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Vol: 1 & Iss: 2

Research Article

Knowledge of Puerperal Sepsis and Self-Care Practices of Puerperal Sepsis Prevention among Postpartum Women in the Gurage Zone, Central Ethiopia

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Citation: Abera M, Tetema MD, Zeleke FT, et al. Knowledge of Puerperal Sepsis and Self-Care Practices of Puerperal Sepsis Prevention among Postpartum Women in the Gurage Zone, Central Ethiopia. *Arch Wom Health 2025;* 1(2): 63-70.

Received: 10 July, 2025; **Accepted:** 13 July, 2025; **Published:** 30 July, 2025

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A B S T R A C T

Background: Existing evidence indicated an increasing burden of puerperal sepsis in sub-Saharan Africa. Across the world, due to a lack of self-care practice and less attention to puerperal sepsis, postpartum women are exposed to major disorders and life-threatening conditions lead to a lower quality of life. Therefore, this study aimed to assess the knowledge of puerperal sepsis and self-care practices of puerperal sepsis preventions.

Methods: A facility-based cross-sectional study was conducted among 422 postpartum women in Gurage zone public hospitals from July to August 2024. A systematic sampling technique was employed in order to get the representative sample. Bivariable and multivariable logistic regression were done to identify factors associated with outcome variables; a p-value < 0.05 was considered statistically significant.

Result: In this study, the response rate was 98.8%. The overall good knowledge and self-care practice was found to be 40.8% (36%, 46%) and 29.3 % (25%, 34%), respectively. Educational status (AOR = 1.13; 95% CI, (1.10, 2.85) and AOR = AOR=2.1; 95% CI, (1.64, 5.43)), occupation (AOR = 2.01; 95% CI: 1.2, 3.4) and antenatal care contact (AOR = 1.3; 95% CI: 1.23, 2.97) were associated with knowledge of puerperal sepsis. Parity (AOR = 1.2; 95% CI, (1.04, 3.14)), antenatal care contact (AOR = 1.27; 95% CI, (1.15, 2.81)) and knowledge (AOR = 4.3; 95% CI, (2.14, 9.31)) were factors associated with the self-care practice of puerperal sepsis preventions.

Conclusions: This finding showed that 70.7% of postpartum women lacked good self-care practices of puerperal sepsis preventions. Hence, counseling and enhancing their knowledge of self-care practice should be provided to women to enhance their awareness regarding their knowledge and self-care practice of puerperal sepsis preventions.

Keywords: Postpartum women, Knowledge, self-care practice, Puerperal sepsis, Ethiopia

1. Introduction

World Health Organization (WHO) defined puerperal sepsis as a life-threatening condition due to organ dysfunction resulting from infection during pregnancy, childbirth, post-abortion or postpartum period[1,2]. Puerperal sepsis is manifested by pelvic pain or abdominal tenderness, fever, offensive vaginal discharge and delayed uterine involution[1]. History of pelvic infection, intra amniotic fluid procedures, prolonged spontaneous rupture of membrane, wound hematoma, retained products of conception & removal, multiple vaginal examinations, length of labor and mode of delivery were contributors to the occurrence of puerperal sepsis[3,4]. It is among the leading causes of maternal mortality worldwide and is a preventable cause of maternal morbidity and mortality in both developing and developed countries[4-6].

Nowadays, in addition to morbidity and mortality, puerperal sepsis is a major cause of long-term health problems such as Pelvic infection and infertility if not recognized and treated early[1,7,8]. It not only endangers the mother's well-being but also leads to financial burdens due to management costs, including hospital stays and medications. In addition, because of puerperal sepsis, the mother is unable to care for the infant which increases the occurrence of early neonatal loss[9,10]. Globally, an estimated 287,000 maternal deaths worldwide, with 70% accounts in sub-Saharan Africa, of which around 11.5% of maternal deaths were due to puerperal sepsis[11]. Even if Ethiopia made a striding change in maternal death over the last decades, in 2017 maternal mortality was 401 per 100,000, this is the death of about 12,000 mothers every year[12].

In developing nations, puerperal sepsis is the most common leading cause of maternal morbidity and mortality, accounting for 15% of maternal deaths. 13% of maternal mortality in Ethiopia is caused by puerperal sepsis[13-15]. The evidence showed that sepsis needs medical emergencies, early treatment and resuscitation. Health providers should give attention to the diagnosis of sepsis to prevent unexplained end-organ damage in the presence of an infectious process, regardless of the presence of fever and the treatment should be within an hour for life-saving[6]. Across the countries, the prevalence of puerperal sepsis is from 2%-24%[16-19], which leads to surgical intervention, multi-organ failure and death[4].

