KNOWLEDGE AND ATTITUDE TOWARDS PRECONCEPTION CARE AND ASSOCIATED FACTORS AMONG PREGNANT WOMEN AT GENERAL AND COMPREHENSIVE SPECIALIZED HOSPITALS OF EAST GOJJAM ZONE, ETHIOPIA

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ABSTRACT

BACKGROUND: Preconception care is the provision of biomedical, behavioral, and social health interventions to women and couples before conception to improve their health status. Despite its recognized importance in improving maternal and neonatal outcomes, evidence regarding knowledge and attitudes toward preconception care among pregnant women remains limited in Ethiopia.

METHODS: A hospital-based cross-sectional study was conducted in the East Gojjam Zone general and comprehensive specialized hospitals from October 1 to November 10, 2024. A systematic random sampling technique was used to select a total of 423 pregnant women who attended antenatal care. Data were collected using pre-tested and structured questionnaires through face-to-face interviews. Data were entered into Epi Data version4.6, and then exported to SPSS version 27 for analysis. Bi-variable and multivariable logistic regression analyses were performed to identify factors associated with knowledge and attitude of pre-conception care. A p-value < 0.05 with 95% CI was considered as statistically significant.

RESULT: This study revealed that 37% of pregnant women had adequate knowledge and 60.1% had a favorable attitude towards preconception care. Preexisting medical diseases (AOR: 2.33; 95% CI: 1.26, 4.3), prior awareness (AOR: 9.8; 95% CI: 8.45, 17.59), and previous history of stillbirth (AOR: 3.47; 95% CI: 1.08, 11.1) were significantly associated with knowledge of preconception care. Furthermore, preexisting medical diseases (AOR: 2.46; 95% CI: 1.27, 4.76), family planning users (AOR: 1.83; 95% CI: 1.13, 2.96), previous history of abortion (AOR: 2.11; 95% CI: 1.05, 4.22), urban residences (AOR: 3.05; 95% CI: 1.59, 5.87), and knowledge of preconception care (AOR: 2.99; 95% CI: 1.66, 5.38) were significantly associated with a favorable attitude towards preconception care.

CONCLUSION: most pregnant women had inadequate knowledge. Integrating PCC into routine maternal health services through health professional training and community-based awareness campaigns targeting women and couples is essential to improve knowledge and uptake.

KEY WORDS: Preconception care, pregnant women, knowledge, attitude, Ethiopia.

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INTRODUCTION

According to the latest World Health Organization (WHO) guidance, preconception care is biomedical, social, and behavioral care given to a woman or couple prior to conception or during their reproductive years[1]. Assessment of nutritional status, quitting smoking, genetic condition screening, environmental health, infertility screening and management, interpersonal violence, preventing unintended and fast consecutive pregnancies, treatment of sexually transmitted infections, Human immunodeficiency virus prevention and management, mental health, prevention of psychoactive substance use, vaccination, and prevention of female genital mutilation are all included in preconception care packages[2–5]. Preventable preconception risk factors are linked to a number of unfavorable reproductive outcomes, such as low birth weight, congenital abnormalities, and pregnancy loss[6-7]. In Ethiopia, the initial prenatal care (ANC) visit usually happens five months later than anticipated, which is deemed too late to address risk factors [8]. If women are aware of preconception care, they can take advantage of health-seeking behaviors and optimize their health prior to becoming pregnant[9]. The primary reason preconception care is not well-known and used in low-income nations like Ethiopia, despite being an essential component of maternal and child health services, is because its purpose and objective are not generally understood and accepted[10]. Preconception care is essential to minimize a number of risky behaviors and exposures that may impact the development of the fetus and its future results [11]. Most pregnant women may already be too late to prevent some birth abnormalities or placental developmental issues by the time they receive their first prenatal appointment. Early implantation, occurring seven days after conception, marks the beginning of placental development[12–14]. Poor placental development has been linked to preterm birth and preeclampsia, and may also contribute to the development of chronic diseases later in life through fetal programming[14].

