is the sixth major cause of disease burden in women during their reproductive years in low- and middle-income countries, accounting for 15% of all maternal deaths, but in high-income nations, puerperal sepsis accounts for fewer than 10% of all maternal deaths **(Spera et al., 2017).** Therefore, the researcher felt need to impotency to educate mothers about puerperal sepsis and its prevention to improve the knowledge regarding puerperal sepsis and its prevention.

Puerperal sepsis is the fourth direct leading cause of death in Egypt, according to a recent study in Upper Egypt done by **(Masoud and Saber,2016)** the study was entitled "Effectiveness of Puerperal Sepsis Self-Care Guideline on Women's Health during Puerperium" concluded that puerperal sepsis was 2% among studied sample.

According to the study done by **(Abbas et al.,2016)** the study was entitled "Maternal mortality: a tertiary care hospital experience in Upper Egypt" who identified that the main causes of maternal mortality in upper Egypt were obstetric hemorrhage, puerperal sepsis, and obstructed labor and also reported in his study about maternal mortality in upper Egypt that there are additional causes for maternal deaths such as poor nutritional status and poor quality of care given to them.

So, the present study had a genuine interest to assess the effect health instructions on pregnant women's knowledge regarding puerperal sepsis.

Aim of the Study

1. Assess pregnant women's knowledge regarding puerperal sepsis.
2. Assess the effect of heath instructions on pregnant women's knowledge regarding puerperal sepsis.

Research Hypothesis

Women's knowledge will be improved after receiving health instructions booklet regarding puerperal sepsis compared with control group or not.

Research Design

Quasi experimental (pre – posttest) research design was carried out in this study.

Settings of the study

The study was conducted at Antenatal Clinics on the first floor at Sohag University Hospital, East Child Care Center and Al Shaheed Medical Center in Sohag City. These settings are the most important settings that provide free services to women from

urban, rural and resident areas in Sohag city. Care is provided by obstetricians, as well as professional and diploma nurses who are responsible for giving nursing care.

Sample

A purposive sample of 100 women divided into two equal groups {study group, control group} each group included 50 women. This size depends on flow rate in antenatal clinics in the previous settings. The total number of pregnant women attending the previous settings is 10125. The sample size was calculated using the EPI info package (Epidemiological information system) software version 6.04. Assuming that a good practice level among studied women at post intervention program was 61.7% and 36.7% among control group, at confidence level is 95% two side with power of study 80%. Sample size is 50 women in each group. **(Abd Elhakam & Abd Elmoniem).** The sample size was determined according to the following equation:

$$n = \frac{L * \sum(N_i^2 * S_i^2)}{N^2 \left(\frac{B^2}{Z^2}\right) + \sum(N_i * S_i^2)}$$

Inclusion criteria

1. All pregnant women in reproductive age (18-49 years) attending the study settings.
2. Primigravida and multigravida women at third trimester of pregnancy
3. Women with any chronic diseases

Tools for Data Collection

1- Structured interviewing questionnaire, this tool was designed by the researcher based on literature review and consulting expertise in this area, it was structured to include three parts:

Part I: Demographic characteristics as name, age, residence.

Part II: It was consisted of three sections:

a- Menstrual history as age of menarche, menstrual cycle, interval.

b- Obstetrical history as number of gravidity, Parity, abortion.

c- Medical history as hypertension, D.M, cardiac disease and so… on.

Part III: Knowledge assessment part, it included: knowledge regarding puerperal sepsis as definition, risk factors, sites of infection, symptoms…etc. Closed questions responded by yes, no or don't know with score one or zero. Every question was rated as poor, fair or good knowledge according to its content items. The total score was classified into good knowledge score (>75%), fair knowledge score (50-75%) and poor knowledge (<50%).

2- Health instructions booklet, the contents of the booklet included definition, causes, the number of women prone to puerperal sepsis, signs, and symptoms, how to protect against puerperal sepsis, complications of puerperal sepsis, diagnosis of puerperal sepsis and the precautions during the post-natal period and included pictures for more illustrations to simplify women's understanding.