The previous findings showed that the majority of postnatal mothers had poor knowledge of the prevention of postpartum sepsis[20-23]. Beyond the care provided by healthcare providers, women's self-care plays a crucial role in influencing women's well-being during the postnatal period. Maternal self-care is the mother's capability to take care of herself, which includes proper nutrition, exercise, taking time to herself, when necessary, hygiene and physical appearance[24,25]. The current evidence indicated that postnatal women had poor self-care practices regarding puerperal sepsis prevention[20-22]. In addition, around three-quarters of postnatal women had poor practices of puerperal sepsis prevention[23,26].

A study conducted in Egypt indicated that less than 66.7% of the study participants had poor knowledge of puerperal sepsis. Furthermore, more than half of them had poor self-care regarding puerperal sepsis prevention[21]. Again, a study in Bangladesh showed the level of knowledge regarding puerperal sepsis and self-care practice levels was poor[22]. A study done in Tanzania indicated that 37.9% of postnatal women had poor knowledge of puerperal sepsis prevention and 88.6% of the women indicated poor self-care practices[23]. Furthermore, a study conducted in Arba Minch showed, that 54.4% of postnatal mothers had poor self-care of puerperal sepsis prevention[26].

Ethiopia aims to reduce maternal mortality to 279/100,000 by 2025, achieving a sustainable development goal (SDG) of 70/100,000 by 2030, by reducing 82% of direct causes including puerperal sepsis[27]. Previous studies did not assess the gap in women's knowledge of puerperal sepsis and self-care practices. Therefore, this study aimed to assess knowledge of puerperal sepsis and self-care practices of puerperal sepsis preventions among postpartum in Gurage zone, Central Ethiopia.

2. Methods and Materials

2.1. Study setting and period

A Facility-based analytical cross-sectional study was conducted in Gurage zone public hospitals, Central Ethiopia Region from July 1 to August 30, 2024. Gurage zone bordered on the southeast with Hadiya zone, on the west Yem special Woredas, on northeast Oromia Region and by the southeast Silte's Zone. According to the 2018/2019 annual report of the Gurage zone health office, there are 7 hospitals and 72 health centers serving the total population of the zone. Among these hospitals, five are primary hospitals, one general hospital and one compressive specialized hospital. All hospitals deliver comprehensive obstetrical and gynecological care[28]. The study was conducted from July to August in all Governmental hospitals found in Gurage Zone, Central Ethiopia, 2024.

2.2. Population

2.2.1. Source population: All postpartum women in the Gurage Zone public Hospitals.

2.2.2. Study population: All postpartum women in postnatal clinic and maternity unit in Gurage Zone public hospitals during study period.

2.2.3. Inclusion and exclusion criteria: All postpartum women in the postnatal clinic and maternity unit who were able to participate in the study and those who agreed to sign the written consent form.

All postpartum women who were seriously ill and those who disagreed to participate in study were excluded from the study.

2.3. Sample size determination and sampling techniques

The sample size was determined using a single population proportion formula by considering population proportion of 50% with 95% confidence interval and 0.05 margin of error.

$$n = \frac{(Z\alpha/2)2p(1-p)}{d2}$$

With the assumptions of 95% CI, 5% estimated knowledge of puerperal sepsis and self-care practices of puerperal sepsis preventions among postpartum women at 50% (P = 0.5) the formula yields = 384. The estimated p-value was selected to get the ideal sample size and give 422 with a 10% non-response rate. There are seven hospitals in the Gurage zone. Using simple random sampling procedures, five governmental hospitals were selected. The estimated total two months reported number of women who gave birth in each hospital were 925. Based on their case follow the sample was proportionally allocated to

each hospital. A systematic random sampling technique was used to select study participants. The sampling interval (K) was calculated by K = N/n, where N = the total average number of postpartum mothers, n = the actual sample size, which yields of two. Then, every second mothers interviewed with similar k value of two. The first study participant was selected by using a random sampling procedure (the lottery method) between the first two women who admitted to postnatal clinic and the maternity unit on the first day of data collection. Then, every second mother was enrolled in the study.

