

Determinants of Utilization of Preconception Care among Pregnant Women Attending Antenatal Care in Gondar Town, Northwest Ethiopia: A Multicenter Study



Selam Yibeltal Desalegn^{1*}, Mastewal Belayneh Akilil², Tazeb Alemu Anteneh², and Wubedle Zelalem Temesgan²

¹Department of midwifery, school of nursing and midwifery, College of Medicine and Health sciences, Wollo University, Dessie, Ethiopia

²Department of Clinical Midwifery, School of midwifery, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia

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***Corresponding author:** Selam Yibeltal Desalegn, Department of midwifery, school of nursing and midwifery, College of Medicine and Health sciences, Wollo University, Dessie, Ethiopia. Email: selamyibe2017@gmail.com

Abstract

Introduction: Preconception care (PCC) is the provision of biomedical, behavioural and social health interventions to women and couples before conception occurs. Preconception care has not been widely implemented especially in low and middle- income countries. In Ethiopia little is known about women's utilization of preconception care. Therefore, this study aimed to assess utilization of preconception care and associated factors among pregnant women.

Methods: An institutional-based cross-sectional study was conducted on 407 pregnant women who were attending antenatal care service from February 15-30/2022. A systematic random sampling technique was used to select the study participants. A structured, pretested, and interviewer-administered questionnaire was used to collect the data. Epi-data version 4.6 was used to enter the acquired data, which was subsequently exported to SPSS version 25 for analysis. A multivariable logistic regression model was fitted and AOR with 95% CI was computed to determine the level of significance.

Results: Prevalence of preconception care utilization was 27.9% [95% CI (23.6, 32.5)]. Maternal age 35 and above (AOR=3.57, 95% CI 1.58, 8.09), chronic medical illness (AOR= 4.70, 95% CI 1.72, 12.88), good knowledge (AOR= 3.23 95% CI, 1.15, 9.08), and favorable attitudes toward preconception care (AOR=1.65 95% CI, 1.01, 2.70) were significantly associated with utilization of preconception care.

Conclusion: The utilization of preconception care is low in the study area. Relevant stakeholders should strive to improve the use of preconception care by improving women's knowledge and attitudes about the use of service. Information, health education, and the creation of awareness should be strengthened in the communities about preconception care.

Keywords: Ethiopia; Pregnant Women; Preconception Care Utilization; Health Education; Detection

Abbreviation: AOR: Adjusted Odds Ratio; CI: Confidence Interval; COR: Crude Odds Ratio; HIV: Human Immune deficiency Virus; LMIC: Low- and Middle-Income Countries; PCC: Preconception Care; SPSS: Statistical Package for Social Science; and WHO: World Health Organization

Introduction

Preconception care (PCC) is the provision of biomedical, behavioural and social health interventions to women and couples before conception occurs. It strives to raise their health status and lower the environmental, behavioral, and individual factors that lead to poor mother and child health outcomes. The goal is to improve maternal and infant health in both the short and long timeframes. Preconception care is widely acknowledged as a means of enhancing the health of women worldwide and the success of pregnancies. An evidence-based intervention, PCC

focuses on the crucial stages of a baby's organ development [1]. Preconception care provides a window of opportunity for early risk detection, counseling, intervention, or management for the risks identified, and, if necessary, referral to specialized prenatal care. This can improve a woman's health prior to, throughout, and after giving birth [2]. It is the first time that maternal and infant health has been linked. Preconception care could result in large health and social benefits in Low- and Middle-Income Countries (LMIC) [3].

In 2017, there were 295,000 maternal deaths globally. Together, Sub-Saharan Africa and Southern Asia make up around 86% of the estimated global maternal mortality rate, with Sub-Saharan Africa making up 66% of that total. Of a similar vein, there were 5.3 million deaths in children under the age of five in 2018, 2.5 million of which occurred in the first month [4,5]. Around 287,000 women died in 2020 during and after pregnancy and childbirth. Nearly 95% of all maternal deaths in 2020 occurred in low- and middle-income countries, and most could have been prevented. The MMR in low-income countries was 430 per 100 000 live births in 2020 compared to 12 per 100 000 live births in high-income countries [6]. Factors like maternal diet and nutritional status, which can be changed before conception, have a considerable impact on the intrauterine environment and fetal growth [7]. PCC assists in reducing maternal adverse pregnancy outcomes (abortion, anemia during pregnancy, maternal death, etc.), as well as newborn and infant bad pregnancy outcomes (low birth weight, preterm baby, stillbirth, neonatal and child mortality, etc) [8,9]. In fact, it is strongly associated with increased utilization of other services, such as ANC, labor and delivery, and postpartum care [10]. Despite all these advantages and the WHO's recommendation, PCC has not been widely adopted, especially in LMIC [8,11]. Women in developing nations may experience a four-fold increase in their risk of having kids with neural tube abnormalities compared to women in wealthy nations due to poor preconception care and insufficient folic acid intake, while folic acid therapy can reduce this risk by up to 80% [12].