The development of vital organs is most critical during the first trimester; additionally, organogenesis occurs throughout the early stages of pregnancy. Neural tube defects are a leading cause of maternal and infant death. Starting folic acid supplementation after neural tube closure (28 days post conception) cannot prevent them[15-17]. Preconception usage of folic acid and multivitamins is a simple and significant preventive factor that influences fetal growth and pregnancy outcomes[18]. Since folic acid supplementation has been shown to be successful in avoiding NTD, it is advised to take it both before conception and during the first trimester of pregnancy[19].

According to WHO, nearly 800 women died every day in 2020 from pregnancy- and childbirth- related preventable causes[20]. Low- and middle-income countries accounted for nearly 95% of all maternal deaths[21]. The Centers for Disease Control (CDC) advises all women of reproductive age to have preconception risk assessments and counseling related to unfavorable pregnancy outcomes as part of their primary healthcare visits[22-27]. According to WHO data, PCC programs have been successfully implemented in low- and middle-income nations, including Bangladesh, the Philippines, and Sri Lanka, as well as high-income nations like Italy, the Netherlands, and the United States[1]. Several previously conducted research studies showed that the level of knowledge of preconception care was low[12,28-30]. Despite global research on preconception care (PCC), evidence on pregnant women's knowledge and attitudes remains limited in the study area. Previous studies have largely focused on healthcare providers, women with chronic diseases, and folic acid supplementation[32-34]. This study addresses these gaps by assessing pregnant women's knowledge and attitudes toward PCC, including modifiable risk behaviors affecting maternal and infant health and pregnancy outcomes.

METHODS

Study design, setting and population

A hospital based cross sectional study was conducted between October 1 and November 10, 2024, in

East Gojjam Zone, Northwest Ethiopia. The zone has one comprehensive specialized hospital (Debre Markos Comprehensive Specialized Hospital, DMCSH) and one general hospital (Motta General Hospital).. The source population consisted of all pregnant women attending antenatal care (ANC) follow up at DMCSH (N = 900) and Motta General Hospital (N = 630) during the study period, giving a total of 1530 women.

Sample Size and sampling procedure:

The sample size was calculated using the estimated proportions for knowledge, attitude, and other key variables, and the largest calculated sample size was selected for the study. Therefore, the final calculated sample size is 423. A systematic random sampling technique was used to include the study participants. The first pregnant woman was selected randomly by using a lottery method in each selected hospital.

Operational definition

Preconception care — any intervention, including advice, treatment, or lifestyle modification, provided before pregnancy or during the inter pregnancy period[23].

Adequate knowledge — Respondents scoring greater than or equal to the mean on seven binary knowledge questions (Yes = 1, No = 0; total score range 0–7)

Those scoring ≥ mean were categorized as having adequate knowledge (23).

Inadequate knowledge — Respondents scoring below the mean on the same seven binary knowledge questions[23].

Favorable attitude — Respondents scoring greater than or equal to the mean on eight Likert scale attitude questions (Strongly Disagree = 1 to Strongly Agree = 5; total score range 8–40).

Those scoring ≥ mean were categorized as having a favorable attitude[25].

Unfavorable attitude — Respondents scoring below the mean on the same eight Likert scale questions[25].

Family size — the total number of individuals living in the household, including parents and children.

Data collection

Data were collected using a structured, interviewer administered questionnaire. The instrument assessed socio demographic characteristics, obstetric history, preexisting medical conditions, sources of information, and knowledge and attitudes toward preconception care. The questionnaire was initially prepared in English, translated into Amharic, and back translated to ensure consistency. Data collectors were BSc qualified health professionals who received two days of training on ethical considerations, questionnaire administration, and participant handling. Continuous supervision was provided by the principal investigator.

Data quality control

The questionnaire was developed based on a review of the literature (24, 34-36), translated into Amharic, and back-translated into English to ensure consistency, and pretested among 5% of the target sample at Debre Markos Health Center, and necessary modifications were made based on the findings. Data collectors and supervisors received two days of training and the principal investigator conducted regular supervision to ensure data completeness and consistency. Incomplete questionnaire were excluded, and likewise deletion was applied for missing values in regression analysis; no imputation was performed.