2.4. Study variables

- **Dependent variable:** Knowledge of Puerperal Sepsis and Self-Care Practices of Puerperal Sepsis Preventions
- **Independent variables:** Sociodemographic Characteri stics: Age, ethnicity, residence, religious, marital status, educational level, occupation, family wealth index. Obstetrics related Factors: Parity, number of ANC contact, place of ANC contact, gestational age at first ANC contact and place of birth.
- **Components of counseling received after birth:** Postpartum danger sign, nutrition, exclusive breast-feeding, immunization schedule, hygiene, exercise family planning. Counseling received on symptoms of puerperal sepsis: Fever, foul smelling of vaginal discharge and abdominal tenderness.

2.5. Operational definition

Puerperal sepsis is a genital tract infection that can occur anytime from the onset of membrane rupture or labor up to the 42nd day postpartum, characterized by pelvic pain, fever, abnormal vaginal discharge, foul odor or delayed uterine involution[1,7].

- **Knowledge of puerperal sepsis score:** Postpartum mothers who scored average score on correct knowledge questions were assumed to have a good knowledge of puerperal sepsis. Those who scored lower than the mean was assumed to have poor knowledge regarding puerperal sepsis[22,23,26].
- **Self-care practices of puerperal sepsis preventions:** postpartum mothers who scored the mean or above on the self-care practice 10 questions (yes-no) related to puerperal sepsis were considered to have a good self-care practice. However, contrarily, those who scored less than the mean score was considered to have poor self-care practices of puerperal sepsis prevention[23,26].

2.6. Data collection tool and procedures

The data collection tool was adapted from similar research on the outcome of interest and used for collecting data[22,23,26]. The questionnaire was prepared in an English version. Then, it was translated to the Amharic version and then, to the Guragigna language. After, it was translated back to the English version to check its consistency. Postpartum mothers' sociodemographic information, obstetrics-related factors, knowledge of puerperal sepsis-related questions and reported self-care practice of puerperal sepsis preventions questions were included in the tool. The overall knowledge score for each participant was calculated by summing the results from 12 questions, with a possible range of 0 to 12. The question items needed categorical responses (yes or no), with 1 point awarded for each correct answer and 0 for each incorrect answer.

The self-care practices were assessed based on practice-related questions and the overall mean was computed and dichotomized as postpartum mothers who scored above the mean value were considered to have good self-care practices which coded as "1" and those mothers who scored less than the mean value considered as a poor self-care practice which coded as"0". Data was collected through face-to-face interviews postnatal clinic. For data collection, two BSc midwives, two Nurses as data collectors and one MSc nurse supervisor were recruited those were able to speak Amharic and Guragigna local languages. Data collectors and supervisor received training on the study's objectives, questionnaire clarification, sampling strategy and data collection process and supervision. The principal investigator and supervisor guided, facilitated and checked data completeness, ensuring the overall activities were effectively managed.

2.7. Data quality management

The tool was pre-tested on 21 postpartum mothers at Wolkite Health center before the actual data collection to ensure consistency, clarity and completeness of tools. The two days orientation and training were given to both data collectors and supervisors by the researchers about the aims of the study, data collection procedures and how to fill out the tool. All data collectors were closely monitored throughout the data collection process. Then, the overall process was coordinated and controlled by the researcher. Data was coded, entered and rechecked during data entry into the computer software before analysis. Simple frequencies and a box plot were done to look for missing values and outliers, respectively.

2.8. Data analysis procedures

The data were thoroughly coded and carefully entered into the Epidata version 4.6 computer programs, then exported to SPSS version 26 for analysis. A descriptive statistical analysis was computed to summarize and describe the characteristics of the study participants and the information was presented using text, frequency tables and figures. The dependent variable, knowledge of puerperal sepsis and reported self-care practices were dichotomized into good and poor based on the analyzed mean values.

A logistic regression model was fitted to compute if there is any relation between Outcome and the independent variables. All predictor's variables in binary logistic regression with a p-value of 0.25 or less were candidate for a multivariable logistic regression analysis. In this study, the adjusted odds ratio with 95% confidence intervals and a p-value less than 0.05 was accepted to declare the association between outcome and predictors variables and statistically significant. Moreover, multivariable logistic regression performed by the enter method was applied to compute variables in the final model.

In addition, model fitness was confirmed by using the Hosmer and Lemeshow Goodness of Fit test with a p-value of 0.461 with omnibus tests of model coefficients value less than 0.0001 and 0.523 with omnibus tests of model coefficients value less than 0.0001 for knowledge and reported self-care practices of puerperal sepsis prevention respectively. Finally, there was no multicollinearity among covariate variables, with a VIF of less than two for all independent variables. Finally, the results were presented in tables, graphs and figures.