In general, preconception care is used differently around the world. A study in Southern Sri Lanka on preconception care use revealed that 27.2% of women had received PCC [13]. Another cross-sectional study done in Kelantan; Malaysia indicated that 45.2% had good practices of PCC [14]. Studies conducted in different regions of Ethiopia indicate a poor overall preconception care usage rate. For instant, the cross-sectional studies done in Debre Birhan town, and in Hosanna town revealed that the overall utilization of preconception care was 13.4% [15], 19% [16], respectively. Utilization of preconception care is linked to several factors, including prior use of family planning, prior history of unfavorable birth outcomes, maternal knowledge of preconception care, receiving preconception care counseling, woman's age, and marital status [15, 16].

In underdeveloped nations like Ethiopia, the use of preconception care is practically nonexistent [17]. In Ethiopia little is known about women's utilization of PCC. Although studies have been conducted on the uptake of preconception care, the reports indicate low uptake of preconception care, this may be due to the lack of promotion of PCC and insufficient attention to PCC implementation by the health care system and lack of preconception clinics at the health facility level. Thus, there is a need to address the barriers to increase the attention

of policymakers and other stakeholders to increase PCC uptake. According to the researchers' best search, there hasn't been any study done in the study area on utilization of PCC. Therefore, this study was aimed to at determining the prevalence of utilization of PCC and associated factors among pregnant women in Gondar town, Northwest Ethiopia.

Methods

Study Design, Period and Settings

An institutional-based cross-sectional study was conducted in Gondar town public health institutions, from February 15-30, 2022. According to the population projection of Ethiopia for all regions at woreda level from 2014 - 2017, the total population of the town was estimated to be 306,246. Among these 149,970 males and 156,276 are females. There is 1 governmental specialized hospital, 8 governmental health centers, 22 health posts, 1 private primary hospital and 1 general hospital serving in the region and other nearby regions. All public health institutions in the town provide antenatal care services.

Study Population

All pregnant women attending ANC at Gondar town public health institutions during the data collection period.

Sample Size Determination and Sampling Procedure

Sample size was determined using the assumptions of a single population proportion formula considering the following assumptions: the utilization of PCC-19%, (16) level of confidence-95%, and margin of error-4%.

$$\begin{aligned} &\text{Therefore, the sample size (n)} \\ &= \frac{(Z\alpha / 2)^2 p(1-p)}{d^2} = \frac{(1.96)^{2*} 0.19(1-0.19)}{(0.04)^2} = 370 \end{aligned}$$

After considering a non-response rate of 10 %, a total sample size was 407.

In Gondar town, there is one specialized referral hospital and eight public health centers. First, all public health facilities in Gondar town were considered. Then, the calculated sample size was proportionally allocated to each health facility based on the number of pregnant women that visited health facilities during the preceding month before data collection. A systematic random sampling technique was used to select all eligible pregnant women. The skipping interval (Kth) was determined for each institution by dividing the estimated average number of women who visited for ANC follow-up in each public health institution during the study period (Ni) by the proportionally allocated sample size of each institution (ni), which was the same, K giving 3.02 (roughly 3) for all health institutions. Using a lottery method, the first case was chosen at random. The required sample size from each institution

was then obtained by taking every third unit.

Variables of the Study

Utilization of PCC was the outcome variable whereas maternal age, occupational status of the women, educational level of the women, marital status, religion, residence, husband educational level, husband occupation, average household monthly income, gravidity, parity, gestational age, planning of current pregnancy, mode of previous delivery, history of abortion, history of stillbirth, medical illness, PNC utilization during previous birth, ever use modern family planning, previous adverse pregnancy outcome, husband's support, availability of unit for preconception care, counselling on preconception care previously, knowledge on preconception care, attitude towards preconception care, intimate partner violence, and social support were independent variables.