Data processing and analysis

The collected data were first checked manually for completeness, clarity, and missing values before entry. After verification, the data were coded and entered into EpiData version 4.6 and subsequently exported to SPSS version 27 for statistical analysis. Descriptive statistics, including frequencies, percentages, means, and medians, were used to summarize socio demographic, obstetric, and health characteristics of the study participants. For inferential analysis, bivariate logistic regression was initially performed to identify candidate variables associated with knowledge and attitudes toward preconception care, using a threshold of $p < 0.25$. Variables meeting this criterion were then entered

into a multivariable logistic regression model to determine independent predictors, with statistical significance set at $p < 0.05$. Both crude odds ratios (CORs) and adjusted odds ratios (AORs) with their corresponding 95% confidence intervals were reported. Knowledge and attitude scores were dichotomized at the mean, consistent with maternal health research in Ethiopia and other low and middle income countries where validated PCC scales are unavailable (Demisse et al., 2019; Hassen & Lelisho, 2022). The mean cut off was selected because it reflects the central tendency of the sample, ensuring balanced classification into above average and below average groups. In psychometric practice, mean based dichotomization is considered a pragmatic approach when validated thresholds are lacking, as it minimizes bias compared to arbitrary cut offs and supports epidemiological utility. This approach is also consistent with WHO and CDC recommendations for maternal health surveillance where standardized thresholds are unavailable. To ensure robustness of the statistical models, the Hosmer–Lemeshow goodness of fit test was applied to assess model fitness, and multicollinearity among independent variables was evaluated using the variance inflation factor (VIF). Results were presented in both text and tables, with clear separation between data analysis and data presentation to avoid redundancy and enhance readability.

RESULTS

Socio-demographic characteristics:

Although 423 women were eligible a total of 416 pregnant women participated in the study, yielding a response rate of 98.3%. The majority of participants (59.6%) were between 25 and 34 years of age. Among (15-24) years women 11 (13.3%) were below 18 years old. Regarding education, 39.9% had attained above secondary school level. Most respondents (94.7%) were married, and 40.6% were housewives. In terms of husbands' characteristics, 45.7% had education above secondary school, and 35.8% were government employees. Concerning residence, 74.5% of participants lived in urban areas, while 25.5% resided in rural areas (Table 1).

Table 1: Distribution of study subjects by socio-demographic characteristics among pregnant women attending ANC in east Gojjam general and comprehensive specialized hospitals, North West, Ethiopia, 2024 (N=416) .

Characteristics	Category	Frequency (N)	Percent
Age	15-24	83	20%
	25-34	248	59.6%
	35-49	85	20.4%
Educational status of women	No formal edu	88	21.2
	Primary edu	71	17.1
	Secondary edu	91	21.9
	Above secondary edu	166	39.9
Marital status	Married	394	94.7
	Single	14	3.4
	Divorced	6	1.4
	Widowed	2	0.5
Occupation	House wife	169	40.6
	Gov.t employ	86	20.7
	Market trade (local sale)	74	17.8
	Daily labourer	12	3.8
	Farmer	58	13.9
	Private	1	0.2
	Students	16	3.8
Income	<1000 Birr	2	0.5
	1000-3000 Birr	22	5.3
	3000-5000 Birr	57	13.7
	>5000 Birr	87	20.9
	Do not know	248	59.6
Husband education	No formal	56	13.5
	Primary	95	22.8
	Secondary	75	18
	Above secondary	190	45.7
Husband occupation	Gov.t employ	149	35.8
	Market trader (Whole sell)	121	29.1
	Daily labourer	43	10.3
	Student	6	1.4
	Farmer	65	15.6
	Private	10	2.4
	Others	22	5.3
Family size	<4	4	1%
	>=4	412	99%
Residence	Rural	106	25.5
	Urban	310	74.5

Obstetric and gynecologic characteristics:
More than half, 310 (74.5%), of respondents had at least a history of one pregnancy, and 249 (59.9%) of them had fewer than 2 living children. The majority, 262 (63%), had a history of family planning use. Seventy-four (17.8%) and 32 (7.7%) had a previous history of abortion and stillbirth, respectively. The majority, 297 (71.3%), had TV as a source of information (see table 2 below).