2.9. Ethical approval and consent to participants

Ethical clearance was obtained from the Wolkite University, College of Medicine and Health Sciences Ethics Committee (Ref no WKU-CMHS REC 025/2024). A formal letter of permission was obtained from Wolkite University to Zonal Health Office and the hospitals to allow the execution of the research. The study was conducted following the ethical standards of the Declaration of Helsinki. An ethical letter was written to Gurage zone public Hospitals to obtain permission for data collection. The purpose of the study and participants' right to refuse was explained to the study participants and informed written consent was obtained. Additionally, informed consent was gathered from parents or guardians of participants under 18 years old. Coding was implemented to remove respondents' names and other personal identifiers throughout the study to ensure participant confidentiality.

3. Results

Among a total sample of 422 study participants, 417 were interviewed and gave a response rate of 98.8% and the results were presented as follows under subheadings.

3.1. Socio-demographic characteristics of the study participants

Nearly two-fifths of respondents were in the age group of 25-29 years, with a mean age of 27 years (27 ± 2.1SD). More than three-fourths of women were Gurage in ethnicity 320 (76.7%), more than half were urban in residence 216 (51.8%), nearly half were orthodox in religion 194 (46.5%), nearly one-third had attended primary school concerning their educational level 124 (29.7%) and nearly two-fifths of respondent's family wealth index was high 161 (38.6%) **(Table 1)**.

3.2. Obstetrics characteristics of study participants

More than half of the study participants were Primparous in parity 236 (56.6%), three-fifths had ANC contact of eight or more 250 (60%) and more than three-fourths started their ANC follow-up during the first trimester 320 (76.7%). Most of the study participants had received counseling after delivery **(Table 2)**.

3.3. Women who received counseling on symptoms of puerperal sepsis

Nearly half of the participants were counseled on fever (49.6%), more than half on foul-smelling vaginal discharge (51.1%) and only one-fifth on abdominal tenderness as those all are symptoms of puerperal sepsis and need treatment at a health facility **(Figure1)**.

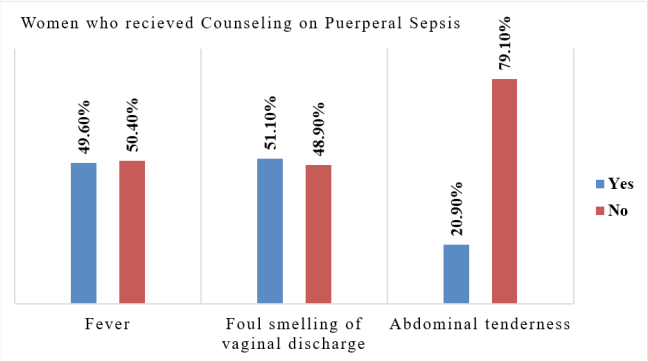

Figure 1: Women who received counseling on symptoms of puerperal sepsis from health care providers in Gurage Zone public hospitals, Central Ethiopia, 2024.

Table 1: Socio-demographic Characteristics of Study Participants among postpartum Women in Gurage zone public hospitals, Central Ethiopia, 2024.

Characteristics	Category	Frequency	Percent (%)
Age	15-24	79	18.9
	25-29	164	39.3
	30-34	121	29.1
	≥35	53	12.7
Ethnicity	Gurage	320	76.7
	Amhara	55	13.2
	Silte	35	8.4
	Others*	7	1.7
Place of residence	Urban	216	51.8
	Rural	201	48.2
Religion	Orthodox	194	46.5
	Muslim	147	35.3
	Protestant	62	14.8
	Others**	14	3.4
Marital status	Married	409	98.1
	Single	8	1.9
Educational level	No formal education	92	22.1
	Primary education	124	29.7
	Secondary education	91	21.8
	Diploma and/ above	110	26.4
Occupation	Unemployed	123	29.5
	Private work	135	32.4
	Employed	159	38.1
Family Wealth Index	Low	121	29.0
	Medium	135	32.4
	High	161	38.6

* =Welayita, Kembata oromo **= Adventist, Catholic

3.4. Women's knowledge regarding puerperal sepsis

The overall women's knowledge level towards puerperal sepsis was 40.8% (36%, 46%). Less than half of the study participants were knowledgeable about puerperal sepsis **(Figure 2)**.