General objectives of the health instructions booklet

The health instructions booklet was designed, implemented and given to each woman in the study group to improve their knowledge regarding puerperal sepsis. The language of the contents of the booklet was simple clear understandable Arabic language.

Content validity

Content validity was tested by a panel of five experts specialized in obstetrics field and nursing professors to ascertain relevance and completeness and the questionnaire was modified according to the panel's judgment.

Pilot study

It was carried out 10% (10) of women in February 2022 to evaluate the validity, reliability and applicability of the tool. It also helped in the estimation of the time needed to fill the tool. No change was done in the assessment sheet, so the ten sample use of women for the pilot study were included in the main study. According to the results of the pilot study, no modification in questionnaire was done.

Ethical considerations

Research proposal was approved from ethical committee in the faculty of nursing, Sohag University, before conducting the study an official permission was obtained from the director of Sohag University Hospital, the head of Obstetrics and Gynecology department and the director of Maternal and Child Health Centers (East Child Care, Al Shaheed Medical Center), women were assured that data collected had confidentiality and used only for research and each woman was free to withdraw at any time of data collection.

Frame work

Data were collected at Obstetrics, Gynecology Department (Antenatal Clinics) at Sohag University Hospital, Maternal and Child Health Centers (East Child Care and Al Shaheed Medical Center) in Sohag City during the period from March 2022 to September 2022 through three days per week (one day for each setting). The tool was filled through

interviewing; the lecture gave to them in the waiting room and in the secretory room.

Field work

First (preparatory phase): A review of recent, national and international related literature in various aspects of the problem was done using books, articles and magazines this helped the researcher to be acquainted with the magnitude of the study and guide the researcher to prepare data collection tools. Women meeting the sampling criteria were interviewed in the outpatient clinics in waiting area.

Second (assessment phase): After introducing the researcher herself and explaining the purpose of the study to women and taking the oral consent from every participant to share in the study. Face to face interviewing questionnaire was done. The researcher met each woman individually in the two groups by systemic allocation where the first 2 women were assigned into study group, then the other 2 women was assigned into control group and collected data related to demographic characteristics, medical and obstetrical history. The all interviewing questionnaire lasted 30 – 45 minutes for each women included in the study.

Third (implementation phase): Pretest was done first to the women in the two groups to assess their knowledge about puerperal sepsis. Then the researcher gave each woman in both groups' health instructions about puerperal sepsis. The study group received the health instructions program through lecture given to them in the form of booklet given to each woman in the group so they can refer to the booklet at any time and remember information about puerperal sepsis later. The researcher explained the contents of the booklet to each woman in details and answered their questions, while on the ethical side; the control group was given oral information about puerperal sepsis without receiving booklet.

Finally: the evaluating phase: After one month of implementation phase, the researcher met the women in both groups again to assess the effectiveness of the health instructions booklet on the study group and compare the results with the control group through posttest using the same pre-test tool.

Statistical design

Data entry and data analysis were done using statistical package for the social science (SPSS) version 26. Data were presented as number, percentage means and standard deviation. Wilcoxon and Chi-square test was used to show relation between variables. T-test was used to compare mean. P-value considered statistically significant when $p < 0.05$.

Results

Table (1): Shows that there was no statistical significant difference in socio-demographic characteristics between control and study group. It was noticed that 60% of women in study group & 62% of women in control group in the age range of 25-35 and 70% of women in study group & 66% of women in control group were rural and had basic education. Also, it noticed that 82% of women in study group & 96% of women in control group were housewife. According to BMI, this table shows that there was high significant difference between two groups P- value is (0.001).

Table (2): Shows that there was high statistical significant difference between two groups pretest regarding of risk factors for puerperal sepsis and preventive measures for puerperal sepsis, P-value are (0.001, 0,001) for all variables mentioned respectively. Also it was noticed that there was high statistical significant difference between two groups posttest regarding of preventive measures for puerperal sepsis, P-value is (0.001). This table also shows that there was high statistical significant difference in control group regarding of the mean and SD of total knowledge score in pre and posttest, P-value is (0.003), and there was high statistical significant difference in study group regarding of the mean and SD of total knowledge score in pre and posttest, P-value is (0.001).