Operational Definitions

Preconception care utilization: If women received any interventions either advice or treatment, and lifestyle modification regarding components of preconception care at least once before being pregnant [15]. Preconception care components for this study was include HIV testing and counseling, STI screening and treatment, infertility/sub-fertility treatment, nutrition, ferrous supplementation, immunization, advice on cessation of alcohol, advice on cessation of cigarette smoking. **Attitude on PCC:** Women attitude towards preconception care was measured using 12 likert scale questions with five scales. The score was (strongly agree=5, agree=4, neutral=3, disagree=2, and strongly disagree=1) for positive statements and vice versa for negative statements and the total score ranged from 12–60 points. Those respondents who scored less than mean and \geq mean was labeled as “unfavorable attitude” and “favorable attitude” respectively [16].

Knowledge on PCC: Women's knowledge of preconception health care was measured using 20 items of preconception health care questions. **Good Knowledge:** Where a participant answered “yes” or “no” to all or any questions. Based on the answers to those questions, the index knowledge was categorized as having good knowledge (score 10–20). **Poor Knowledge:** Participants were categorized as having poor knowledge if they scored less than 10 [18]. **Intimate partner violence:** If the respondent said “yes” to any of the areas of sexual, psychological, and physical violence, or a combination of the three compulsions, regardless of the legal status of the relationship with the current/former intimate partner, this was considered intimate partner violence [19].

Social support: Is defined as the physical and psychological comfort that other people provide. The measurement was based on the three-point Oslo scale for social support [20]. Oslo Social Support Scale (OSS-3) scores ranged from 3–14 with a score of 3–8, poor support; 9–11, moderate support; and 12–14, strong support [21].

Data Collection Tool, Procedures

Face-to-face interviews were used to collect the data using a structured, pretested, and interviewer-administered questionnaire. Nine BSc midwives and one MSc clinical midwife were recruited for data collection and supervision respectively. The questionnaire was prepared by reviewing different literatures. The questionnaire used for this study consists of sociodemographic characteristics, obstetric history, intimate partner violence, knowledge of preconception care, attitude toward PCC, and social support.

Data Quality Control Measures

The questionnaire was initially written in English, then translated into Amharic (the local language), and then back into English to check its consistency. In order to assess the tool's language, organization, suitability, and feasibility, a pretest was conducted on 5% of pregnant women who attend ANC follow-up in a setting other than the study's (in Koladiba hospital). The primary investigator trained the data collectors and supervisors for a full day on how to gather and record data as well as on the over aim of the study. The questionnaire was regularly reviewed for completion by the supervisors during the actual data collection period.

Data Processing and Analysis

The acquired data were entered into Epi-data version 4.6 and exported SPSS version 25 for analysis. Data recording and coding were carried out. Data were checked for errors, outlying observation, missing observation, and inconsistencies. The descriptive analysis results were shown as frequencies and percentages. Age was described using the mean and standard deviation as it was not skewed. Before conducting a bivariable analysis, the chi-square assumption was evaluated. The Hosmer-Lemeshow test was also performed to check model's fitness. Multicollinearity was checked among variables which had an association with utilization of PCC. In the bivariable analysis, variables with a p-value of less than 0.2 were added to the multivariable regression analysis.

Result

Socio-Demographic Characteristics of Study Participants

In this study, 402 mothers were included, giving a response rate of 98.77%. The mean age of the participants was 27.35 years (SD \pm 4.29) and 61.2% of respondents were between the age group of 25 to 34 years. The majority, (91.8%) and (86.8%) of the women were Orthodox Christians by religion and urban residency respectively. The majority, (97.8%) and more than one third (38.6%) of the study participants were currently married and housewives respectively. Moreover, more than one-third (35.1%)

of pregnant women and nearly half of (48.6%) of their husbands respectively (Table 1). were attend secondary education and attend college and above

Table 1: Socio-demographic characteristics of pregnant women in Gondar town governmental health facilities, Northwest Ethiopia, 2022 (n=402).