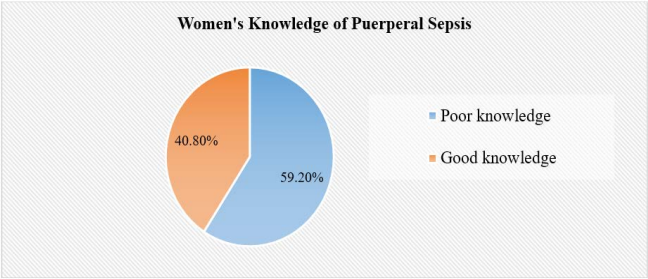

Figure 2: Women's Knowledge towards Puerperal Sepsis in Gurage Zone public hospitals, Central Ethiopia, 2024.

3.5. Factors associated with women's knowledge of puerperal sepsis

Binary logistic regression analysis was done to identify candidate variables for multivariable logistic regression at a P-value of 0.25 and variables like residence, Family wealth index educational level, occupation, parity and ANC contact were identified as; candidate variables for multivariable logistic

analysis. All candidate variables were entered together into a multivariable logistic regression using the enter method to determine final predictors of women's knowledge of puerperal sepsis by controlling the potential confounders. In multivariable analysis, three variables, including educational level, occupation and ANC contact were found to be statistically significantly associated with women's knowledge of puerperal sepsis after confounders were adjusted in the final model.

Table 2: Obstetrics Characteristics of Study Participants among postpartum Women in Gurage zone public hospitals, Central Ethiopia, 2024.

Variables	Category	Frequency (n=417)	Percent (%)
Parity	Primparous	236	56.6
	Multiparous	181	43.4
Number of ANC contact	<8 ANC contact	167	40.0
	≥8 ANC contact	250	60.0
Place of ANC contact	Hospital	203	48.7
	Health center	174	41.8
	Private clinic	40	9.5
Gestational age at first ANC contact	First trimester	320	76.7
	Second trimester	97	23.3
Recent baby's place of birth	Hospital	327	78.4
	Health center	87	20.9
	Home	3	0.7
Counseling received after birth			
Postpartum danger sign	Yes	401	96.2
	No	16	3.8
Nutrition	Yes	319	76.5
	No	98	23.5
Exclusive breastfeeding	Yes	409	98.1
	No	8	1.9
Immunization schedule	Yes	413	99.0
	No	4	1.0
Hygiene	Yes	303	72.6
	No	114	27.4
Exercise	Yes	28	6.8
	No	389	93.2
Contraceptive methods	Yes	414	99.2
	No	3	0.8

Women who attended, secondary school and diploma and above education were, 1.13 and 2.1 times (AOR=1.13; 95% CI, (1.10, 2.85) and AOR=2.1; 95% CI, (1.64, 5.43) more likely have had good knowledge regarding puerperal sepsis than those who did not attend formal education respectively. The odds of having a good knowledge of puerperal sepsis were two times (AOR = 2.01; 95%CI: 1.2, 3.4) higher in women who were employed as compared to unemployed. Women who had ≥8 ANC contacts were 1.3 times (AOR = 1.3; 95% CI: 1.23, 2.97) more likely to have had good knowledge of puerperal sepsis as compared to their counterparts **(Table 3)**.

3.6. Women's self-care practice of puerperal sepsis preventions

The overall level of self-care practices for puerperal sepsis preventions was 29.3 % (25%, 34%). More than two-thirds (70.7%) of women lacked good self-care practices for prevention of puerperal sepsis **(Figure 3)**.

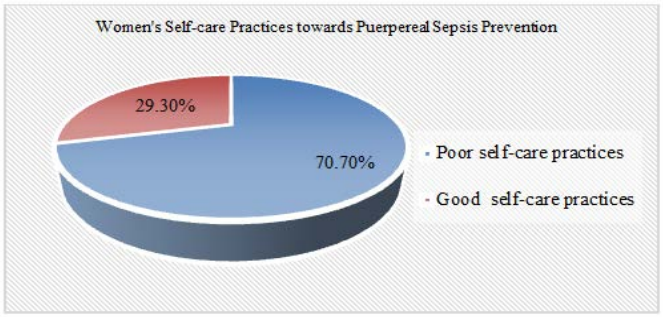

Figure 3: Women's Self-Care Practice towards Prevention of Puerperal Sepsis in Gurage Zone public hospitals, Central Ethiopia, 2024.