Table (3): Shows that there was statistical significant difference between the level of knowledge score about puerperal sepsis of women in study group pretest and their residence, occupation and age at marriage. It was found that 60% of women who had good level of knowledge were from urban in comparison with (70%) of women who had poor level of knowledge were from rural, P-value is (0.049), and 50% of women who had good level of knowledge were employed in comparison with (94.1%) of women who had poor level of knowledge were housewives, P-value is (0.011), and 80% of women who had good level of knowledge got married at age ≥ 20 years in comparison with (76.5%) of women who had poor level of knowledge got married at age < 20 years, P-value is (0.012). It also noticed that there was high statistical significant difference between the level of knowledge score about puerperal sepsis of women in control group pretest and their level of education and age at marriage. It found that 50% of women who had good level of knowledge were university education in comparison with (42.1%) of women who had poor

level of knowledge were illiterate or only can read and write, P-value (0.001), and 62.5% of women who had good level of knowledge got married at age ≥ 20 years in comparison with (73.7%) of women who had poor level of knowledge got married at age < 20 years, P-value is (0.015).

Figure (1): Shows that there was no statistical significant difference between two groups as 80% of women in study group and 88% of women in control group have heard or read about puerperal sepsis before.

Figure (2): Shows that there was no statistical significant difference between two groups as 52.5% of women in the study group and 70.4% of women in the control group got information about puerperal sepsis through their relatives.

Figure (3): Shows that there was no statistical significant difference between two groups pretest regarding of total knowledge score of puerperal sepsis, 46% of women in the study group had fair knowledge and 38% of the women in the control group had poor knowledge, P-value is (0.204). Also there was no statistical significant difference between two groups posttest regarding of total knowledge score of puerperal sepsis, it found that 66% of women in study group and 60% of women in control group had good knowledge about puerperal sepsis; P-value is (0.778). This figure also shows that there was high statistical significant difference between pre and posttest in study group regarding of total knowledge score of puerperal sepsis, 66% of women had good knowledge posttest in comparison with (20%) of women had good knowledge pretest, P-value is (0.001). Also there was high statistical significant difference between pre and posttest in control group regarding of total knowledge score of puerperal sepsis, 60% of women had good knowledge posttest in comparison with (32%) of women had poor knowledge pretest, P-value is (0.001)

Results

Table (1) distribution of the studied women according to socio-demographic characteristics in study and control group (N= 100)

Socio-demographic characteristics	Study group		Control group		P-value
	N(50)	%	N(50)	%	
Age/years					
• 18-<25	9	18.0	13	26.0	
• 25-<35	30	60.0	31	62.0	0.331
• 35 or more	11	22.0	6	12.0	
Residence					
• Urban	15	30.0	17	34.0	0.668
• Rural	35	70.0	33	66.0	
Educational level:					
• Illiterate	11	22.0	8	16.0	
• Read and write	0	0.0	0	0.0	0.430
• Primary	20	40.0	16	32.0	
• Secondary education	7	14.0	13	26.0	
• University	12	24.0	13	26.0	
Occupation					
• Employed	9	18.0	2	4.0	0.025
• Housewife	41	82.0	48	96.0	
Age at marriage /years					
• < 20	30	60.0	24	48.0	0.229
• 20 or more	20	40.0	26	52.0	
Body mass index					
• < 25	0	0.0	0	0.0	0.001**
• 25- 30	14	28.0	35	70.0	
• > 30	36	72.0	15	30.0	

Table (2) distribution of the studied women according to mean and SD of knowledge about puerperal sepsis in pre and posttest in study and control group (N= 100)