Characteristics	Frequency	Percentage
Maternal age in years		
18-24	111	27.6
25-34	246	61.2
≥35	45	11.2
Residence		
Rural	53	13.2
Urban	349	86.8
Religion		
Orthodox	369	91.8
Muslim	27	6.7
Others*	6	1.5
Educational status of the women		
No formal education	86	21.4
Primary(1-8)	38	9.5
Secondary (9-12)	141	35.1
College and above	137	34
Maternal occupation		
Employed (governmental)	100	24.9
Housewife	155	38.6
Self employed	82	20.4
Student	39	9.7
Others ^a	26	6.4
Current marital status		
Married	393	97.8
Single	4	1
Widowed	5	1.2
Husbands' educational status (n=393)		
No formal education	77	19.6
Primary(1-8)	46	11.7
Secondary (9-12)	79	20.1
College and above	191	48.6
Husbands' occupational status (n=393)		
Farmer	48	12.2
Private employee	146	37.2
Government employee	151	38.4
Merchant	42	10.7
Other ^b	6	1.5
Average monthly income (n=402)		
≤1500ETB	27	6.7

1501-2000ETB	39	9.8
2001-2800ETB	3	0.7
>2800ETB	333	82.8

*= Catholic, Protestant a= daily laborer, merchant b= daily laborers

Obstetrics and Reproductive Health Characteristics

More than half, 53.7%, and 52.5% of mothers were multigravida and multiparous, respectively. Most of the respondents (87.8%) and more than three in five (61.2%) planned their pregnancy and on third trimester of pregnancy, respectively. The majority (77.1%) and 73.1% of the respondents had utilized modern

family planning and had husband support on preconception care, respectively. Nearly one-fourth (25.4%) of respondents faced intimate partner violence in current pregnancy. The majority (89.1%) of respondents had no previous adverse pregnancy outcome. Regarding the overall attitude of women towards preconception care, more than half (51.0%) of respondents had favorable attitude (Table 2).

Table 2: Obstetrics, reproductive health and preconception care related characteristics of pregnant women in Gondar town governmental health facilities, Northwest Ethiopia, 2022 (n=402).

Characteristics	Frequency	Percentage
Gravidity		
Primigravida	186	46.3
Multigravida	216	53.7
Parity		
Nulliparous	191	47.5
Multiparous	211	52.5
Trimester of current pregnancy		
1 st Trimester	48	11.9
2 nd Trimester	108	26.9
3 rd Trimester	246	61.2
Current pregnancy planned		
Yes	353	87.8
No	49	12.2
Mode previous delivery (n=216)		
Vaginal delivery	189	87.5
Cesarean delivery	27	12.5
History of abortion (n=216)		
Yes	42	19.4
No	174	80.6
History of stillbirth (n=216)		
Yes	16	7.4
No	200	92.6
Chronic medical illness		
Yes	19	4.7
No	383	95.3
PNC utilization during previous birth (n= 216)		
Yes	86	39.8
No	130	60.2

Ever use modern family planning		
Yes	314	78.1
No	88	21.9
Previous adverse pregnancy outcome		
Yes	44	10.9
No	358	89.1
Husband's support (n=393)		
Yes	294	73.1
No	99	24.6
Availability of unit for preconception care		
Yes	24	6
No	132	32.8
I don't know	246	61.2
Counseling on preconception care previously		
Yes	63	15.7
No	339	84.3
Knowledge on preconception care		
Poor knowledge	52	12.9
Good knowledge	350	87.1
Attitude towards preconception care		
Unfavorable attitude	195	48.5
Favorable attitude	207	51.5
Intimate partner violence		
Yes	102	25.4
No	300	74.6
Social support		
Poor support	187	46.5
Moderate support	184	45.8
Strong support	31	7.7

Preconception Care Utilization

This study showed that 27.9% [95% CI (23.6, 32.5)] of mothers utilized preconception care. The most commonly received preconception care services were being screened and treated for chronic medical diseases (53.6), HIV counseling, testing and initiating HAART (Highly Active Antiretroviral Therapy) (42.9), being screened and treated for STIs (35.7), getting vaccination for tetanus (35.7), taking folic acid supplementation (21.4). The least component mentioned by participants was a cessation of alcohol and cigarettes smoking (8), avoiding teratogenic and illicit drugs (2.7), and (1.8) study participants also weight monitored before conception. The majority (83%) of married study participants reported their husbands' support for preconception screening. Among those who utilized PCC 67.9 percent of mothers received the preconception care service in public hospitals (Figure 1).