Table 2: Obstetrics and gynecologic characteristics among pregnant women attending ANC in East Gojjam general and comprehensive specialized hospitals, Northwest, Ethiopia, 2024 (N=416)

Variables	Label	Frequency	Percent
Gravidity	Primi gravida	106	25.5
	Multi gravida	310	74.5
Parity	Primi para	249	59.9
	Multi para	167	40.1
Abortion	Yes	74	17.8
	No	342	82.2
Still birth	Yes	32	7.7
	No	384	92.3
Preterm birth	Yes	21	5.0
	No	395	95.0
Congenital abnormality	Yes	10	2.4
	No	406	97.6
Neonatal death			
	Yes	23	5.5
	No	393	94.5
Contraceptive use	Yes	262	63.0
	No	154	37.0
Source of information (multiple responses)		TV	297 71.3
	Mobile	320	76.9
	Radio	15	3.6
	None	91	21.9

Note: Multiple responses were allowed; therefore, totals exceed N = 416.

Health status of the women:

Ninety-six (23.1%) of respondents had chronic health problems, and from those who had chronic health problems, 60 (62.5%) of them were hypertensive patients. Among these 47 (78.3%) received counseling, 39 (65%) regular exercise, 4 (6.7%) diabetes control, 1 (1.7%) cessation of alcohol, and 4 (6.7%) changed medication (see table 3 below).

Preconception care knowledge scores

185 (44.5%) of women had heard about preconception care before. For those women who had heard about preconception care, the major source of information was health workers 117 (63.2%). Among the participants, 39.9% of women said that preconception care is needed for women only. More than half, 241 (57.9%), of women responded that preconception care is important for the baby and mother, and the majority of women, 297 (71.4%), said that preconception care benefits couples. Levels of women's knowledge of preconception care were measured using 7 knowledge questions. From the participants, 154 (37.0%) and 262 (63%) of women had adequate and inadequate knowledge, respectively (table 4 below).

Table 4: knowledge of preconception care among pregnant women attending ANC in east Gojjam general and comprehensive specialized hospitals, North West, Ethiopia, 2024 (N=416)

Variables	Options	Frequency (N)	Percent
Ever heard	Yes	185	44.5
	NO	231	55.5
Information heard (n=185)	Health workers	117	63.2
	School	7	3.8
	Mass media	37	20
	Friends and families	26	14.1
Preconception care needed	For women only	166	39.9
	For men and women	149	35.8
	Do not know	101	24.3
Preconception care important	For baby only	9	2.2
	For mother only	52	12.5
	For the baby and mother	241	57.9
	Don't know	114	27.4
Preconception benefits couples	Yes	297	71.4
	No	119	28.6
Knowledge	Adequate	154	37
	Inadequate	262	63

Attitudes towards preconception cares

Among the total participants, 151 (36.3%) respondents agreed and 128 (30.8%) strongly agreed that preconception care is important for reproductive-age women. Additionally, one hundred forty-nine (35.8%) agreed and 131 (31.5%) strongly agreed that preconception care is important for achieving a healthy pregnancy. Regarding service provisions, 124 (29.8%) agreed that government facilities are better suited to provide pre-conception care. One hundred forty-one (33.9%) of respondents agreed that preconception is important for planning pregnancy, and 140 (33.7%) agreed that preconception helps one to prepare better for future pregnancy outcomes.. According to this study, the mean for attitude questions score was 1.4.. Of the

participants, 250 (60.1%) had a favorable attitude, while 166 (39.9%) had an unfavorable attitude (see table 6 below).

In this study, marked disparities emerged between urban and rural participants. Women residing in urban areas were significantly more likely to demonstrate favorable attitudes toward preconception care compared to their rural counterparts, underscoring inequities in access to information and services. Similarly, educational attainment played a critical role: women with higher levels of education were more likely to have adequate knowledge, while those with no formal schooling were disproportionately represented among those with inadequate knowledge. Chronic health conditions also influenced awareness, as women with preexisting medical diseases reported higher knowledge and attitude scores, likely reflecting greater contact with health services. Sources of information further revealed inequities: while television and mobile phones were dominant channels, rural women had limited access to these platforms, leaving them more vulnerable to gaps in knowledge. These findings highlight structural inequities in maternal health information dissemination and service utilization.