Variables	Mean and SD of knowledge in pretest		Mean and SD of knowledge in posttest		P v 1	P v 2	P v 3	P v 4
	Study group	Control group	Study group	Control group				
	Mean ±SD	Mean ±SD						
General knowledge	2.32±1.87	2.50±1.56	3.56±1.31	3.56±1.31	0.209	NA	0.014*	0.225
Risk factors for puerperal sepsis	2.32±1.87	6.60±5.19	10.40±3.08	10.06±3.23	0.001**	0.741	0.001**	0.001**
Sites of infection	1.48±1.75	2.28±2.25	3.40±1.62	3.26±1.71	0.082	0.707	0.591	0.057
Method of infection	2.68±1.97	3.12±1.97	4.22±0.99	4.10±1.16	0.999	0.270	0.001**	0.001**
symptoms of puerperal sepsis	6.40±4.36	7.26±3.57	8.70±2.14	8.56±2.37	0.165	0.477	0.001**	0.005**
laboratory tests & complications	1.92±2.32	2.76±3.09	4.70±2.59	4.56±2.25	0.047*	0.327	0.443	0.028*
Treatment of puerperal sepsis	2.40±2.19	2.86±2.05	2.88±2.15	3.76±1.74	0.645	0.142	0.897	0.254
Preventive measures for puerperal sepsis	8.72±6.07	10.92±3.33	12.36±2.28	13.3±1.25	0.001**	0.001**	0.001**	0.001**
Total knowledge score	**32.36±23.28**	**38.30±19.15**	**52.08±12.55**	**51.0±12.44**	**0.175**	**0.951**	**0.001****	**0.003****

(*) statistical significant difference (**) highly statistical significant difference (NA) Not applicable
Pv1-- between study and control group in pretest Pv2-- between study and control group in posttest
Pv3-- between pre and posttest in study group Pv4-- between pre and posttest in control group

Table (3) relationship between level of knowledge score about puerperal sepsis in pretest and socio-demographic characteristics in study and control group (N= 100)

Variables	Level of knowledge in pretest							
	Study group				Control group			
	Good (10) N (%)	Fair (23) N (%)	Poor (17) N (%)	p-value1	Good (16) N (%)	Fair (15) N (%)	Poor (19) N (%)	p-value 2
Age/years								
• 18-<25	3(30.0)	4(17.4)	2(11.8)	0.416	3(18.8)	2(13.3)	8(42.1)	0.21
• 25-<35	4(40.0)	13(56.5)	13(76.4)		11(68.7)	12(80.0)	8(42.1)	1
• 35 or more	3(30.0)	6(26.1)	2(11.8)		2(12.5)	1(6.7)	3(15.8)	
Residence								
• Urban	6 (60.0)	4 (17.4)	5(29.4)	0.049*	7(43.8)	4(26.7)	6(31.6)	0581
• Rural	4(40.0)	19(82.6)	12(70.6)		9(56.2)	11(73.3)	13(68.4)	
Educational level:								
• Illiterate	1(10.0)	6(26.1)	4(23.5)		0(0.0)	0(0.0)	8(42.1)	
• read and write	0(0.0)	0(0.0)	0(0.0)	0.072	0(0.0)	0(0.0)	0(0.0)	0.00
• Primary	2(20.0)	10(43.5)	8(47.1)		5(31.2)	4(26.7)	7(36.8)	1**
• Secondary education	1(10.0)	2(8.7)	4(23.5)		3(18.8)	6(40.0)	4(21.1)	
• University	6(60.0)	5(21.7)	1(5.9)		8(50.0)	5(33.3)	0(0.0)	
Occupation								
• Employed	5(50.0)	3(13.0)	1(5.9)	0.011*	1(6.3)	1(6.7)	0(0.0)	0.52
• Housewife	5(50.0)	20(87.0)	16(94.1)		15(93.7)	14(93.3)	19(100.0)	7
Age at marriage /years				0.012*				0.01
• < 20	2(20.0)	15(65.2)	13(76.5)		6(37.5)	4(26.7)	14(73.7)	5*
• 20 or more	8(80.0)	8(34.8)	4(23.5)		10(62.5)	11(73.3)	5(26.3)	
Body mass index								
• < 25	0(0.0)	0(0.0)	0(0.0)	0.364	0(0.0)	0(0.0)	0(0.0)	0.48
• 25- 30	1(10.0)	7(30.4)	6(35.3)		11(68.7)	9(60.0)	15(78.9)	4
• > 30	9(90.0)	16(69.6)	11(64.7)		5(31.3)	6(40.0)	4(21.1)	

Figure (1) distribution of the studied women according acquired information about puerperal sepsis in study and control group (N= 100)