Factors associated with Utilization of Preconception Care

To identify factors affecting the utilization of PCC bivariable and multivariable logistic regression analysis was done. After controlling the confounding factors, the multivariable analysis revealed that the following factors have an association with the utilization of preconception care. Those mothers whose age is 35 and above were 3.57 times (AOR=3.57, 95% CI 1.58, 8.09) more likely to utilize preconception care compared to their counterparts. Those mothers who had history of chronic medical illness were 4.70 times (AOR= 4.70, 95% CI 1.72, 12.88) more likely to utilize preconception care compared to mothers who had no history of chronic medical illness. Women who had good knowledge about PCC were 3.23 times (AOR= 3.23 95% CI, 1.15, 9.08) more likely to utilize PCC when compared to their counterparts. Mothers who

had favorable attitudes toward PCC were 1.65 times more likely their counterparts who had unfavorable attitude towards PCC (AOR=1.65 95% CI, 1.01, 2.70) to utilize PCC when compared to (Table 3).

Table 3: Bivariable and multivariable analysis of factors associated with utilization of preconception care among pregnant women in Gondar town public health facilities, northwest Ethiopia, 2022 (n=402).

Variable	Preconception care utilization		COR (95%CI)	AOR (95%CI)
	Yes	No		
Maternal age				
18-24 years	23	88	1	1
25-34 years	68	178	1.46 (0.85, 2.50)	1.34 (0.75, 2.38)
≥35 years	21	24	3.35 (1.59, 7.05)	3.57 (1.58, 8.09)**
Residence				
Rural	10	43	1	1
Urban	102	247	1.77 (0.86, 3.67)	1.18 (0.51,2.72)
Chronic medical illness				
Yes	12	7	4.85 (1.86, 12.66)	4.70 (1.72, 12.88)**
No	100	283	1	1
Ever use modern family planning				
Yes	94	220	1.66 (0.94, 2.94)	0.86 (0.45,1.66)
No	18	70	1	1
Counselling on preconception care previously				
Yes	24	39	1.75 (0.99, 3.08)	1.43 (0.77,2.65)
No	88	251	1	1
Knowledge on preconception care				
Good	107	243	4.14 (1.60, 10.69)	3.23 (1.15, 9.08)*
Poor	5	47	1	1
Attitude towards preconception care				
Favorable attitude	71	136	1.96 (1.25, 3.07)	1.65 (1.01, 2.70)*
Unfavorable attitude	41	154	1	1
Intimate partner violence				
Yes	19	83	1	1
No	93	207	1.96 (1.12, 3.42)	0.55 (0.29, 1.03)
Social support				
Poor support	46	141	1	1
Moderate support	60	124	1.48 (0.94, 2.33)	1.39 (0.84, 2.31)
Strong support	6	25	0.73 (0.28, 1.90)	0.79 (0.28, 2.23)