Table 5: attitude of preconception care among pregnant women attending ANC in east Gojjam General and comprehensive specialized hospitals, North West, Ethiopia, 2024 (N=416)

Variables	Option	Frequency	Percent (%)
PCC is important for RH-age women	Strongly agree	128	30.8
	Agree	151	36.3
	Neutral	96	23.1
	Disagree	19	4.6
	Strongly disagree	22	5.3
PCC implies pregnancy	Strongly agree	131	31.5
	Agree	149	35.8
	Neutral	99	23.8
	Disagree	16	3.8
	Strongly disagree	21	5.0
Government facilities are the best place for PCC	Strongly agree	103	24.8
	Agree	124	29.8
	Neutral	124	29.8
	disagree	45	10.8
	Strongly disagree	20	4.8
Private health facilities are the best place for PCC	Strongly agree	83	20
	Agree	103	24.8
	Neutral	131	31.5
	Disagree	68	16.3
	Strongly disagree	31	7.5
PCC is an important time to ensure good health	Strongly agree	125	30
	Agree	130	31.3
	Neutral	120	28.8
	Disagree	22	5.3
	Strongly disagree	19	4.6
PCC is important for planning your pregnancy	Strongly agree	128	30.8
	Agree	141	33.9
	Neutral	115	27.6
	Disagree	12	2.9
	Strongly disagree	20	4.8
PCC helps us to prepare better for future pregnancy outcomes	Strongly agree	129	31.0
	Agree	140	33.7
	Neutral	113	27.2
	Disagree	14	3.4
	Strongly disagree	20	4.8
Health workers are the best people to provide PCC	Strongly agree	132	31.7
	Agree	144	34.6
	Neutral	107	25.7
	Disagree	13	3.1
	Strongly disagree	20	4.8

Factors associated with knowledge of preconception care.

Bi-variable analysis identified several factors associated with knowledge of preconception care (PCC), with a p-value <0.25. These factors included age, educational status, gravidity, history of abortion, stillbirth, preterm birth, neonatal death, contraceptive use, awareness of PCC, husband support, and preexisting medical diseases. These variables were included in the final multivariable logistic regression model. In multiple logistic regression analyses, three factors were found to have statistically significant independent associations with knowledge of PCC. Preexisting medical diseases, awareness of PCC, and previous history of stillbirth were found to be factors associated with knowledge of pre-conception care.

As shown in the table below, women with preexisting diseases were two times more likely to have adequate knowledge about preconception care than women with no preexisting medical diseases (AOR: 2.33; 95% CI: 1.26, 4.30). Women who had prior awareness about preconception care were ten times more likely to have adequate knowledge about preconception care than women who had not heard about preconception care yet (AOR: 9.8; 95% CI: 8.45, 17.59). Women who had a previous history of stillbirth were approximately four times more likely to have adequate knowledge about preconception care than women who had not had a previous history of stillbirth (AOR: 3.47; 95% CI: 1.01, 11.1) (table 6 below).

Table 6: Factors associated with knowledge of preconception care among pregnant women in east GOJJAM general and comprehensive specialized hospitals, North West, Ethiopia, 2024.

Variables	Category	Knowledge of PCC Good	Poor	P value	COR,95% CI	P value	AOR,95% CI
Age	15-24	20	63	0.09	2.428 (1.254,4.703)	0.545	0.753(0.299,1.891)
	25-34	97	151	0.474	1.200(0.729,1.976)	0.250	0.669(0.338,1.327)
	35-49	37	48		1	1	1
Educational status	No formal edu	33	55	0.657	1.128 (0.663,1.919)	0.548	1.241(0.614,2.508)
	Primary edu	21	50	0.117	1.611 (0.887,2.926)	0.385	1.405(0.653,3.026)
	Secondary edu	33	58	0.520	1.189 (0.702,2.017)	0.793	1.095 (0.557,2.151)
	Above secondary edu	67	99		1	1	1
Ever heard	Yes	124	61		1	1	1
	No	30	201	<0.001	0.073(0.045,0.120)	<0.001	9.795(5.454,17.588)
Husband support	Yes	93	91		1	1	1
	No	61	171	<0.001	0.349 (0.231,0.527)	0.559	0.844(0.478,1.490)
Pre-existing medical diseases	Yes	65	31		1	1	1
	No	89	231	<0.001	0.184 (0.112,0.301)	0.007	2.329(1.263,4.295)