Table 3: Factors associated with Women's Knowledge of Puerperal Sepsis in Gurage Zone public hospitals, Central Ethiopia, 2024 (n = 417).

Knowledge of Puerperal Sepsis					
Variables	Good (%)	Poor (%)	COR [95% CI]	AOR [95% CI]	P-value
Family wealth index					
Low	26(22.3)	95 (77.7)	1	1	
Medium	44 (31.9)	91 (68.1)	1.76 [0.9, 2.85] *	1.50 [0.98, 2.29]	
High	51 (32.3)	110 (67.7)	1.69 [1.07, 3.85] *	1.23 [0.85,3.34]	
Educational status					
No formal education	30 (32.6)	62 (67.4)	1	1	
Primary education	40 (32.3)	84 (67.7)	0.98 [0.53, 4.75] *	0.61 [0.30, 3.46]	
Secondary completed	36 (39.6)	55 (60.4)	1.35 [1.21,4.47] *	1.13 [1.10, 2.85]	0.042**
Diploma and above	64 (58.2)	46 (41.8)	2.87 [1.61, 7.12] *	2.1 [1.64, 5.43]	0.001**
Residence					
Rural	74 (36.8)	127 (63.2)	1	1	
Urban	96 (44.4)	120 (55.6)	1.37 [0.92, 2.03] *	1.21 [0.88, 2.04]	
ANC contact					
< 8 Contact	80 (33.9)	156 (66.1)	1		
>= 8 contact	90 (49.7)	91 (50.3)	1.93 [1.29,4.86] *	1.31 [1.23, 2.97]	0.002**
Parity					
Primparous	65 (38.9)	102 (61.1)	1	1	
Multiparous	105 (42)	145 (58)	1.13 [0.96, 1.69] *	1.01 [0.9,2.14]	
Occupation					
Unemployed	39 (31.7)	84 (68.3)	1	1	
Private work	56(41.5)	79 (58.5)	1.5 [0.9, 2.54] *	1.6 [0.97-2.85]	
Employed	75 (47.2)	84 (52.8)	1.92 [1.17, 5.14] *	2.01 [1.2,3.4]	0.008**

*(P<.0.25) in bivariate, 1 = Reference group, ** = statically significant in multivariable analysis.

3.7. Factors associated with self-care practices of puerperal sepsis prevention

Binary logistic regression analysis was done to identify candidate variables for multivariable logistic regression at a P-value of 0.25 and variables like educational level, occupation,

family wealth index, parity, NC contact and women's knowledge of puerperal sepsis were identified as; candidate variables for multivariable logistic analysis. All candidate variables were entered together into a multivariable logistic regression using the enter method to determine final predictors of women's self-care practices of puerperal sepsis prevention by controlling the potential confounders.

In multivariable analysis, three variables, including multiparous, ≥8 ANC contact and women's knowledge of puerperal sepsis were found to be statistically significantly associated with women's self-care practices of puerperal sepsis prevention after confounders were adjusted in the final model. Women who were multiparous 1.2 times (AOR=1.2; 95% CI, (1.04, 3.14) were more likely to have good self-care practices of puerperal sepsis prevention than those who were Primparous. Women who attended ≥8 ANC contact were 1.27 times (AOR = 1.27; 95% CI, (1.15, 2.81) more likely to have had good self-care practices of puerperal sepsis prevention as compared to their counterparts.

Postpartum women who have good knowledge 4.3 times (AOR = 4.3; 95% CI, (2.14, 9.31) are more likely to have had good self-care practices of puerperal sepsis prevention as compared to those who have poor knowledge of puerperal sepsis **(Table 4)**.

*(P<.0.25) in bivariate analysis, 1 = Reference group, ** = statically significant in multivariate analysis.

4. Discussion

This study revealed that the overall magnitude of women who had a good knowledge of puerperal sepsis and reported self-care practices was 40.8% (36%, 46%) and 29.3% (25%, 34%) respectively. That means 59.2 % and 70.7% lacked good knowledge of puerperal sepsis and self-care reported practices respectively. This finding is higher than study conducted in Tanzania (11.4%) and Minia University Hospital, Egypt (25.3%) (20,23). On the other hand, this result is lower than study conducted in Arba Minch, Ethiopia (45.6%). The discrepancy might be due to: small sample size, study setting and study year interval, variation in socioeconomic status and sociodemographic background of participants, this might explain the reason for variation with the present study.