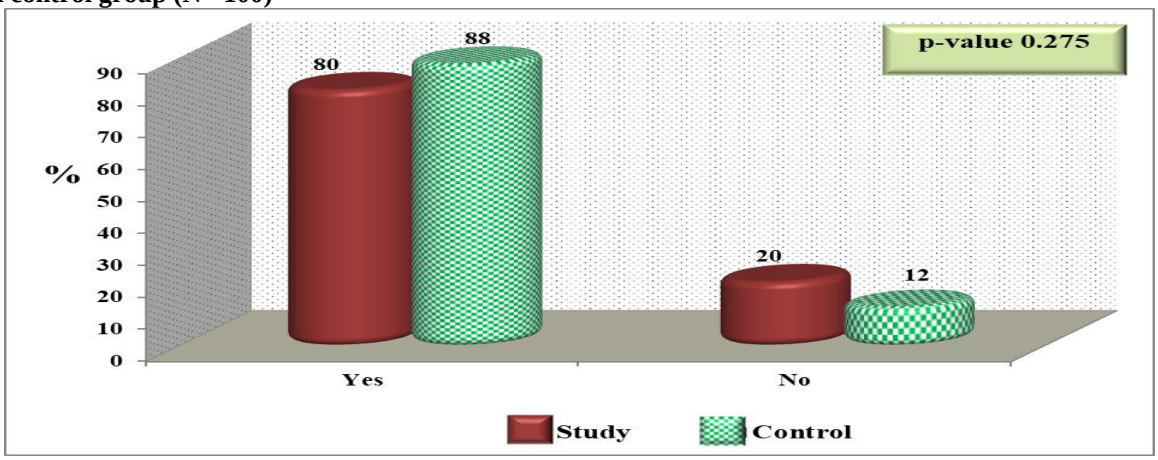


Figure (2) distribution of the studied women according to source of their information in pretest in study and control group (N= 100)

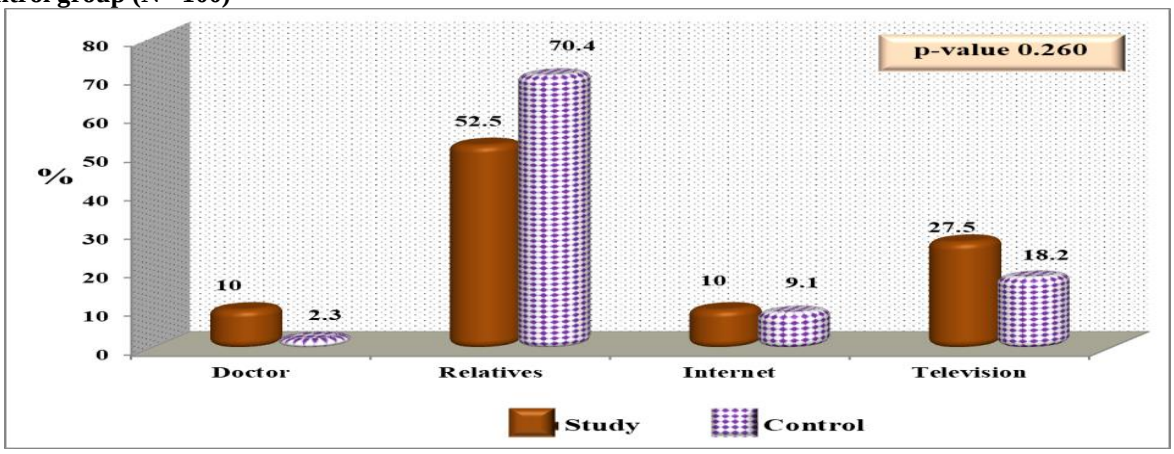
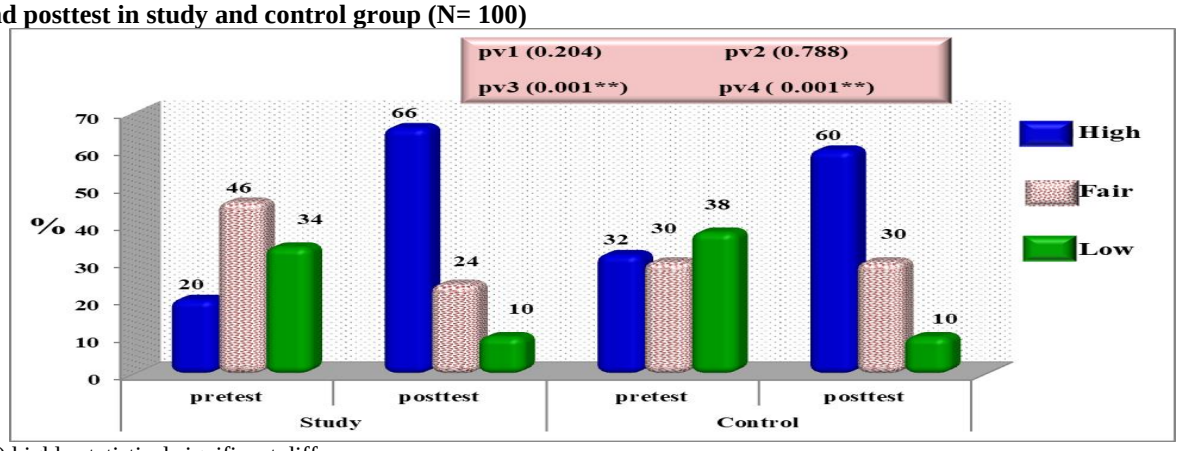