Variables	Category	Knowledge of PCC Yes	No	P value	COR,95% CI	P Value	AOR,95% CI
Number of pregnancy	<2	26	80	0.002	2.164 (1.317,3.557)	0.371	1.348(0.701,2.592)
	>=2	128	182		1	1	1
History of abortion	Yes	43	31		1	1	1
	No	111	231	<0.001	0.346(0.207,0.579)	0.794	1.095(0.555,2.159)
History of still birth	Yes	26	6		1	1	1
	NO	128	256	<0.001	0.115(0.046,0.287)	0.036	3.465 (1.082,11.100)
History of preterm birth	Yes 18	3		1	1	1	
	NO	136	259	<0.001	0.088(0.025,0.302)	0.199	2.892 (0.573,14.600)
History of congenital abnormality	Yes 8	2		1	1	1	
	NO	146	260	0.014	0.140(0.029,0.670)	0.538	1.794(0.280,11.509)
History of neonatal death	Yes 12	11		1	1	1	
	No	142	251	0.127	0.519(0.223,1.206)	0.367	0.583 (0.180,1.8850
History of contraceptive use	Yes	91	171		1	1	1
	No	63	91	0.208	1.301(0.864,1.960)	0.645	0.882(0.516,1.507)

Factors associated with attitude of preconception care

Bi-variable analysis showed that factors such as age, educational status, husband education, abortion, stillbirth, preterm birth, residence, contraceptive use, ever heard, husband support, and preexisting medical diseases had a p-value <= 0.25 and were taken into the final model. In multiple logistic regressions, five factors were found to have an independent association with an attitude of PCC. Preexisting medical diseases, previous history of abortion, residences, contraceptive use, and knowledge were found to be factors associated with an attitude of preconception care. Women with preexisting diseases are three times more likely to have a favorable attitude towards preconception care than women with no preexisting medical diseases (AOR: 2.458; 95% CI: 1.271, 4.756). Women who had used family planning were two times more likely to have a favorable attitude towards preconception care than women who had not used family planning yet (AOR: 1.8; 95% CI: 1.10, 2.96). Women who had a previous history of abortion two times had a more favorable attitude towards preconception care than women who had not had a previous history of abortion (AOR: 2.11; 95% CI: 1.01, 4.22). Women who came from urban areas were three times more likely to have a favorable attitude towards preconception care than women who came from rural areas (AOR: 3.05; 95% CI: 1.59, 5.87). Women who had adequate knowledge were approximately three times more likely to have a favorable attitude towards preconception care than their counterparts (AOR: 2.99; 95% CI: 1.66, 5.38) (table 7).

Table 7: Factors associated to attitude of preconception care among pregnant women attending ANC in east Gojjam general and comprehensive specialized hospitals, North West, Ethiopia, 2024

Variables	Category	Attitude of PCC		P Value	COR,95%CI	P value	AOR, 95%CI
		Favourable	Unfavourable				
Age	15-24	48	35	0.628	0.628 (0.467,1.582)	0.948	1.026(0.479,2.195)
	25-34	156	92	0.153	0.696(0.423,1.145)	0.740	0.899(0.478,1.689)
	35-49	46	39	1	1	1	1
Educational status	No formal edu	33	55	<0.001	3.187(1.862,5.455)	0.148	1.971(0.786,4.944)
	Primary edu	46	25	0.897	1.0399(0.580,1.862)	0.803	0.910 (0.434,1.910)
	Secondary edu	62	29	0.688	0.894(0.519,1.543)	0.549	0.820 (0.429,1.568)
	Above secondary edu	109	57	1	1	1	1
Husband edu	No formal Edu	22	34	0.002	2.649 (1.437,4.885)	0.488	1.433 (0.518,3.961)
	Primary Edu	56	39	0.491	1.194 (0.721,1.976)	0.165	0.598(0.290,1.236)
	Secondary	52	23	0.343	0.758(0.428,1.344)	0.271	0.683(0.346,1.347)
	Above secondary Edu	120	70	1	1	1	1
Residence	Rural	42	64	<0.001	3.107 (1.970,4.901)	<0.001	3.050 (1.586,5.866)
	Urban	208	102	1	1	1	1
Ever heard	Yes	129	56	1	1	1	1
	No	121	110	<0.001	0.478 (0.318,0.717)	0.402	0.773(0.424,1.410)
Husband support	Yes	125	59	1	1	1	1
	No	125	107	0.004	0.551(0.368,0.825)	0.503	1.189(0.716,1.977)
Pre-existing medicalNO diseases	Yes	75	21	1	1	1	1
	175	145	<0.001	0.338 (0.199,0.575)		0.008	2.458 (1.271,4.756)