COR= Crude odds ratio, AOR=Adjusted odds ratio, CI=Confidence interval

*P-value ≤0.05, **P-value ≤0.001

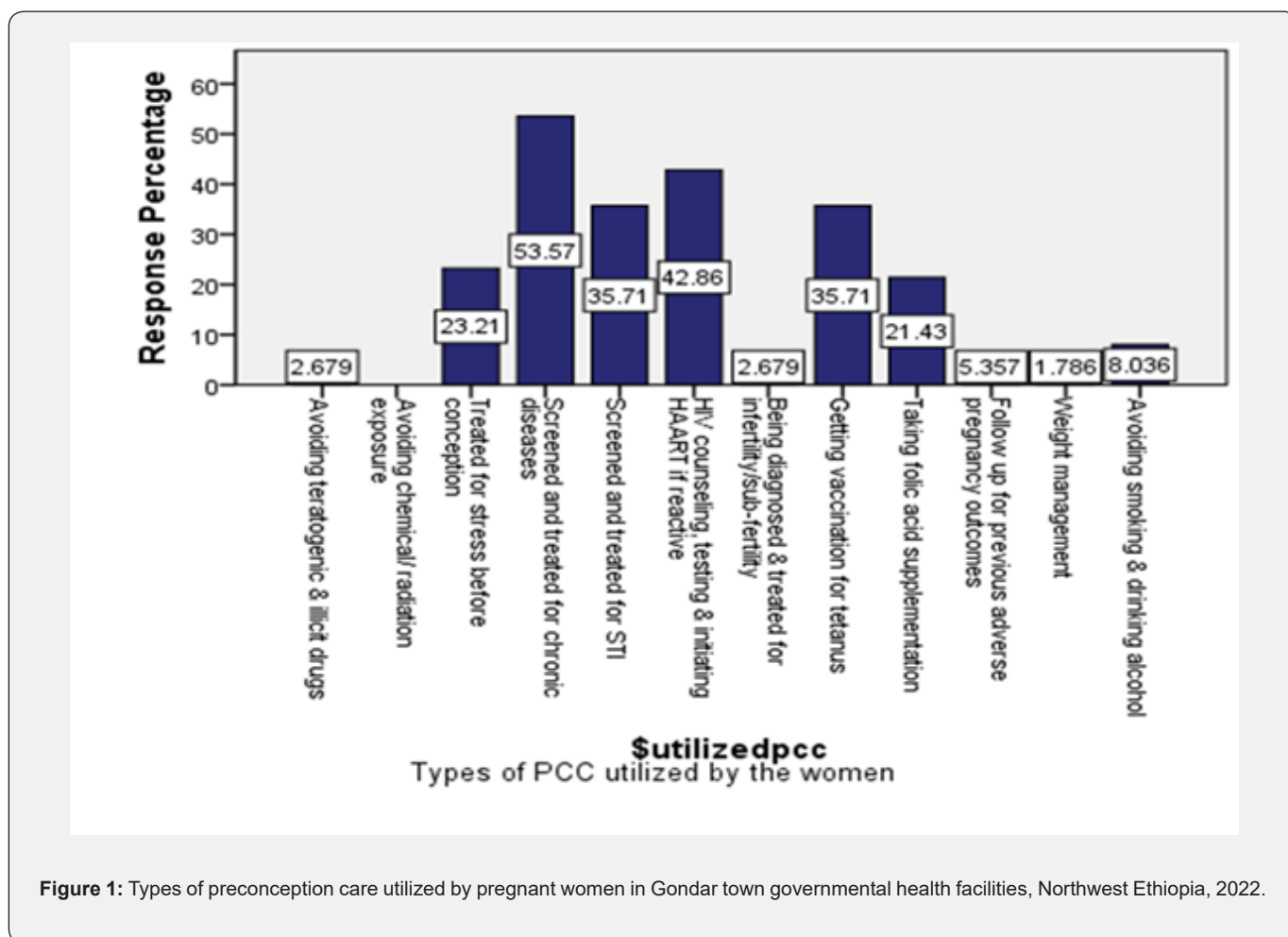


Figure 1: Types of preconception care utilized by pregnant women in Gondar town governmental health facilities, Northwest Ethiopia, 2022.

Discussion

This study revealed that 27.9% of mothers utilized preconception care which was higher than the studies carried out in Nigeria 10.3% [22], French 15.8% [23], Brazil 15.9% [24] and Saudi Arabia 21.5% [25]. The possible reasons for this variation could be due to differences in the study setting and in the study population. This could also be due to differences in the use of maternal and child health services and the time gap between the studies. In addition, the prevalence of preconception care utilization in this study was higher as compared to studies done in Ethiopia including Debre Birhan town 13.4% [15], in Hosanna town 19% [16], in West Shewa zone 14.5% [26], in Adet 9.6% [27], in northern Ethiopia 18.2% [28], Mizan Aman town 16.2% [29], and in West Guji Zone 22.3% [30]. The possible justification for this variation might be due to differences in the study setting, educational status of participants and sociodemographic characteristics of the study participants. For instance, the studies conducted in Hossana town, West Shewa zone, and West Guji zone showed that 24.3%, 17.3%, and 15.5% of study participants attended college and above in their educational status, respectively

whereas, 34 percent of the study participants attended college and above in this study. In fact, the women who get high educational status might have good knowledge and information towards the utilization of preconception care in turn they might have high chance to utilize PCC. Evidence supports that higher educational level increases the utilization of PCC [29]. In addition, the studies conducted in Debre Birhan town, West Showa zone; West Guji zone, northern Ethiopia, Mizan Aman, and Adet town all were community-based studies. So, the higher utilization of PCC in institutional-based study than in community-based studies might be due to social, and cultural barriers in community may decrease utilization of PCC. In addition, the mothers in the institutional-based study may have better health-seeking behavior and service utilization in turn it may increase the utilization of PCC.