Regarding the knowledge of puerperal sepsis, in this study, 59.2% lacked a good knowledge of puerperal sepsis. This finding is higher than study done in Minia university hospitals, Egypt (12.6%)[20]. The discrepancy might be due to: small sample size, study setting and study year interval, variation in socioeconomic status and sociodemographic background of participants, this might be the possible reason for variation with the present study. Women who attended, secondary school, diploma and above education were,1.13 and 2.1 times more likely have had good knowledge regarding puerperal sepsis than those who did not attended formal education respectively. These findings supported by study done in Bangladesh, Tanzania, Arba Minch Town, Minia University Hospital, Egypt respectively[20,22,23,26]. The evidence showed that women's knowledge increased as the level of their education increased[22,23].

In this study, respondents who were employed were 1.3 times more likely to have good knowledge of puerperal sepsis as compared to unemployed. The possible explanation is those women who are employed has an information regarding puerperal sepsis and as well as access to quality healthcare than unemployed women[29]. Women who had ≥8 ANC contacts were 1.3 times more likely to have had good knowledge of puerperal sepsis as compared to their counterparts. This might be as ANC contact increases the chance to have information from health care personnel increases, which enhance their knowledge of puerperal sepsis. This is supported by study done in Hadiya Zone and Uganda[30,31].

Table 4: Factors associated with Women's Self-Care Practices of Puerperal Sepsis Prevention in Gurage Zone Public Hospitals, Central Ethiopia, 2024 (n = 417).

Reported Self-Care Practices					
Variables	Good (%)	Poor (%)	COR [95% CI]	AOR [95% CI]	P-value
Occupation					
Unemployed	28 (22.8)	95(77.2)	1	1	
Private work	43(31.9)	92(68.1)	1.58 [0.9, 2.76] *	1.6[0.97-2.85]	
Employed	51(32.1)	108 (67.9)	1.60 [1.03, 3.74] *	0.91 [0.83,2.47]	
Educational status					
No formal education	21 (22.8)	71(77.2)	1	1	
Primary education	32 (25.8)	92 (74.2)	1.17 [0.62, 2.21] *	1.01 [0.50, 2.87]	
Secondary completed	30 (33.0)	61 (70.0)	1.66 [0.86,3.19] *	0.97 [0.81, 2.65]	
Diploma and above	39 (35.5)	71 (64.5)	1.86 [1.20, 3.46] *	1.22[0.79, 3.43]	
ANC contact					
< 8 Contact	61 (25.8)	175 (74.2)	1		
>= 8 contact	61 (33.7)	120 (66.3)	1.46 [1.23,4.21] *	1.27 [1.15, 2.81]	0.02**
Parity					
Primparous	43 (25.7)	124 (74.3)	1	1	
Multiparous	79 (31.6)	171 (68.4)	1.33 [1.08, 4.67] *	1.20 [1.04,3.14]	0.01
Family wealth index					
Low	27(22.3)	94 (77.7)	1	1	
Medium	43 (31.9)	92 (68.1)	1.63 [0.9, 2.85] *	1.50 [0.98, 2.29]	
High	52 (32.3)	109 (67.7)	1.66 [1.07, 3.85] *	1.23 [0.85,3.34]	
Women's Knowledge of puerperal sepsis					
Poor	30 (12.1)	117 (87.9)	1	1	
Good	92 (54.1)	78 (45.9)	8.5 [5.24, 13.7] *	4.3[2.14, 9.31]	0.003**

Regarding the self-care reported of puerperal sepsis prevention, 70.7% lacked good reported self-care practices of puerperal sepsis prevention. Women who were multiparous 1.2 times were more likely to have good self-care practices of puerperal sepsis prevention than those who were Primiparous. This is inconsistent with study done in Arba Minich Town[26]. The possible explanation of this discrepancy, those women who have more labor and delivery experience, have the ability to self-

care regarding their wellbeing and their children. The evidence showed that women's experience and confidence often enhance to better self-care practices, both during pregnancy and after childbirth[32].

Women who attended ≥8 antenatal care contact were 1.27 times more likely to have had good self-care practices of puerperal sepsis prevention as compared to their counterparts. The possible explanation for this is as ANC contact increases the chance to have information regarding to puerperal sepsis prevention self-care from health care personnel increases, which enhance their self-care practices of puerperal sepsis. The evidence showed that, as ANC contact increases their level of self-care practice increases[23,31].