Variables	Category	Attitude of PCC		P value	COR,95% CI	P Value	AOR,95%CI
		Favourable	Unfavourable				
Abortion	Yes	56	18	1	1	1	1
	No	194	148	0.003	0.421(0.238,0.747)	0.036	2.105 (1.050,4.219)
Still birth	Yes	23	9	1	1	1	1
	No	227	157	0.161	0.566 (0.255,1.255)	0.797	0.863(0.281,2.650)
Preterm birth	Yes	17	4	1	1	1	1
	No	233	162	0.	0.338 (0.112,1.024)	0.166	2.925(0.640,13.376)
Congenital anomalies	Yes	9	1	1	1	1	1
	No	241	165	0.086	0.162(0.020,1.293)	0.096	7.512 (0.701,8.498)
Contraceptive use	Yes	170	92	1	1	1	1
	No	80	74	0.010	0.585(0.390,0.877)	0.013	1.831 (1.134,2.956)
Knowledge	Adequate	118	36	1	1	1	1
	Inadequate	132	130	<0.001	0.310(0.199,0.483)	<0.001	2.986(1.658,5.379)

DISCUSSION

This study revealed that 154 (37%) of pregnant women had adequate knowledge of preconception care. This finding is consistent with a study conducted in Mizan Aman town, where 39.8% of women demonstrated good knowledge[9]. However, it is higher than the study in Adet town (27.5%)[12] and Nepal (15.5%)[27]. The variation may be explained by differences in study settings and populations. The current study was hospital based among pregnant women, whereas the Adet study was community based among reproductive age women. Women in contact with healthcare providers are more likely to receive information about PCC, as reflected in the higher proportion of participants in this study (44.5%) who had heard of PCC compared to 31.8% in Adet. Conversely, our finding was lower than studies in West Shoa Zone (48.2%)[28] and Jordan (48.6%)[26], likely due to differences in study populations. The West Shoa study was conducted among healthcare providers, who naturally have greater awareness of PCC than the general public.

Regarding attitudes, 250 (60.1%) of pregnant women in this study had favorable attitudes toward PCC. This is comparable to Mizan Aman (52.4%)[9], but lower than West Shoa (71%)[28] and Nigeria (98.5%)[15]. The difference may be attributed to study populations, as healthcare providers in West Shoa and Nigeria may have more favorable attitudes due to professional exposure. However, our finding was higher than studies in the Amhara region (50.2%)[29] and Jordan (48.1%)[26], possibly due to differences in sample size and study setting. The current study included 422 pregnant women, while the Jordanian study involved 1,368 reproductive age women, among whom awareness may be diluted.

The disparities observed in this study reflect broader inequities in maternal health services in Ethiopia. Urban residence, higher education, and prior health system contact were consistently associated with better knowledge and attitudes toward preconception care, suggesting that rural, less educated, and healthier women are systematically disadvantaged. This inequity

perpetuates cycles of poor maternal and neonatal outcomes, as those most in need of preventive interventions are least likely to access or understand them. Comparisons with other low and middle income countries reveal similar patterns, where PCC uptake is uneven and often concentrated among urban and educated populations. Structural barriers such as late initiation of antenatal care, limited rural outreach, and reliance on mass media rather than direct counseling exacerbate these inequities. Furthermore, the perception that PCC is "for women only" highlights a gender equity gap, as male involvement remains minimal despite evidence that couple based interventions improve outcomes. Addressing these inequities requires policy interventions that integrate PCC into routine maternal health services, expand rural outreach, and promote male participation.