The current study is in line with study conducted in Southern Sri Lanka 27.2%. [13], and Kenya 25.8% [31]. On the other hand, the finding of the current study is lower than the study done in Kasnazan, Iraq [32], Iran 33% [33], Kedah, Malaysia 44.0% [34], and Kelantan, Malaysia 45.2%. [14] The discrepancy may be due to the small sample sizes employed in the Kelantan Malaysian study, the study setting, the sociodemographic characteristics of

the study participants, and the different health care systems in these countries. This study showed that maternal age is one of the variables significantly associated with preconception care utilization, women whose age ≥ 35 years were 3.57 times more likely to utilize preconception care than those women whose age 18-24 years. This finding was supported by studies conducted Kedah, Malaysia [34], in Debre Tabor, Ethiopia [35], and Debre Birhan, Ethiopia [15]. The possible explanation might be women with older age may have more information and awareness as well as intention to preconception care utilization [36]. Moreover, women with older age had a high chance for the occurrence of adverse pregnancy outcome like: -hypertensive disorders, diabetes mellitus, caesarean section, and fetal death [37].

The history of chronic medical illness was another important factor that was significantly associated with utilization of preconception care. The odds of preconception care utilization were 4.70 times higher among mothers who had history of chronic medical illness compared to mothers who had no history of chronic medical illness. Similar finding was reported by a study conducted in northern Ethiopia [28]. The possible explanation might be that women with chronic medical illness may have follow-up and more health care service utilization that might have the opportunities to communicate with health care providers and may get counseling for the use of preconception care to prevent maternal and fetal adverse outcomes. Control of chronic diseases is essential for optimizing pregnancy outcomes. Family physicians should work with patients to control conditions such as diabetes mellitus, hypertension, and seizure disorders before pregnancy. In addition, mother's knowledge about preconception care was significantly associated with utilization of preconception care. The odds of preconception care utilization was 3.23 times higher among women who had a good knowledge on preconception care compared to those women who had poor knowledge on preconception care. This finding is consistent with a previous studies conducted in Hossana, Southern Ethiopia, West Shewa zone, Debre Birhan town, MizanAman town, northern Ethiopia, West Guji zone, Oromia, Ethiopia, and a meta-analysis study in Africa [15, 16, 26, 28, 29, 30, 38]. This might be since women who had good knowledge on PCC may have better understanding of the benefit of PCC. Also, women with good knowledge had positive perception towards PCC [39].

Lastly, women's attitude towards preconception care was significantly associated with preconception care utilization. Women who had favorable attitude towards preconception care were 1.65 times more likely to utilize preconception care compared to their counterparts. This finding is consistent with studies done in West Guji zone [30]. This might be due to the fact that if women had favorable attitude towards preconception care they may have intention to utilize PCC and increase its utilization. This could also be because mothers with a positive attitude may

have the opportunity to receive information about the importance of preconception care for the well-being of the mother and children, leading them to rely on the use of PCC.

Conclusion

This study found that the utilization of preconception care in the study area is low. Maternal age ≥ 35 years, having a chronic medical illness, having a good knowledge of utilization of PCC, and having a favorable attitude towards utilization of PCC were independent factors positively affecting the utilization of preconception care. The concerned stakeholders should work to improve the utilization of PCC by improving knowledge and attitude of women towards utilization of the service. Information, health education, and the creation of awareness should be strengthened in communities about preconception care.

Declarations

Ethical Approval and Consent to Participate

The ethical approval letter was obtained from the School of Midwifery on behalf of the University of Gondar Institutional Review Board (IRB). A formal letter of administrative approval was obtained from each health facility in Gondar town. The study participants were then informed about the purpose of the study and the rights of the participants. Finally, prior to the actual data collection, written informed consent was obtained from each participant.

Authors' Contributions

All authors made a significant contribution to the study reported, whether that is in the conception, study design, execution, acquisition of the data, analysis, and interpretation, or in all these areas; took part in drafting, revising, or critical reviewing the article; give final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the study.

Data Availability Statement: The authors declare that the data regarding this manuscript can be accessed as per the request of any interested body from the principal author.

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