Postpartum women who have good knowledge 4.3 times are more likely to have had good self-care practices of puerperal sepsis prevention as compared to those who have poor knowledge of puerperal sepsis. This supported by study done in Arba Minch, Tanzania and Egypt[20,23,26]. The possible explanation for this is empowering women with knowledge can enhance informed decisions and protect their health and well-being during postpartum periods, potentially preventing puerperal sepsis[33].

5. Strengths and Limitations of the study

5.1. Strength of the study

Measurements of the women's knowledge of puerperal sepsis and self-care practice of puerperal sepsis prevention included both multigravida and primigravida women.

Up to the knowledge of the investigator, there has been no study conducted in the study setting. In this study, potential biases were minimized by using clear objectives, research questions, pretested questionnaires, training provided for data collectors and supervisor, random sampling method and ideal sample size and statistical adjustments (multivariable regression) to account for confounding variables. Finally, ethical guidelines were implemented to ensure unbiased participants.

5.2. Limitations of the study

- This study has the same limitations as other studies that are based on cross-sectional data.
- There is a possibility of recall bias among study participants on the self-care practice of puerperal sepsis preventions since the study was self-reported.
- Since the cross-sectional study, the study does not show cause-and-effect relationships.

6. Conclusion and Recommendations

6.1. Conclusion

This study showed that, 59.2 % and 70.7% of postpartum women lacked good knowledge and self-care practices of puerperal sepsis preventions. Women's primary role in puerperal sepsis self-care is to improve their well-being and, indirectly, that of their fetus and families. The educational status, women's occupation and antenatal contact were significantly associated with the women's knowledge of puerperal sepsis and parity, antenatal contacts and knowledge of puerperal sepsis were significantly associated with self-care practices of puerperal sepsis prevention. As a result, the study concludes that by intervening in the able factors, postpartum women's awareness regarding self-care practices can be increased.

6.2. Recommendations

The following recommendations were given based on the above results to the concerned bodies:

- **To the ministry of education:** Facilitate means to enhance postpartum women's education and knowledge level through strengthening public education that targets improving the level of self-care practice of puerperal sepsis prevention.
- **To regional, zonal and woredas health offices:** The health office should work to improve the self-care practice of puerperal sepsis among mothers by enhancing health education and importance of antenatal care contact through various programs such as having women's conferences at the health facility and delivering information via local media.

To encourage in-service training for postpartum women during postnatal visit to update their knowledge, improve their ability to care for themselves, enhance self-care practices and avoid unhealthy lifestyle practices.

- **At the community level:** It is encouraged in the area to participate in improving women's self-caret practices for puerperal sepsis preventions by improving their educational status and thinking about proper home self-care as a culture.
- **To Gurage zone public hospitals and health care providers:** It is encouraged to extend health education and counseling to enhance postpartum women's self-care of puerperal sepsis preventions. To design a health education program on puerperal sepsis and their self-care strategies at both the facility and community levels.
- **For the researcher:** A longitudinal study and qualitative study need to be done to identify important factors and a better understanding of women's self-care practices of puerperal sepsis with a large sample size. Besides, the current study recommends further research to investigate the unsafe practices related to puerperal sepsis during postpartum and their effect on the mother.

7. Acknowledgments

The authors would like to thank Wolkite University for giving us the opportunity to conduct the research and for granting ethical approval. Authors also extend our gratitude to study participants, data collectors and supervisor for their unreserved efforts and willingness to participate in this research study.

8. Abbreviations

ANC: Antenatal care, **ACOG:** American College of Obstetrics and Gynecology, **SDG:** Sustainable Development Goal, **SPSS:** Statistical Package for Social Science, **WHO:** World Health Organization.

9. Authors' Contributions

MA, MDS and ABD wrote the proposal, participated in data collection supervision, analyzed the data and drafted the paper. MA, KN, DT, ABT, TGG, MAW, MGS, FTZ, MOG and OD approved the proposal with some revisions, participated in data analysis and revised subsequent paper drafts. MA, ABD, MDT and MDS commented on the final paper and manuscript. All authors read and approved the manuscript.

9.1. Funding statement

The author(s) received no financial support for this article's research, authorship and/or publication.

9.2. Conflict of interest statement

There is no potential conflict of interest concerning the research, authorship and/or publication of this article.

9.3. Informed consent

Written informed consent was obtained from all study participants.

9.4. Consent for Publication

Not applicable.

9.5. Data availability

Data that support the findings are available from corresponding author upon a reasonable request.

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