Figure (3) distribution of the studied women according to total knowledge score of puerperal sepsis in pre and posttest in study and control group (N= 100)



(**) highly statistical significant difference

Pv1-- between study and control group in pretest

Pv2-- between study and control group in posttest

Pv3-- between pre and posttest in study group

Pv4-- between pre and posttest in control group

Discussion

Puerperal sepsis is the fourth common cause of maternal mortality after postpartum bleeding, unsafe abortion and hypertensive disorder of pregnancy. It causes about 8% of maternal deaths Globally 6 million had developed puerperal sepsis and around 77,000 mothers died of it. Mother's susceptibility to developing an infection is related to such factors as caesarean section, prolonged labor, and obesity, anemia and poor prenatal nutrition. **(Sultana et al., 2018).**

Antenatal education for women during the third trimester of pregnancy is very important to avoid or decrease the incidence of complications during antenatal, intra natal and the postnatal period. On other hand, the awareness of the mothers towards postpartum complications had a lot of lacunae. So, there is scope for improvement by providing better care and health education for antenatal mothers at primary care. **(Varghese & Patwa, 2020)**

Based on the results on the present study, more than half of the studied women were in the age group 25-35 because this age is a reproductive age, and were rural. These findings are match with study that done by **(Gamel et al, 2020)** study was entitled " Impact of puerperal sepsis self-care nursing guideline on women's knowledge and practices" In the study who reported that more than the half of the women aged ranged between 28 – 33 years and most of them were rural.

Relation to education and occupation, most of the studied women in the current study were primary education and the majority of them were housewives so that they have more space time to take care of more children. these findings are match with study that done by **(Lalitha, 2016)** study entitled " A study

to assess the knowledge and practice of postnatal mothers on prevention of selected puerperal infections in a selected maternity hospital" In the study who reported that the majority of the studied mothers were with the educational status of primary education and most of them were housewives.

The findings also matched with study that done by (**Elsayed et al., 2023**) study was entitled " Effect of Antenatal Educational Package on Primiparous Women's Knowledge and Practices for Prevention of Selected Aspects Postpartum Complications" In the study who reported that more than half of pregnant women in study and control group were in the age ≥22 years with a mean age of 25.3±5.3& 22.8±3.3 years and most of both groups were housewife and subjected from rural area.

In the current study, the majority of studied women heard about puerperal sepsis before and their source of information about puerperal sepsis were their relatives such as their mother this may be due to that the mothers are the most one who had good relationship with their girls and she acts to transfer his knowledge and practices to her daughter. .Similarly in **(Sarkar et al., 2019),** study was entitled " A Descriptive Study to Assess the Knowledge and Practices Regarding Prevention of Puerperal Infection among Postnatal Mothers in Civil Hospital, Panipat, Haryana" and mentioned that near one half of the other studied women have received information from mothers and friends.