Several factors were independently associated with knowledge of PCC. Women with preexisting medical conditions were twice as likely to have adequate knowledge compared to those without (AOR: 2.33; 95% CI: 1.26, 4.23), consistent with findings from the Amhara region[29]. This may be due to routine follow up visits that increase awareness of risks before pregnancy. Similarly, women who had ever heard of PCC were nearly ten times more knowledgeable (AOR: 9.8; 95% CI: 8.45, 17.59), in line with North Wollo findings[30]. Prior history of stillbirth was also strongly associated (AOR: 3.47; 95% CI: 1.1, 11.1), supported by Mizan Aman[31], likely reflecting heightened risk awareness among women with adverse pregnancy outcomes.

Attitude was influenced by five independent factors: preexisting medical diseases, previous history of abortion, residence, contraceptive use, and knowledge. Women with chronic conditions were three times more likely to have favorable attitudes (AOR: 2.46; 95% CI: 1.27, 4.76), consistent with West Shoa (28) and Amhara[29]. Family planning users were nearly twice as likely to have favorable attitudes (AOR: 1.83; 95% CI: 1.13, 2.96), echoing findings from Amhara (29). Previous abortion history also increased favorable attitudes (AOR: 2.11; 95% CI: 1.05, 4.22), supported by West Shoa (28). Urban residence was strongly associated (AOR: 3.05; 95% CI: 1.59, 5.87), consistent with Jordanian findings[24], likely due to greater access to mass media and health promotion in urban areas. Finally, adequate knowledge was a strong predictor of favorable attitudes (AOR: 2.99; 95% CI: 1.66, 5.38), consistent with West Shoa (28) and Amhara[29], underscoring the importance of awareness in shaping attitudes and behaviors.

Strengths and limitations of the study

Limitation of studies

The cross-sectional design precluded causal inferences. Despite measures to minimize social desirability bias, including private interviews, control questions, and clear explanations of the study objectives and confidentiality, some bias may have persisted.

CONCLUSION AND RECOMMENDATIONS

Only 37% of pregnant women had adequate knowledge of preconception care (PCC), while 60.1% demonstrated a favorable attitude, highlighting a substantial knowledge–attitude gap. These findings underscore the need to integrate PCC into Ethiopia's maternal and reproductive health services. The Ministry of Health should strengthen guideline implementation, health professional training, and monitoring of equitable PCC access. Targeted community-based education should prioritize rural and less-educated women. Health extension workers and mass media should be leveraged to improve awareness and service utilization. Integrating PCC into existing services and promoting couple-based counseling may enhance accessibility and shared responsibility. Future research should assess PCC practices and barriers among underserved populations.

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Abbreviations and acronyms

AIDS: Acquired Immune Deficiency Syndrome,
ANC: Ante Natal Care, BSc: Bachelor of Science,
CDC: communicable diseases control,
CI: confidence interval,
DM: diabetes mellitus,
EDU: Education,
ETB: Ethiopian birr,
FA: folic acid,
HTN: hypertension,
NTD: neural tube defect,
PCC: preconception care,
OR: odds ratio,
SRS: simple random sampling,
SPSS: Statistical Product and Service Solutions,
RH: reproductive age,
UN: United Nations,
WHO: World Health Organization.

Declarations

Ethical consideration

Prior to data collection, participants were informed about the study's objectives, potential benefits, and their right to decline participation. Written informed consent was obtained from all respondents. Ethical clearance and approval letter to conduct the study was obtained from the Debre –Markos University, College of Medicine and Health Sciences institutional review committee with RCSTTD/390/01/17 references number.

Data availability- the data that support the findings of this study are available from the cross ponding author up on a reasonable request.

Author's contribution:

TB designed the study, develop proposal, data analysis, final thesis, and manuscript writing. AT, FA, WA, MT edit the proposal, data analysis with cross ponding authors and finally approved the paper. MJ, DS, AS, BW searched literatures and collected data.

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