According to knowledge of the studied women in two groups about puerperal sepsis, the current study showed that there is highly statistical significant difference in two groups (study, control) between pre and posttest. Near one half of studied women in the study group had fair knowledge level. More than one half of studied women's knowledge is improved to a good level at the post-test after the implementation of the health instructions by using booklets with highly statistical significant difference P- value is (0.001). From a researcher point of view, the reason is that the majority of the studied sample in the study group were from rural areas who did not receive any kind of training of health education regarding puerperal sepsis and the improvement of their knowledge level could be attributed to that most women of the studied sample were interested with the health instructions booklet and this helped the women in the study group to refer to the booklet at any time and remember information about puerperal sepsis later. According to studied women in the control group, this study showed that near one half of the studied women in the control group had poor knowledge level at the pre-test period, and more than one half of studied women's knowledge is improved to a good level at the post-test test after the implementation of the health instructions by oral lectures with a highly statistical significant differences P- value is (0.001). From a researcher point of view, the reason is that the majority of the studied sample in the control group were also from rural areas who did not receive any kind of training of health education regarding puerperal sepsis and the improvement of their knowledge level could be attributed to that most women of the studied sample were interested with the oral information about puerperal sepsis. Similarly, this result matching with study done by **(Abdel-fattah et al., 2022),** study was entitled "Knowledge and Practice of Postpartum Mothers Regarding Puerperal Sepsis Prevention" revealed that there was a highly statistical significant improvement in mothers knowledge and practices regarding puerperal sepsis after applying the instructional guidelines, this evidence that these health instructions were effective in raising mothers knowledge regarding puerperal sepsis and improving their practices regarding puerperal sepsis prevention with ($p < 0.001$).

In the study group, the current study shows that there was a statistical significant relation between women's knowledge regarding puerperal sepsis and their residence and occupation. More than one half of women who were from urban areas had good level of knowledge at pretest compared to most of women from rural who had poor level of knowledge. This difference may be because urban residents may have better access to health information and maternal health services compared with rural residents. One half of women who had good level of knowledge regarding puerperal sepsis were employed at pretest compared to majority of women who had poor level of knowledge regarding puerperal sepsis were housewife. These findings on the same line with **(Bishaw et al., 2022),** study which had been entitled as " Prevention of puerperal sepsis in northwest Ethiopia: Knowledge and practice of postnatal women; A multicenter cross-sectional study" mentioned that postnatal women living in urban were 5.84 times more likely to be knowledgeable than those living in rural.

In the control group, this study revealed that there was a statistical significant relation between women's knowledge regarding puerperal sepsis and their educational level. One half of women who had university education had good level of knowledge at pretest compared to near one half of women who were illiterate had poor level of knowledge regarding puerperal sepsis. Similarly, this result matching with study which was done by **(Nchimbi & Joho, 2022),** the study was entitled "Puerperal

sepsis-related knowledge and reported self-care practices among postpartum women in Dar El-salam, Tanzania" revealed that a positive association between secondary education, college/university education, and reported self-care practice for prevention of puerperal sepsis.

Conclusion

Based on the findings of the current study, it was concluded that the health instructions program had a positive effect on knowledge among pregnant women regarding needs to know about puerperal sepsis and its prevention. So, an appropriate health education packages using oral lectures or booklets on puerperal sepsis during antenatal and labor and delivery by health caregivers should be considered to improve the knowledge of mothers about puerperal sepsis.

Recommendations

The study recommended that;

1- Implement special measures as: A) develop health education program for the pregnant and postnatal women based on their cultural and socio-demographic characteristics.

2- At the antenatal care units it is required to conduct a training health intervention regarding puerperal sepsis and how to prevent for maternity nurses in order to educate the women about postpartum care, and reduce maternal morbidity and complications.

3- To strength and generalize the findings further researches and similar studies in other places and on a larger sample size are still needed.

Limitations of the study:

Level of literacy in some women limit their ability to access or benefit from some parts in the educational booklet because of lack in their reading ability.

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